ON THE PRESENT PERFECT IN GERMAN

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I. INTRODUCTION

1. Outline

The present perfect in German has been investigated intensely in the past, with the result that today there is little doubt about what the most pressing problems concerning its semantics are. At least the following points are not yet settled in a widely accepted analysis of the construction:

- whether, or: to which extent, the present perfect can be given a compositional semantic analysis;
- whether the present perfect in German is a tense or an aspect or both or maybe switching back and forth between a temporal and an aspectual reading;
- how the numerous readings of the construction come about;
- what the relationship between the present perfect and the simple past tense is like, and especially, why they can sometimes be substituted for each other and sometimes not;
- in how far the German present perfect differs from the present perfect in other languages;
- how temporal adverbials interact with the present perfect.

Compared to the number and complexity of the open questions concerning the present perfect, what is known about it for sure is little: it is morphosyntactically complex, and it expresses some kind of anteriority.

The goal of this book is to provide a more or less complete description of the behavior of perfect constructions in general, and the present perfect in particular, in German and to propose an analysis of the construction that provides answers to the open questions listed above. In order to reach this goal, it will be necessary to illuminate the semantics and pragmatics of the present perfect as well as its historical development, its morphosyntactic composition, and some of the phonological characteristics of its morphosyntactic components. The relevant literature will be discussed issuewise in the course of the book as we tackle the various problems related to the construction. The book proceeds as follows.

The second chapter, THE SEMANTICS OF THE PRESENT PERFECT, aims at providing an outline of the semantics of the present perfect. Specifically, it will be shown that the present perfect is not an ambiguous tense/aspect-form. Rather, it has a uniform and (more or less) compositional semantics. For presentational reasons, the formal semantics that is offered as the result of this chapter will disregard the interaction of the present perfect with temporal adverbials; the idea is that the complete semantics of the form can be better developed step by step in the course of the book. Taking up the common and correct intuition that the present perfect, the past perfect, and the future perfect function analogously, also the semantics of these other two perfect constructions will be sketched.
Chapter III, THE MEANING EFFECTS OF THE PRESENT PERFECT, is concerned with the different readings of the present perfect. Given the claim that the present perfect is an unambiguous form, the question must be raised how the different readings of the present perfect can be explained. I propose that the different readings can be best explained in a pragmatic account. The idea is that in German present perfect constructions, the reference time as well as the situation time can be assigned topical status. By varying the choice of the topical times of present perfect clauses as well as exploiting different possibilities for assigning them concrete values, many (if not all commonly discussed) readings of the construction can be captured. (What does it depend on whether a language can assign topical status to both the reference time and the situation time?) Since some readings of the present perfect in German are ultimately almost identical to past tense readings, I will discuss the similarities and differences between the present perfect and the past tense in German and sketch the range of readings and uses of both forms where they can substitute each other. The role of topicality suggests that the dependence of present perfect constructions on various concrete types of contexts should be discussed in this chapter, too. Moreover, I will show that my account is more adequate than other accounts, especially Klein's scope account. The chapter ends with an improvement of the formal semantics presented in chapter II.

Chapter IV, ENGLISH AND GERMAN, focuses on the difference between the present perfect in German and English. It aims at pointing out the synchronic differences again and in detail and seeks possible causes for the different historical developments. Also (?), it will be concerned with differences concerning the present tense. How come the present perfect in German is what it is? - Chapter IV aims at providing a survey of the historical development of the construction, mainly by summarizing results from other studies. Also, the historical development of the present perfect in other Germanic languages will be reviewed and compared to the one in German - this being important for the discussion in the remainder of the chapter. It has been claimed that in Frühneuhochdeutsch, some crucial changes concerning the present perfect occur. Thus, the ability to have past tense readings has been claimed to have developed then (Oubouzar), and the ability to occur with modal auxiliaries (Grønvik). As far as the first claim is concerned, I cannot see that it is adequate (data in Dentler). To me it seems that past-tense-readings occur as early as in Notkers writings (until 1022). In any case, the phenomena mark important differences to the present perfect in other Germanic languages, e.g. English. I want to investigate whether the historical development of differences can be traced back to reasonable independent triggers.

Chapter V, INTERACTIONS WITH ADVERBIALS, is about the interactions between the present perfect and temporal adverbials. It aims at providing a semantics that fits everything together.

Chapter VI, THE CONTRIBUTION OF PARTICULAR ADVERBIALS, looks in more detail at the semantic contribution of individual temporal adverbials. It concentrates especially on some adverbials whose semantic contribution is somewhat mysterious.

Chapter VII, THE PRESENT PERFECT IN SUBORDINATE TEMPORAL CLAUSES, integrates the account of the present perfect into an account of temporal clauses and augment the semantics reached in the preceding chapter accordingly. I am especially interested in explaining why the present perfect or the past tense are acceptable in some types of clauses but unacceptable in others.
Before I start the discussion of the present perfect as such, let me introduce in
the remainder of this chapter a basic framework of temporal semantics. In the next
few sections, I will intuitively characterize the functioning of tense, aspect, and
temporal specifications (sections 2 and 3). The simple tenses of German, i.e. the
present tense ('Präsenz'), the past tense ('Präteritum'), and the future tense (which is
technically speaking not a simple tense but composed of the auxiliary werden
('become') and the present tense) will be briefly introduced and some important
features of their semantics will be mentioned (section 4). For later purposes, it will be
necessary to also introduce some apparent side issues related to tense semantics -
namely, some issues of pragmatics that will prove inevitable in order to explain tense
effects: the implicatures and presuppositions related to temporal interpretation
[section 5]. Finally, in section 6, I will sketch how the intuitive approach in sections
2-5 may be packed into a formal semantic representation.

2. Tense and aspect

Reichenbach (1947) describes tenses as relations holding between three points of
time - the UTTERANCE TIME (TU) of an uttered clause; the time at which the
situation described in the clause takes place, i.e. its SITUATION TIME (TS); and its
REFERENCE TIME (R).\footnote{Reichenbach uses the terms speech time (S) and event
time (E) instead of utterance time (TU) and situation time (TS). I want to avoid the term event
time because "event" is a term that is still under discussion and used differently in the
literature. For example, according to many terminologies, it is only applicable to achievements
and accomplishments. Thus the term "situation" seems much less problematic and more
general. Since the abbreviation TS for "situation time" could then easily be confused with the abbreviation S for "speech time", I also
switch to the term "utterance time".} While the notions of utterance time and situation time are
intuitively clear, the notion of reference time is more abstract. It may be characterized
as the temporal point of view on the situation. On the basis of TU, TS, and R,
Reichenbach defines the set of all possible times. The main idea of this approach is
that TU, TS, and R can stand in all logically possible temporal order relations to each
other, i.e. each pair of them can precede or follow each other, or coincide. The
diagrams in (2-1) illustrate this for the simple tense and complex perfect tense
constructions in English, where temporal coincidence is indicated by a comma.\footnote{Cf. Binnick (1991:111ff.).}

\begin{align}
\text{(2-1)} & \quad \text{PAST PERFECT} & \quad \text{SIMPLE PAST} & \quad \text{PRESENT PERFECT} \\
& \quad \text{I had seen John} & \quad \text{I saw John} & \quad \text{I have seen John} \\
\text{TS} & \quad \text{R} & \quad \text{TU} & \quad \text{R,TS} & \quad \text{TU} & \quad \text{TS} & \quad \text{R} \\
\text{PRESENT} & \quad \text{I see John} & \quad \text{SIMPLE FUTURE} & \quad \text{FUTURE PERFECT} \\
\text{TU,TS} & \quad \text{TU} & \quad \text{R,TS} & \quad \text{TU} & \quad \text{TS} & \quad \text{R} \\
\end{align}

Reichenbach's three point system has been criticized, used, or improved in various
versions by many linguists (e.g. Bäuerle (1977, 1979), Declerck (1991), Ehrich (1992),
(1985), Vater (1983)). In its original version, Reichenbach's account captures any particular tense construction as a combination of the ordering relations between all three points TU, TS, and R, regardless of whether the tense construction is simple or morphosyntactically complex.

Yet especially the simple tenses strongly suggest that the relation between TU and TS constitutes the core meaning of tenses, i.e. the present tense locates TS at TU, the past tense before TU, and the future tense after TU. Intuitively, this seems plausible; in fact, most naive speakers share this intuition. Thus, at first glance, one might think that the function of tense is to locate the situation time TS of the main predicate of an uttered clause relative to its utterance time. For instance, the sentences in (2-2) seem to express that Stefan's calling me, Claudia's getting an appointment, and Uta's winning the marathon are located before the time at which these sentences are uttered.

(2-2) a. Stefan rief mich an.  
Stefan called me  
b. Claudia bekam einen Termin.  
Claudia got an appointment  
c. Uta gewann den Marathon.  
Uta won the marathon

However, other sentences clearly show that this cannot be quite right. Thus, the marked expressions in the examples in (2-2) are certainly not meant to say that Barschel's being dead, Juliane's not being a child anymore, and the being dry of the flowers are located in the past but not in the present.

(2-3) a. Sie fanden Barschel in der Badewanne. Er war tot.  
they found Barschel in the bathtub. he was dead  
last year met I Juliane again. she was no child anymore  
c. Ich warf die Blumen raus, weil sie trocken waren.  
I threw the flowers out because they dry were

Rather, the clauses are used to assert something about what was the case at a certain time in the past - the time when Barschel was found in the bathtub, the time when I met Juliane again, and the time when I threw out the flowers, respectively. For instance, in (2-3a), the speaker asserts about the time when Barschel was found in the bathtub that Barschel was dead at that time. The time about which the assertions are made in each of the cases above is the reference time R. Exploiting a traditional term from information-structural theories, one may also say that the reference time R functions as a topic in the examples above.

On the basis of observations like this, Klein (1992, 1994) proposes that TENSE locates the time about which an utterance asserts something - the TOPIC TIME (TT) - with respect to the time of utterance. Deviating from Klein, I will use the notion "tense time" in this book instead of the notion "topic time", where the TENSE TIME (TT) of an uttered clause is the time which the speaker locates by the tense. The
motivation for this change of terminology will become clear shortly; roughly speaking the main reason is that the time which is located by the tense does not have to be topical in every case. The tense time is usually definite (cf. Partee (1973)), though - in the sense that the speaker usually has a particular time in mind. Because of this, the tense time has a strong tendency to be topical, but its topicality is by no means obligatory. insofar the tense time behaves like a definite noun phrase: definite noun phrases have a strong tendency to be topical, too, but can also be non-topical.

Specifically, in accordance with standard assumptions, the past tense locates the tense time before the time of utterance, the present tense around the time of utterance or, perhaps, in other languages like German, not before the time of utterance, and the future tense at a time after the time of utterance.\(^4\) Note that the notion of tense time in terms of assertion is based on a subjective, speaker-oriented view: the tense time of an utterance is the time the speaker has in mind as the time about which she wants to say what is, was, or will be, the case then.

The diagram below illustrates the effect of the past tense in the second sentence of (2-3a). While the first sentence suggests the time when Barschel was found in the bathtub as the tense time of the second sentence, the past tense in the second sentence tells us that this tense time is located before the time of utterance and asserts about this time that Barschel is dead.

\begin{align*}
\text{(2-4) } & \text{Sie fanden Barschel in der Badewanne. Er war tot.} \\
& \text{they found Barschel in the bathtub. he was dead} \\
& \text{...}[[\_]]\text{...}TU\text{...} \\
& \text{TU time of utterance} \\
& \text{[\_] tense time: the time when they found Barschel in the bathtub} \\
\end{align*}

Given this approach, why does tense somehow seem to locate the situation expressed by the main predicate with respect to the time of utterance? Here, the interaction of tense and aspect comes into play: ASPECT locates the situation time of the main predicate with respect to the tense time.

Aspect is not grammaticalized in German; in most cases it just seems to require by a perfective default interpretation that the situation time and the tense time intersect. For reasons that need not concern us now, it locates the situation time of the being dead in our example around the tense time. Hence, since it is a common assumption that the being dead of a person is a never ending state, we arrive at the picture in (2-5).

\begin{align*}
\text{(2-5) } & \text{Sie fanden Barschel in der Badewanne. Er war tot.} \\
& \text{they found Barschel in the bathtub. he was dead} \\
& \text{...}\{\[\_]\}\text{...}TU\text{...}() \\
\end{align*}

\(^4\) Let us assume that this holds at least for the canonical usage of the tenses. Later, we will have to say more about the semantics of the tenses.

\(^5\) This may not be the most adequate analysis for the future tense, though. There is evidence that the present tense, which is clearly morphosyntactically present in future tense constructions, has to be taken seriously on the semantic level, too. For some details, see Musan (1999) on werden.
Time of utterance

- tense time: the time when they found Barschel in the bathtub
- situation described: his being dead

- situation time of his being dead ("(}") indicates that the right edge of
  the situation time is not 'real' because the state of a person's being dead
  does not end.

Note that in this approach, every main predicate of a clause is subject to aspect. If it
were not, then its situation time would not be located in time at all.

Of course, there are several other possibilities of how the tense time and the
situation time may relate to each other. Morphosyntactically realized aspect can
serve to distinguish these options; by choosing a particular aspect, one can express,
for instance, that the situation time is located before the tense time or after the tense
time. As I said above, in German, however, aspect is not morphosyntactically realized,
and by default expresses intersection of the tense time and the situation time.  

3. Contexts and temporal specifications

Depending on the context, the tense time of an utterance may, but need not, be
further restricted. We will thus distinguish temporally specified from temporally
unspecified contexts. An utterance stands in a TEMPORALLY SPECIFIED CONTEXT
if the utterance itself or the preceding discourse provide appropriate temporal
specifications. And an utterance stands in a TEMPORALLY UNSPECIFIED CONTEXT,
if neither the preceding discourse nor the utterance itself provide appropriate
temporal specifications, or the utterance introduces a discourse.

Temporal specifications can be provided, for instance, by explicitly mentioned
time intervals or by the sequence of events described in the preceding discourse.
Temporal specifications can have various effects in an utterance. Among other things,
they can help to determine the temporal location of the situation described in the
utterance by restricting the tense time of the utterance. Hence, intuitively, they can
assign more or less precise time values to the tense time. In (2-3a), for example, the
second sentence stands in a temporally specified context; the first sentence provides
a value for the tense time of the second sentence, namely, the time when Barschel
was found in the bathtub.

An important point about temporal specifications is that they can only further
restrict the initial tense time that is provided by the tense of a clause. That is,
temporal specifications can only serve to cut out pieces of the initial tense time. But

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6 As an illustration, I add a survey of aspects and their realization in English, where TS- is the
time before the situation time and TS+ is the time after the situation time (cf. Klein (1992,
1994)).

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Characterization TT/TS</th>
<th>Realization in English</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPERFECTIVE</td>
<td>TS properly includes TT: .....[---[---]}......</td>
<td>ing-form</td>
</tr>
<tr>
<td>PERFECTIVE</td>
<td>A. TT properly includes TS: .....[---[---]}......</td>
<td>simple form</td>
</tr>
<tr>
<td></td>
<td>B. TT intersects with TS,TS+: .....[---[---]}......</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. TT intersects with TS,TS-: .....[---[---]}......</td>
<td></td>
</tr>
<tr>
<td>Perfect</td>
<td>TS+ properly includes TT: .....[----{]}......</td>
<td>perfect</td>
</tr>
<tr>
<td>Prospective</td>
<td>TS- properly includes TT: .....[----{]}......</td>
<td>is going to</td>
</tr>
</tbody>
</table>

Interestingly, according to criteria of morphological markedness, the perfective aspect is the
default aspect.
they can never assign time intervals to the tense time of a clause that reach beyond
the initial tense time.

Temporal specifications may also provide time values for other "time variables"
of an utterance. And, as will become clear in the course of the book - especially in
chapter 3 - there are many other possible sources for time values that were not
mentioned yet.

4. Past tense ('Präteritum') and present tense ('Präsens')

The past tense in German provides a tense time that is located before the time of
utterance of a clause. The tense time, however, has to be somewhat distant to the time
of utterance. That is, it cannot touch the time of utterance.

The present tense can be used in different ways in German - e.g. for the
description of present situations (4-1) and of future situations (4-2). It can also be
used for generic or habitual assertions (4-3), which may be viewed as special cases of
present situations - present situations that can reach quite far into the past and future.

(4-1) PRESENT TENSE FOR PRESENT SITUATIONS
 a. Maria studiert in Berlin.
   Maria studies in Berlin
 b. Eva ist sieben Monate alt.
   Eva is seven months old

(4-2) PRESENT TENSE FOR FUTURE SITUATIONS
 a. Im Juni hat Maria Ferien.
   in June has Maria vacation
 b. Maria kriegt Ferien.
   Maria gets vacation

(4-3) PRESENT TENSE FOR PRESENT SITUATIONS: GENERIC/HABITUAL
 a. Männer sind klüger als Frauen, und die Erde ist eine Scheibe.
   men are smarter than women, and the earth is flat
 b. Hans raucht.
   Hans smokes

There are some more subtle uses of the present tense in German such as the so-called
' historical present tense', among others. But for now I want to leave it at this and
characterize the semantics of the present tense in the unmarked cases. Of course, it
would be highly desirable to assume a maximally uniform account of all uses of the
present tense. However, it is not clear how they can be given a uniform account. The
following proposals can be found in the literature.

While Klein (1992, 1994) proposes that the present tense locates the topic time
around the time of utterance, Fabricius-Hansen (1994), for instance, suggests that the
present tense creates a direct association of the situation time of the verb with the
time of utterance. According to Kratzer (1978), the present tense is a non-past tense
and thus locates the situation time either in the present or in the future. However, in
order to be able to account for uses like the historical present tense, Kratzer assumes

7 For more information on this, see, for instance, Fabricius-Hansen (1986) and Thieroff
(1992:89ff).
that times other than the actual time of utterance can "count" as the time of utterance. Contrasting with the accounts mentioned so far, Vater (1983) pursues an aspectual account of the present tense; he argues that the present tense signals that the situation time is not yet completed at the time of utterance. Finally, some linguists, like Heidolph et al. (1981), Zeller (1994), and Grewendorf (1995) propose that the present tense is temporally neutral, i.e. does not locate anything - neither the situation time of the verb nor the topic time or tense time - relative to the time of utterance.

For reasons of space, we will not evaluate these proposals in detail here. Rather, we will only use one of them and - without expecting this to be necessarily the most adequate solution - for the present purpose assume that the present tense locates the tense time in the present or in the future time (i.e. in the non-past time), relative to the time of utterance. This amounts to an account in Klein's terms which is similar to Kratzer's account insofar as it generalizes over present time and future time uses of the tense. There is much more to be said about this issue, of course, but for now the account seems adequate enough.

Independently of particular accounts of the present tense in German, however, it is important to note that the present tense shows an interesting behavior with regard to the availability of future time readings: although the German present tense generally allows for future readings, activity and state predicates like schlafen ('sleep) with a present tense allow for such a reading only when they occur with a future adverbial as in (4-4c), but not when they occur without such an adverbial as in (4-4a). Contrasting with this, achievement and accomplishment predicates like gewinnen ('win') can always get a future time reading, regardless of whether they occur together with a future time adverbial as in (4-4c) or without one as in (4-4b) (cf. Ehrich (1992:69)).

(4-4) a. FUTURE READING NOT POSSIBLE: Hans schläft.  
   Hans sleeps  

b. FUTURE READING POSSIBLE: Hans gewinnt.  
   Hans wins  

c. FUTURE READING POSSIBLE: Hans schläft morgen mittag.  
   Hans sleeps tomorrow at-noon  

d. FUTURE READING POSSIBLE: Hans gewinnt morgen mittag.  
   Hans wins tomorrow at-noon

This interaction between Aktionsarten and the availability of interpretations of the present tense should be kept in mind; it will become important in chapter 2.

The future tense in German is in fact not a simple tense but a periphrastic verb form that is composed of the auxiliary werden ('become') and the present tense. For the present purpose, however, the internal composition of the tense does not play an important role. Also other more intricate characteristics of the future tense construction - i.e. that it exhibits modal present tense readings - are not relevant presently. Hence, I will just assume that the future tense locates the tense time of its clause after the time of utterance.

5. Temporal interpretation and individuals

Many predicates impose LIFE-TIME PRESUPPOSITIONS on all or some of their arguments. When a predicate imposes a life-time presupposition on an argument, it presupposes that the situation times of the predicate must be included in the life-time
or TIME OF EXISTENCE of the individual(s) that function(s) as that argument.\textsuperscript{8} For instance, typical stage-level predicates like available and sick as well as typical individual-level predicates like intelligent and altruistic presuppose that their subject is alive during their situation times. Thus, for predicates of these types (5-1) holds.

\begin{equation}
(5-1) \quad \text{For all stage-level and individual-level predicates } P, \text{ individuals } x \text{ and times } t, \quad P(x, t) \text{ presupposes that the time of the situation at which } P \text{ holds of } x \text{ is (possibly nonproperly) included in the time of existence of } x.
\end{equation}

This captures the intuition that an individual can only be available, sick, intelligent, or altruistic during its time of existence; deceased individuals cannot take part in such eventualities. Thus, the predicates available, sick, intelligent, and altruistic impose life-time presuppositions on their external arguments.

Similar presuppositions can be imposed on non-subject arguments, too. Not all arguments of all predicates, however, are subject to such presuppositions. The predicates famous, mentioned, talked about, missed, and forgotten, for instance, do not presuppose that their subject arguments be alive during their situation times. Again, the same can be true of other, non-subject, arguments. Thus, the object argument of miss neither has to be present nor alive in the missing-situation. I will call a predicate \textit{P} that imposes a life-time presupposition on its argument \textit{a} EXISTENCE-IMPLYING with respect to \textit{a}. Accordingly, a predicate \textit{P} that does not impose a life-time presupposition on its argument \textit{a} is not existence-implying with respect to \textit{a}; the argument \textit{a} will be called EXISTENCE-INDEPENDENT relative to \textit{P}.

6. A formal semantic implementation of tense and aspect

Until now, we have described the functioning of tense and aspect only in an intuitive way. In this section, I present a proposal of how these intuitions may be implemented in a formal semantic representation. As we will see, the intuitive effect of tense to locate the tense time is not a direct but rather an indirect effect of tense.

All accounts of temporal interpretation have to solve the problem of how to deal with the fact that sentences can have either definite or indefinite tense readings. INDEFINITE TENSE READINGS are readings that are paraphrased best with a quantifier over times. This is the case with the sentence \textit{Today, Eva was not happy} which has the reading "It is not the case that there is a time \textit{t}, such that \textit{t} is today and \textit{Eva} is happy at \textit{t}". DEFINITE TENSE READINGS are readings which imply a contextually salient time interval that is relevant for the representation of the reading, as with Partee's (1973) well-known example \textit{I didn't turn off the stove}. The strongly preferred reading of this sentence is neither "It is not the case that there is a time \textit{t} such that I turned off the stove at \textit{t}" nor "There is a time \textit{t} such that it is not the case that I turned off the stove at \textit{t}" but something like "At the designated time \textit{t} (\textit{e.g.} for the sentence here, right before I left the house) it is not the case that I turned off the stove at \textit{t}". Thus, the most salient reading of the sentence is a definite one, in the sense that the speaker has a particular, contextually salient time

\textsuperscript{8} The observation of such requirements imposed on individuals by certain predicates is not new. Thus, Kratzer (1989b:619) states that to different extents verbs can impose physical presence requirements on their arguments. Klein (1994:42) briefly discusses to what extent one may say that individuals' properties can go beyond their physical existence. For more details, see Musan (1995:Ch.II, 1997).
interval in mind. Based on the existence of such definite tense readings, Partee (1973) argued that an adequate analysis of tense must provide the option to interpret tense as denoting specific time intervals. But neither the occurrence of indefinite tense readings nor the occurrence of definite tense readings must necessarily lead to the conclusion that tense itself is responsible for the indefiniteness or definiteness. Adopting basically the accounts of Bäuerle (1977, 1979) and Kratzer (1978), and a recent version of these accounts by von Stechow (1992), I assume that both aspects of tense interpretation are provided by independent elements in LF.

My semantics exploits three basic types, \( e, t, \) and \( i \), which are the semantic types of entities, truth values, and (possibly instantaneous) time intervals, respectively. I assume that predicates of all syntactic categories have time arguments, regardless of whether they are stage-level or individual-level predicates or existence-independent predicates. Time arguments are made explicit and occupy positions in the syntactic structure; the time argument of a predicate appears as a sister of that predicate. Thus, any semantic PREDICATE \( P \) contributes an open formula as shown in (6-1) to semantic representations.

(6-1) \( P(x, t) \)

\( P \) may, of course, have more arguments than in the particular case illustrated in (6-1). Specifically, one may want to raise the question whether predicates - in general or some of them - have DAVIDSONIAN or EVENT ARGUMENTS. Throughout this work, I will remain neutral with regard to this question. That is, I will not make use of event arguments in semantic representations; as far as I can see, it is not necessary to add event arguments in addition to time arguments for the purposes of this work. Hence, I will dispense with them, mainly in order to keep the semantic representations as simple as possible. This should, however, definitely not be understood as a statement against event arguments.

I adopt the standard assumption that the time interval assigned to the time variable \( t \) cannot extend beyond the situation time of the predicate, cf. (6-2).

(6-2) For all predicates \( P \), individuals \( x \), and times \( t \), \( P(x, t) \) is true if and only if \( x \) is \( P \) at \( t \) and \( t \) is (possibly nonproperly) included in the time interval during which \( x \) is \( P \).

With von Stechow, I will treat TENSE as a predicate that takes two times as arguments. The lexical entry for PAST TENSE, PRESENT TENSE, and FUTURE TENSE are as follows.

(6-3) \( [[\text{PAST }]] = \) the function \( f: D_i \rightarrow D_{<i, t} \) such that for any \( t, t^* \in D_i, f(t)(t^*) = 1 \) iff \( t^* < t \).\(^9\)

(6-4) \( [[\text{PRES }]] = \) the function \( f: D_i \rightarrow D_{<i, t} \) such that for any \( t, t^* \in D_i, f(t)(t^*) = 1 \) iff \( t^* \subseteq t \) or \( t < t^* \).

(6-5) \( [[\text{FUT }]] = \) the function \( f: D_i \rightarrow D_{<i, t} \) such that for any \( t, t^* \in D_i, f(t)(t^*) = 1 \) iff \( t < t^* \).

\(^9\) I adopt a slightly modified version of von Stechow's semantics.

\(^10\) "<" means "before"; "\( \subseteq \)" means "(possibly improperly) included by."
Being a predicate of times, tense itself is neither definite nor indefinite. As a consequence, any definite or indefinite aspects of tense readings have to come from other sources, sometimes from phonetically empty elements.

The indefiniteness is caused by an OBLIGATORY ADVERB OF QUANTIFICATION that can be overt - like immer ('always') - or phonetically empty, in which case it gets by default an existential quantifier meaning, represented as "∃T".\(^{11}\)

\[
[[\exists T]] = \text{the function } f: D_{\langle i, t \rangle} \rightarrow D_{\langle i, t \rangle} \\
such that for any } p, q \in D_{\langle i, t \rangle}, f(p) = 1 \iff \text{there is a time } t^* \text{ such that: } p(t^*) = 1 \text{ and } q(t^*) = 1.
\]

Tense functions as a restrictor of the obligatory adverb of quantification ℄.

Temporal definiteness is caused either by explicit definite temporal adverbials (like heute ('today')) or by implicit temporal restrictions of the adverb of quantification. Implicit temporal restrictions are provided by TEMPORAL SPECIFICATIONS in the context and represented here as a variable C that can receive values by the context. Technically, I will assume that these variables are elements of type <i, t> that are interpreted by intersection with other restrictive material in the restrictive clause of the adverb of quantification (cf. Westerståhl (1984) and von Fintel (1994) on an analogous treatment of contextual restrictions of determiner-quantifiers). That temporal interpretation is thus relative to the discourse context is marked with superscripts "c". The interpretation of C is captured in (6-7); it will be revised in chapter V; for the present purpose, however, it is precise enough.\(^{12}\)

\[
[[C]]^c = \text{the function } f: D_i \rightarrow D_t \\
such that for any } t^* \in D_i, f(t^*) = 1 \iff t^* \text{ is a subinterval of a time the speaker in } c \text{ refers to.}
\]

When there are several contextual restrictions of a quantifier, they are interpreted by intersection. The intersection of all restrictors of ℄ is intuitively perceived as the tense time of the clause.

Like tense, also ASPECT is treated as a predicate of two times. As mentioned above, in German, aspect is not morphosyntactically realized and just seems to require by a perfective default interpretation (which is not to be mixed up with the semantics of the perfect constructions!) that the situation time and the tense time intersect.

\[
[[\text{PERF}]]^c = \text{the function } f: D_i \rightarrow D_{\langle i, t \rangle} \\
such that for any } t, t^* \in D_i, f(t) = 1 \iff t^* \cap t.\(^{13}\)
\]

---

\(^{11}\) Note that there are also empty operators with a generic or universal meaning.

\(^{12}\) In a Bäuerle/Kratzer/Stechow type account, temporal definiteness is caused by an obligatory definite time adverbial. This obligatory time adverbial functions as a frame adverbial. The main difference between von Stechow's proposal and my version of it is that I treat implicit definite temporal adverbials as part of the restrictive clause of the adverb of quantification. The motivation for the modification is that it assigns a generalized quantifier type to the adverb of quantification. As Kai von Fintel pointed out to me, this step makes it possible to treat temporal definiteness as a special case of implicit restrictions of quantifiers that are commonly assumed anyway (cf. von Fintel (1994)).

\(^{13}\) "∩" means "intersects with."
Aspect serves - again, like tense - as a restrictor of an obligatory adverb of quantification. This adverb of quantification is phonetically empty and gets by default an existential quantifier meaning, represented as “…∃A". As we will see below, the quantifier “…∃A" is located at the left edge of the nuclear scope of “…∃T". Hence, one may assume in the spirit of Heim (1982) that “…∃A" corresponds to an existential closure operator. Be that as it may, for the present purpose we will adopt the definition in (6-9) for “…∃A."

\[(6-9) \quad [[...∃A]]^c = \text{the function } f: D_{i, t} \rightarrow D_{i\ast, t}\]
\[\quad \text{such that for any } p, q \in D_{i, t}, \quad f(p)(q) = 1 \]
\[\quad \text{iff there is a time } t^\ast \text{ such that: } p(t^\ast) = 1 \text{ and } q(t^\ast) = 1.\]

Aspect functions as a restrictor of the obligatory adverb of quantification “…∃A", which introduces a time interval that corresponds to a truth interval of the situation described by the VP. Hence, according to this approach, aspect does not have to relate the whole situation time of the VP-situation with respect to the tense time; rather it need only relate a truth interval of that situation with respect to the tense time. Note, moreover, that similar to “…∃T" - and in fact as any quantifier - “…∃A" may be subject to contextual restrictions and hence, contain a contextual variable C in its restrictive clause.

With regard to the SYNTAX-SEMANTICS INTERFACE, I will make the following assumptions. I adopt a GB-type syntax with (at least) the functional categories Complementizer Phrase (CP), Subject Agreement Phrase (AGRs-P), Tense Phrase (TP), Aspect Phrase (ASP-P). Logical forms (LFS) correspond, as far as temporal adverbials, adverbs of quantification, and tense are concerned, to the unmarked surface order of sentences. The syntactic surface tree has noun phrase arguments in case positions. At LF, noun phrases can occur in their base position when they are reconstructed. Subjects are base-generated VP-internally.

The LF is not in general interpretable just by functional application between daughters of any binary branching node. Instead, the following mechanism applies: For the interpretation of any quantifier - i.e. an element of type </t, <t, t>>, where t may be of any type - a tripartite semantic representation is constructed, consisting of the quantifier, a RESTRICTIVE CLAUSE (RC), and a NUCLEAR SCOPE (NS). The restrictive clause and the nuclear scope get filled with any material of the appropriate type that can be found below the next dominating node of type t, which defines the maximal scope of the quantifier. In the sample structure below, which contains the phonetically empty adverb of quantification “…∃T" this is the highest of the TP-nodes.

Since the quantifier “…∃T" is of type </t, <t, t>>, it needs at least two arguments of type </i, t>, which are to be filled into the restrictive clause and the nuclear scope, respectively. The mapping into restrictive clause and nuclear scope proceeds as follows: first, the lowest argument of the appropriate type is mapped into the nuclear scope; second, all other arguments of the appropriate type are filled into the restrictive clause and are conjoined there. Thus we have the principle of Tripartite Structure Construction.

\[(6-10) \quad \text{Tripartite Structure Construction:} \]
\[\quad \text{The lowest appropriate argument gets into the nuclear scope. All other arguments of the appropriate type get into the restrictive clause.}\]

The following semantic rules apply:
(6-11) a. Functional Application:
[[\alpha \beta]] = [[\alpha]] ([[[\beta]]]) or = [[\beta]] ([[\alpha]])
b. \lambda-Conversion:
[[\lambda x \alpha]] g (i) = [[\alpha]] g [x \rightarrow i]
c. Predicate Modification:
[[\alpha \& \beta]] (i) = 1 iff \[[\alpha]] (i) = 1 and \[[\beta]] (i) = 1
d. Predicate Abstraction: (with \(i\) index)
[[i \alpha]] g = \lambda x [[\alpha]] g [x \rightarrow i]

Let me now briefly illustrate with a concrete example how this proposal works. Since I am not concerned with complex sentences presently, and the evaluation time and the time of utterance coincide for matrix clauses, the time interval a tensed clause applies to can, for the present purpose, safely be identified with the time of utterance. For ease of presentation, I will identify the time of utterance with the present time, i.e. now.

Suppose Lola rannte (‘Lola ran’) is uttered in the context given in (6-12a). Then the sentence has an LF-structure roughly like (6-12b); I simplify the presentation by reconstructing the subject noun phrase to its base position. In order to save space in the LF-structure, I attach \(\lambda\)-binders directly to category nodes. With such nodes, semantic types appear below and above the category node. These are the types before and after \(\lambda\)-abstraction, respectively.


(6-12) b.

\[
\begin{array}{c}
\text{CP} \\
\text{...} \\
\text{AGR}s-P \\
\text{...} \\
\lambda t \text{TP} \\
\lambda t^* \text{ASP-P} \\
\lambda t^* \text{TENSE} \\
\lambda t** \text{VP} \\
\lambda t** \text{ASPECT} \\
\text{PERF} \\
\text{Lola renn-}
\end{array}
\]
[Note that the complete internal structure of the tense node, for instance, is as follows:

\[
\begin{array}{c}
\lambda t^* \text{TENSE} \\
\begin{array}{c}
\lambda t \text{PAST} \\
5 <i, t>
\end{array}
\end{array}
\]

For presentational reasons, however, we will skip these details here and below.]

From the structure (6-12b), the LF-representation (6-12c) is constructed. The adverb of quantification $\exists_T$ takes tense and the obligatory definite temporal restriction as its restrictor. By the context, the temporal restriction receives the value "when I saw Lola on Sunday." The rest of the clause is mapped into its nuclear scope. The adverb of quantification $\exists_A$ in turn takes aspect as its restrictor and again, the rest of the clause is mapped into the nuclear scope.

\[
(6-12) \text{ c. } \lambda t \left( \exists_T \left[ \lambda t^* \left( C(\text{when I saw Lola on Sunday}) \ (t^*) & \text{PAST} \ (t)(t^*) \right) \right] \left[ \lambda t^* \left( \exists_A \left[ \lambda t^{**} \left( (C \ t^{**}) & \text{PERF} \ (t^*)(t^{**}) \right) \right] \left[ \lambda t^{**} \left( \text{renn-} \ (t^{**})(Lola) \right) \right] \right] \right)
\]

The lexical entries of verbs and proper names are given in (6-13a, b).

\[
(6-13) \text{ a. } [[\text{renn-}]]^C = \text{the function } f: D_i \rightarrow D_{<e, t>} \text{ such that for any } t \in D_i, x \in D, f \ (t) \ (x) = 1 \text{ iff } x \text{ runs at } t.
\]

\[
(6-13) \text{ b. } [[\text{Lola}]]^C = \text{the individual } Lola \text{ (of type e)}.
\]

Note that contextual restrictions of quantifiers that do not receive a value from the context are omitted in the calculation of truth conditions, as is the case with the contextual restriction of "$\exists_A$" in our example. Under these assumptions, the calculation of truth conditions works as follows.

\[
[[\text{Lola rannte}]]^C \text{ (now) } = 1
\]

iff (by 2 Tripartite Structure Constructions and with $C = \text{"on Sunday"} )

\[
[[\lambda t \left( \exists_T \left[ \lambda t^* \left( (C(\text{when I saw Lola on Sunday}) \ (t^*) & \text{PAST} \ (t)(t^*) \right) \right] \left[ \lambda t^* \left( \exists_A \left[ \lambda t^{**} \left( \text{PERF} \ (t^*)(t^{**}) \right) \right] \left[ \lambda t^{**} \left( \text{renn-} \ (t^{**})(Lola) \right) \right] \right] \right) ]]]^C \text{ (now) } = 1
\]

iff (by $\lambda$-Conversion)
[[ ∃_T [ λt* (C(when_I_saw_Lola_on_Sunday) (t*) & PAST (t)(t*)) ]
  [ λt* ( ∃_A [ λt**(PERF (t*)(t**)) ]
    [ λt**(renn- (t**)(Lola))] ) ] ] c, [t→now] = 1

iff (by the lexical entry of ∃_T)
there is a time t' such that
[[ λt* (C(when_I_saw_Lola_on_Sunday) (t*) & PAST (t)(t*))]]c, [t→now] (t') = 1
and
[[ λt* ( ∃_A [ λt**(PERF (t*)(t**)) ]
    [ λt**(renn- (t**)(Lola))] ) ] ] c, [t→now] (t') = 1

iff (by Predicate Modification applied to the RC of ∃_T and by λ-Conversion)
there is a time t' such that
[[ λt* (C(when_I_saw_Lola_on_Sunday) (t*))]]c, [t→now] (t') = 1
and
[[ λt* (PAST (t)(t*))]]c, [t→now] (t') = 1
and
[[ ∃_A [ λt**(PERF (t*)(t**)) ]
  [ λt**(renn- (t**)(Lola))] ] ] c, [t→now], [t*→t'] = 1

iff (by λ-Conversion and by the lexical entry of ∃_A)
there is a time t' such that
[[ C(when_I_saw_Lola_on_Sunday) (t*) ] ] c, [t→now], [t*→t'] = 1
and
[[ PAST (t)(t*) ] ] c, [t→now], [t*→t'] = 1
and
there is a time t" such that
[[ λt**(PERF (t*)(t**)) ]] c, [t→now], [t*→t'], (t'') = 1
and
[[ λt**(renn- (t**)(Lola))] ] ] c, [t→now], [t*→t'], (t'') = 1

iff (by λ-Conversion)
there is a time t' such that
[[ C(when_I_saw_Lola_on_Sunday) (t*) ] ] c, [t→now], [t*→t'] = 1
and
[[ PAST (t)(t*) ] ] c, [t→now], [t*→t'] = 1
and
there is a time t" such that
[[ PERF (t*)(t**)] ] ] c, [t→now], [t*→t'], [t**→t''] = 1
and
\[
[[\text{renn- } (t^{**})(\text{Lola}) ]]^c, [t\rightarrow\text{now}], [t^*\rightarrow t'], [t^{**}\rightarrow t'']= 1
\]

iff (by variable assignments)
there is a time \(t'\) such that
\[
[[C(\text{when I saw Lola on Sunday}) (t')] ]^c = 1
\]
and
\[
[[\text{PAST} (\text{now})(t')] ]^c = 1
\]
and
there is a time \(t''\) such that
\[
[[\text{PERF} (t')(t'')] ]^c = 1
\]
and
\[
[[\text{renn- } (t'')(\text{Lola}) ]]^c = 1
\]

iff (by the lexical entries of the remaining elements)
there is a time \(t'\) such that
\(t'\) is a subinterval of the time when I saw Lola on Sunday
and
\(t' < \text{now}\)
and
there is a time \(t''\) such that
\(t' \cap t''\) and
Lola runs at \(t''\).

Hence, in the context given in (6-12a) and with the value of \(C\) provided by the preceding sentence as suggested, \(\text{Lola rannte}\) is true if and only if there is a time \(t'\) before now, which is the time when I saw Lola last Sunday, and which intersects with a time \(t''\) at which Lola runs.