

German *seit* ‘since’ and the ambiguity of the German perfect

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1. The claims^{*}

The meanings of temporal adverbials seem easy to describe, but the compositional interaction with tense and aspect is notoriously difficult to analyse because we (more accurately: I) do not understand yet the principles governing the tense/aspect architecture of natural languages well enough. One of the most difficult areas of temporal structure is the perfect, and the literature quoted in this article shows that there is little agreement on its meaning(s). I believe that we will make progress only by a careful investigation of the meanings of temporal adverbials and by stating their formal semantics in a way which is precise enough to test empirical predictions. This is what the present article wants to do. It studies the interaction of the German durative temporal PP *seit* [] ‘since []’ with tense, in particular with the perfect.

The result will be that the German present perfect morphology is ambiguous in at least four ways: (a) it may denote a semantic PAST; (b) it may denote an Extended Now in the sense to be explained; (c) it may express a perfect of result; (d) it may express a PRESENT PERFECT in a sense to be explained.¹

There have been several attempts in the literature to reduce these ambiguities to a combination of semantic PRESENT and a unique PERFECT-meaning, where the latter is expressed by the participle or the perfect auxiliary (see e.g. Herweg 1990, Klein 1999, Rathert 1999, Stechow 1999, Musan 2000). Recently, I have come to the conclusion that a compositional reduction to two independent meanings is not possible. The ambiguities are genuine.

* I wish to thank Gergely Pethö and Uli Sauerland for helpful comments and Angela Cook for helping me with my English. An anonymous referee and the editors of this volume gave me excellent comments. I have tried to follow their suggestions as well as I could.

1 “PAST” denotes the semantic tense, while “past” denotes the morphological tense. Similarly for the other tenses.

Most semanticists working on tense would agree that the perfect of result has a meaning different from the other variants given (cf. Rapp 1996, Kratzer 1994). So the claim that this reading constitutes a separate meaning is not a controversial issue. The most interesting issue is whether there is a genuine ambiguity between a PAST-reading and the Extended Now interpretation. To a certain extent, the PP *seit* \square may serve as a diagnostics.

The German PP *seit* \square is different from its English counterpart *since* \square in two respects. In English, \square must denote a time span, i.e., a position in time given by a date or some appropriate deictic description. The German preposition *seit* allows for complements of this sort, but it allows for durations, i.e., lengths of times, as well. If \square is a position, then *seit/since* \square says of a time span that its left boundary is \square . If \square is a duration, then *seit* \square says of an interval that it has the length \square .

There is a second difference between the two languages. English *since* \square is a perfect level adverbial: it modifies an Extended Now introduced by the perfect auxiliary (cf. McCoard 1978 and Dowty 1979). These notions will be explained in greater detail in the next section. An Extended Now Perfect modified by *since* \square may embed any aktionsart. German perfects modified by *seit* \square may have these readings, though they are a bit marked.

In contrast to English, *seit* \square may combine with simple tenses as well, but then it behaves differently. The aktionsart modified must be a state or an activity, more generally, it must be cumulative.² Accomplishments and achievements are impossible in this construction. Now, if the present perfect combines with temporal adverbial denoting a past time span, it behaves exactly like a simple past. From this I conclude that the present perfect is genuinely ambiguous between an Extended Now and a semantic PAST.

So, in addition to the PAST/Extended Now distinction for the perfect, we have to introduce two further different meanings for *seit* \square : the first one *modifies* an Extended Now introduced by the present perfect and imposes a restriction on the aktionsart selected. The second variant of *seit* \square *introduces* an Extended Now (more accurately, an extended TENSE) and requires that the selected aktionsart be a state.

I have to add that the remaining reading of the present perfect, the PRESENT PERFECT, behaves like a simple tense with respect to the modification by *seit* \square .

These are the arguments supporting the claims concerning the ambiguity of the perfect and of *seit* \square .

Here are some examples illustrating the claims. The first data are taken from Wunderlich (1970). They illustrate the combination of *seit* \square with the present and with the present perfect.

- (1) a. Ich warte seit 3 Stunden auf dich.
I wait since 3 hours for you

2 A property P of events/states is cumulative if we have it for two adjacent P-events e_1 and e_2 that their mereological sum $e_1 + e_2$ is a P-event as well.

- b. Ich habe (jetzt) seit 3 Stunden auf dich gewartet.
I have (now) since 3 hours for you waited
'I have been waiting for you for 3 hours.'

The following data, which are taken from Wunderlich's book as well, show that the present perfect can denote the simple PAST.

- (2) Perfect with PAST reference
 - a. Wir sind gestern im Schillertheater gewesen.
we have yesterday in.the Schiller.theater been
 - b. Wir waren gestern im Schillertheater.
(As (a) with preterite instead of perfect.)
'Yesterday, we were in the Schiller theatre.'

The XN-reading of the present perfect can embed an achievement, the PAST-reading can't:

- (3) a. Franzis hat mich seit 4 Uhr dreimal angerufen.
Franzis has me since 4 o'clock three.times called
'Franzis has called me three times since 4 o'clock.'
b. ?? Franzis hat mich gestern seit 4 Uhr dreimal angerufen.
Franzis has me yesterday since 4 o'clock three.times called
'Yesterday, Franzis called me three times after four o'clock.'

The following examples show that Perfect of Result behaves exactly like simple tenses with respect to modification by *seit* \square . It selects a state and must therefore be distinguished from the Extended Now Perfect.

- (4) a. Bettina ist seit 10 Minuten eingeschlafen.
Bettina is since 10 minutes slept.in
'Bettina has been asleep for 10 minutes.'
b. *Bettina schlief seit 10 Minuten ein.
'Bettina fell asleep for 10 minutes.'
- (5) a. Wolfgang hat Diano seit Freitag verlassen.
Wolfgang has Diano since Friday left
'Wolfgang has been out of Diano since Friday'
b. *Wolfgang verließ Diano seit Freitag.
'Wolfgang left Diano since Friday.'

The structure of the article is as follows. I first make the meanings of the temporal PP *seit* \square precise. Then I introduce the tense/aspect architecture assumed in this article. Then a discussion of data follows. Finally, two alternative proposals from the literature are discussed. The conclusion reached is in agreement with the observations in Wunderlich (1970) that the German perfect is semantically ambiguous, indeed. An appendix gives evi-

dence that ambiguities arising with the tense/aspect morphology are found in other languages as well.

2. The meanings of *seit*

This section introduces the meanings of the prepositions *since*, *seit* and the English perfect auxiliary on a more formal level.

As I said, the German preposition *seit* behaves rather differently from its English counterpart *since*. English *since t* modifies an Extended Now (XN) introduced by the *have*-perfect; the adverbial says that the left boundary of the XN is t and that the tenseless VP is true of that XN. More or less, this is Dowty's (1979) analysis.

The formal semantics for English *since* was formulated in Dowty (1979), and there seems to be growing agreement in the literature that his proposal is the correct one.³ According to Dowty's analysis, *since t* is a perfect level adverbial. It modifies an Extended Now introduced by the *have*-perfect and says that the left boundary of the XN is t . Consider the following sentence:

- (6) Since 1990, Dieter has been to Tübingen four times.

We want to arrive at the following meaning:

- (7) λt XN(t , NOW) & LB(1990, t) & $\lambda t'$ λt Dieter go to Tübingen at t'

NOW is the meaning of the semantic present, the speech time conceived as a moment. XN(t' , t) means that t is a final subinterval of t' ; this is the meaning of *have* (cf. Dowty 1972: 342). LB(1990, t') means that 1990 is the left boundary of t' ; this information is introduced by *since 1990*.⁴ To be concrete, let us assume the following semantics:

- (8) *have* and *since*
 $\| \textit{have} \| := \lambda P \lambda t \lambda t'. \text{XN}(t', t) \ \& \ P(t')$, where $\text{XN} = \lambda t \lambda t'$. t is a final subinterval of t' ⁵
 $\| \textit{since} \| (t) := \lambda P \lambda t'. P(t') \ \& \ \text{LB}(t, t')$

As the reader may check for herself, we obtain the reading desired if we assume the following syntactic structure and use functional application for the composition:

3 Among many others, see Kratzer (1996), Iatridou and Izvorski (1998), or von Stechow and Iatridou (2001).

4 I leave it open whether the left boundary starts at the beginning of 1990, somewhere in 1990 or at the end of 1990. Musan (2000) assumes that each of these options is possible.

5 The formulation of my semantic rules do not always distinguish between meta- and object language. The general convention is that bold face expressions belong to the object language.

- (9) NOW [have [since 1990 [four times [Dieter go to Tübingen]]]]

We obtain the wrong result, however, if we switch the relative hierarchy between *have* and *since 1990*.

- (10) *NOW [since 1990 [have [four times [Dieter go to Tübingen]]]]

This LF gives us a reading where the left boundary of NOW is 1990, and Dieter may go to Tübingen four times in an XN reaching into a time before 1990.⁶ Clearly, this reading is not available intuitively. Therefore we have to add a syntactic stipulation that rules out the structure (10). For the time being, we require the following:

- (11) Perfect level adverbials
Since t must be immediately embedded under *have*.

It is not clear what the theoretical status of this stipulation is. Perhaps it can be subsumed under a feature checking mechanism in the sense of the Minimalist Program.⁷ It is, of course, precisely this syntactic restriction that makes *since t* a perfect level adverbial and there seems to be no way of getting rid of this constraint, one of the idiosyncrasies of English.

A referee asked me to provide examples which show that the meaning given for *have* combines with any semantic tense, i.e., PAST and FUTR. Clearly, the meaning combines with PAST. Take for instance *He had been sick since Christmas*. For the reasons discussed in section 4.4, English *since*-adverbials don't combine with FUTR, but *for*-adverbials do: *In two weeks we will have been married for thirty years*.

Next, let us turn to German *seit*. There are several variants of this preposition. One is like English *since*, and I will represent it by that word in the logical language. This is not the prevailing use of *seit*. As said already, the most common function of *seit* is, rather, that it *introduces* an XN and specifies either the left boundary of XN or the length of XN.

Following Musan (2001), I will call the first variant of *seit* the *positional* one. This preposition takes a time span *t* as argument, where *t* refers to a time located somewhere in history, say the afternoon of last Tuesday. Unlike its English counterpart, *seit t* is compatible with any tense, therefore it cannot simply indicate the starting point of the reference time. In fact, the reference time is only the right boundary of the XN introduced by *seit t*. More precisely, the meaning of the adverbial is this:

6 The meaning of the LF is this: $\exists t [B(1990, NOW) \ \& \ \exists t' [XN(t', NOW) \ \& \ \text{Dieter be four times to Tübingen at } t']]$

7 Another way of blocking the non-existing reading would be to let *since 1990* modify *have* directly. But this would be even more clumsy because *have* could not be an existential quantifier in that case. The adverb would have to modify the relation XN directly and the existential closure could apply after the modification.

(12) Positional *seit*

$\| \textit{seit} \|(t) = \Box P \Box t' \Box t'' [XN(t'', t') \ \& \ LB(t, t'') \ \& \ P(t'')]$, P is homogeneous

P is homogeneous if it has the subinterval property, i.e., for any t and t': if t' is a subinterval of t and P is true of t, then P is true of t' as well.⁸ As an illustration, consider the following contrast:

- (13) a. Dieter ist seit 1975 in Düsseldorf.
 Dieter is since 1975 in Düsseldorf
 b. *Dieter ist seit 1990 achtmal in Tübingen.
 Dieter is since 1990 eight.times in Tübingen

The contrast follows immediately from the semantics: *go eight times to Tübingen* is not homogeneous.

Next, consider the adverb of duration *seit d*, where *d* is the duration of a time span, something like ‘two hours’, ‘one year’ and so on. A precise counterpart of this PP does not exist in English but in many other closely related languages.⁹ The semantics of this adverbial is exactly parallel to the semantics of *seit t*.

(14) Durative *seit*

$\| \textit{seit} \|(d) = \Box P \Box t \Box t' [XN(t', t) \ \& \ |t' - t| = d \ \& \ P(t')]$, P is homogeneous

Here is an example illustrating the semantics:

- (15) Wir sind heute seit 30 Jahren verheiratet.
 We are today since 30 years married
 ‘Today, we have been married for 30 years.’

The sentence has the following truth condition:

- (16) NOW $\Box [t \text{ in today} \ \& \ [\textit{seit 30 years} \ \Box t'. \text{we are married at } t'] (t)]$

The point of the analysis is this: the temporal adverb ‘today’ gives us a frame for the reference time. The adverbial of duration, however, does not specify the duration of the reference time. If it did, the length of the reference time would have to be 30 years long. This would be in conflict with the requirement that the reference time is included in today. To my mind the example refutes analyses that assume that the semantic present, i.e., PRES, gives us a long time stretch, which may extend to an indefinite past and be restricted by an

⁸ Dowty (1979: 166) gives a slightly different definition for stative predicates: he says that they are true of every point of an interval. Presumably, my definition is Krifka’s (1989) definition of divisivity.

⁹ The English translation of *seit zwei Stunden* is ‘for two hours’, but this adverb simply measures the length of a state and has nothing to do with an Extended Now. In particular, the adverb doesn’t introduce an Extended Now.

adverb of duration.¹⁰ I hold the view that, like in English, the PRES denotes the speech time conceived as a point.¹¹ We will see that this view is borne out by the German data.

3. The tense/aspect/aktionsart-architecture

Wunderlich's examples in section 1 suggest that the present perfect is ambiguous in at least four ways: it has a PAST reading, it has an Extended Now Reading, it has FUTURE PERFECT reading, and it has a resultative reading. As we will see, the FUTURE PERFECT reading can be reduced to an ambiguity of the German present tense. But my claim is that the other ambiguities are irreducible.

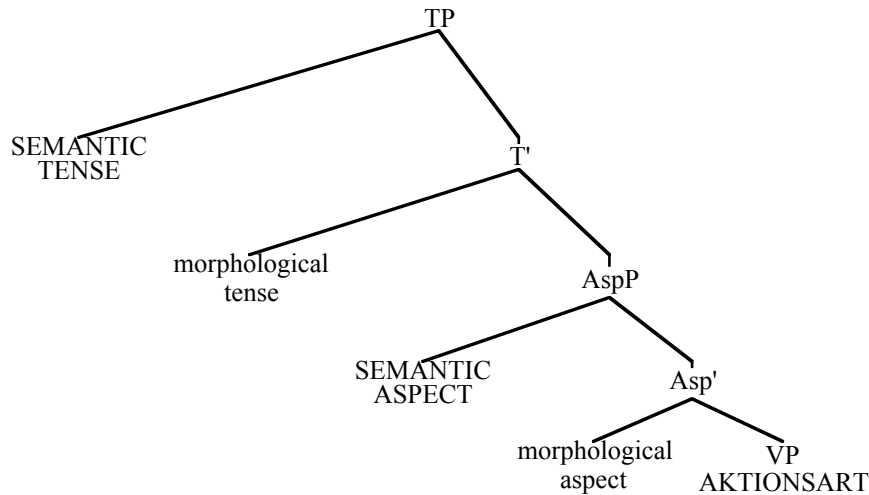
One may argue that this proliferation of meanings is undesirable on methodological grounds. In this section I want to show that the situation is not uncommon: the perfect is the unmarked past tense in German, unmarked in the sense of being common. Comparative evidence teaches us that the unmarked morphology always carries several meanings. In this section, I will compare German and English. Two more examples are given in the appendix. It is remarkable how much the interpretations differ despite very similar morphologies.

There is little agreement about the details of the tense/aspect organisation in natural language, so it is necessary that I give an exposition of the picture, which I have in mind. I will strictly distinguish between morphological and semantic tense and aspect. The semantic notions will be represented by capital letters, the morphological ones by small letters. This is the architecture of the finite clause:

10 Musan's (2000) favourite example for a "long present" is the sentence *Die Sonne scheint seit Jahrmillionen* 'The sun has been shining for billions of years'. My analysis will be "PRES *seit* d the sun shine". If the present were that long time span, it would not be clear what the right boundary of the *seit*-interval is.

11 In addition, the morphological present may denote FUTR and even the relation PROSPECTIVE, i.e., a relative future.

(17) The tense/aspect/aktionsart-architecture



The standard semantic tenses are PRESENT, PAST and FUTURE, but there might be some others in addition. Their morphological realisation may be rather different in different languages. In German, PAST may be morphologically realised by the preterite or by the perfect.¹² The FUTURE is realised by the morphological present or by *werden* + infinitive.

The notion of aspect has a Janus face, which often leads to confusion. The semantic side of the aspect morphology is complicated by the fact that we have to distinguish between two different notional categories, viz. *aspectual class* and *aspectual relation*. In the semantic literature *aspectual class* usually is a synonym with *aktionsart* in the sense of Vendler (1957). In other words, an *aktionsart* is an accomplishment/achievement, activity or a state.¹³ The Vendler *aktionsart* is expressed by the tense- and aspectless VP. I will assume that an accomplishment/achievement is a class of events, whereas Vendlerian states are sets of times or states. Activities are regarded as classes of events as well.

The precise details of the structure in (17) are debatable and empirically underdetermined. I localise semantic tenses in the specifier position because they are analysed as referential terms checked by a functional category in the head (cf. (19)). Semantic aspects

12 I reserve term perfect for the temporal *haben/sein*-construction. The adjectival passive (“Zustands-passiv”) is not called perfect here, though you may call it “perfect of result”.

13 In the philology of Slavic, the term *aktionsart* is used a bit differently. Aktionsarten are properties of actions such as inchoativity, terminativity, frequentativity and anything else that can be expressed by verbal prefixes. The Vendlerian *aktionsarten* are classes of events defined by their temporal properties. The term says nothing about the problem of how the VP expressing such an *aktionsart* is built up by means of internal *aktionsarten* in the sense intended by Slavists.

map properties of events or states into properties of times and are therefore something like adverbs. They could be located equally well in the head of the aspect phrase. I have no good arguments to consider morphological tense and morphological aspect as heads, either. The only thing that matters is the relative order of tense and aspect in the tree and the separation of morphological and semantic categories on the expression side.

I will use the terminology introduced by Reichenbach (1947) and call the time denoted by a semantic tense the *reference time*.¹⁴ Aktionsarten are located in time by means of a relation that connects the reference time with an event time or event state instantiating the aktionsart. With Klein (1994), I will call these relations ASPECTS, more accurately, ASPECTUAL RELATIONS. The following ASPECTUAL RELATIONS are used in many languages: the reference time may INCLUDE (\supseteq) the event time or the state time, the reference time may be INCLUDED (\sqsubseteq) in the event time, or the reference time may follow the event time or state time, being POST ($>$). The SEMANTIC ASPECTS are not exactly these relations but operations defined by means of these relations. They map properties of events into properties of times and may therefore be regarded as “temporalisers”. Here is the list of the SEMANTIC ASPECTS used in this article.

(18) **SEMANTIC ASPECTS**

- a. $\| \text{PERFECTIVE} \| = \lambda P \lambda t \lambda e.t \supseteq \lambda(e) \ \& \ P(e)$, P of type $\langle v, t \rangle$ ¹⁵
- b. $\| \text{PERFECT} \| = \lambda P \lambda t \lambda e.t > \lambda(e) \ \& \ P(e)$
- c. $\| \text{IMPERFECTIVE} \| = \lambda P \lambda t \lambda e.t \sqsubseteq \lambda(e) \ \& \ P(e)$

e can be an event or a state. $\lambda(e)$ is the time of e , i.e. the interval from the beginning of e till the end of e . Do not confuse SEMANTIC ASPECT with morphological aspect. In particular do not fall into the trap to believe that the Slavic imperfective morphology necessarily expresses IMPERFECTIVE. This morphology may very well be a concomitant with PERFECT or PERFECTIVE in particular contexts. Henceforth, I will use the abbreviations IPFV for IMPERFECTIVE, PFV for PERFECTIVE, while PERF will stand for PERFECT.

Let us turn to semantic TENSES next. Recently, a version of Partee’s (1973) deictic theory of TENSE has become increasingly popular. I will follow the proposal given in Heim (1994), according to which tenses restrict the interpretation of temporal variables:

(19) **SEMANTIC TENSES**

are symbols of type i which bear time variables as indices. Let c be the context of the utterance with t_c the speech time. g is a variable assignment.

- a. $\| \text{NOW} \|^{g,c}$ is the speech time conceived as a point.

14 It is what Bäuerle (1979b) and Fabricius-Hansen (1986) call *Betrachtzeit*, what Klein (1994) calls *topic time* or *time of the claim*, what Musan (2000) calls *tense time*. I see little point in contributing to the general confusion by coining a new term. Any is fine for me, provided it has a clear interpretation.

15 i is the type of times, v that of events.

- b. $\| \text{PAST}_j \|^{g,c}$ is defined only if $g(j)$ precedes the speech time t_c . If defined,
 $\| \text{PAST}_j \|^{g,c} = g(j)$.
- c. $\| \text{FUTR}_j \|^{g,c}$ is defined only if $g(j)$ follows the speech time t_c . If defined,
 $\| \text{FUTR}_j \|^{g,c} = g(j)$.

Here are some examples illustrating the system:

- (20) a. Dieter wohnt in Düsseldorf.
 b. $[_{TP} \text{NOW Pres } [_{AspP} \text{IPFV } \emptyset [_{VP} \text{Dieter in Düsseldorf wohn-}]]]$
 c. $\llbracket t.\text{NOW} \rrbracket t$ & Dieter lives in Düsseldorf at t

I am assuming that $\| \text{Dieter wohnt in Düsseldorf} \| = \llbracket t.\text{Dieter lives in Düsseldorf at } t \rrbracket$. German has no aspect morphology. I have indicated this by means of the zero morpheme \emptyset . If not stated otherwise, the evaluation of the LF proceeds via functional application. I ignore morphological heads that do not mean anything.

The perfect morphology is connected with several meanings in German. Most of the researchers agree that the perfect may be interpreted as the aspectual relation PERFECT, though they do not state it necessarily in that way (cf. Ballweg 1989, Bäuerle 1979b, Klein 1998, Herweg 1990, Musan 2001, Löbner 2002).

The simplest analysis that comes to the mind says that the perfect is a combination of TENSE + PERFECT. We have three combinations of this perfect: PRESENT + PERFECT (*hat gewohnt*), PAST + PERFECT (*hatte gewohnt*) and FUTURE PERFECT (*wird gewohnt haben*). This is the prevailing account in the literature, and it is in fact Prior's (1967) Past-operator.¹⁶ I am not convinced that this combination is a possible realisation of the perfect morphology at all.

16 The proposals in the literature differ somewhat in how TENSE and PERFECT are exactly defined. For instance, many if not most researchers assume that PRESENT denotes a time not before the speech time, i.e., $\| \text{NOW} \|^{g,c}$ is not before t_c (Ehrich 1992, Abusch 1997, Musan 2000). Others say that PRESENT includes the speech time (Fabricius-Hansen 1986, Klein 1994). Given the divergence of the different proposals, the question of which meaning is the correct one does not seem an empirical issue alone but is determined by the overall architecture of the TA-system. As I said, I will assume that NOW denotes the speech time conceived as a point (Mittwoch 1988).

The PERFECT relation is spelled out differently, too. Herweg (1990) says that the time/event related to the reference time by this relation must not be too distant from the reference time, while the simple past gives us a time distant to the reference time. Musan (2000) says that the time related to the reference time by PERFECT either precedes the reference time or abuts it. For Fabricius-Hansen (1986) and Rathert (1999), PERFECT introduces an unbounded past interval which abuts the reference time. For Fabricius-Hansen, this interval may even include the reference time. There are other proposals. In this paper, I assume that PERFECT is an existential quantifier that introduces a time/event prior to the reference time. This is the simplest analysis going back at least to Prior (1967). It has to be justified by the overall architecture of the system.

Consider example (21a). Adopting a PRESENT PERFECT analysis, it would have the interpretation (21b).

- (21) a. Dieter hat in Berlin gewohnt.
 b. $[_{TP} \text{NOW Pres } [_{AspP} \text{PERF } [_{PartP} \text{Dieter in Berlin wohn-}] \text{hab-}]]$
 c. $\Box [t < \text{NOW} \ \& \ \text{Dieter lives in Berlin at } t]$

Note, however, that a much more natural expression of that reading would be the following sentence:

- (22) Dieter hat mal in Berlin gewohnt.
 Dieter has sometime in Berlin lived
 'Dieter has lived in Berlin.'

Mal is Bäuerle's (1979b) adverb of quantification. But what could this adverb modify? The only time/event that is available is the event time. This would express the statement that there is a time in the past containing another time in the past which is a living of Dieter in Berlin. Conceptually, this reading is more complicated than the one expressed by (21a). By Gricean maxims we would therefore expect the former sentence to be the more natural candidate, which is not so. In Stechow (1999), I defended the view that the German perfect always expresses an XN. This claim was too strong. Now I hold the view that it *can* denote an XN. If *haben* in (22) denotes an XN, we have a natural explanation why we need the adverb of quantification *mal*; since 'Dieter live in Berlin' is a state, we have to confine it by means of something like *mal* within the XN. There is additional support for this view, and I will come back to that. For the time being, let us assume that my hypothesis is correct and that the LF of the last example is something like this:

- (23) $[_{TP} \text{NOW Pres } [_{AspP} \text{HAVE}_{\text{Germ}} \text{mal } [_{PartP} \text{Dieter in Berlin wohn-}] \text{hab-}]]$,
 where $\text{mal} = \Box P \Box t \Box [t' \Box t \ \& \ P(t')]$

$\text{HAVE}_{\text{Germ}}$ is the abstract version of the English PERFECT defined above as *have*. Rathert (1999) has given convincing arguments that the German XN-PERFECT does not include the reference time. We could define the German XN-PERFECT as:

- (24) The German XN-PERFECT
 $\text{HAVE}_{\text{Germ}} = \Box P \Box t \Box [t' \succ t \ \& \ P(t')]$, where \succ is the abutting relation.

In the sequel, I will ignore this distinction, and I will not distinguish between an English and German XN. The definitions imply that the LF (23) has the following truth condition:

- (25) $\Box [XN(t, \text{NOW}) \ \& \ \Box t' \Box t: \text{Dieter lives in Berlin at } t']$

The German translation of the English example in (6), viz.

- (26) Seit 1990 ist Dieter viermal in Tübingen gewesen.

is best analysed as an XN-PERFECT as well. In other words, the sentence has the LF (7). It is hard to see what a viable alternative could be.

Many if not most occurrences of the German perfect morphology express a plain PAST tense. Some researchers try to reduce the past readings to the PRESENT PERFECT. I agree with Löbner (2002) that this is not possible. Löbner gives many examples with a perfect where the reference time cannot be the speech time. Here is a sentence that makes Löbner's point with durational *seit*.

- (27) Wir sind gestern seit genau dreißig Jahren verheiratet gewesen.
 We are yesterday since exactly thirty years married been
 'Yesterday, we had been married for thirty years.'

Seit d introduces an interval that reaches up to the reference time. If the reference time were the speech time, then the *seit*-interval should end at the speech time, but it does not. It ends within yesterday. So the finite form of *sein/haben* may license a semantic PAST. Here is the LF which I have transliterated into English for convenience:

- (28) a. [_{TP} PAST_i [_t [yesterday [since 30 years [_{VP} ∅ [_{AP} we married] been]]] are]
 b. PAST_i [yesterday & we are married at PAST_i & [t XN(t,PAST_i) & | t | = 30 years & we are married at t

The copula *gewesen* 'been' converts the adjectival passive 'we married' into a non-finite VP. The finite auxiliary *sind* 'are' is interpreted as PAST_i.

Löbner (2002) correctly notes that the German perfect may have a resultative reading as well. The observation is presumably as old as German Grammar. For *seit d*, Bäuerle (1979b), illustrates this interpretation by means of the following contrast:

- (29) Bäuerle's (1979a) contrast
 a. Seit einer Stunde hat er die Jacke aus-gezogen.
 since one hour has he the jacket off-stripped
 '?He has stripped off his jacket for an hour.'
 b. Ich habe ihn seit einer Stunde beobachtet.
 I have him since one hour observed
 'I have been being observing him for an hour.'

The analysis of (29b) poses no problem. *Habe* must be interpreted as an XN-PERFECT, and the state expressed by the Participle Phrase (PartP) is predicated of the XN or perhaps linked to the XN by means of the ASPECT IMPERFECTIVE. The puzzling sentence is (29a). If we were to analyse it in analogy to (29b), it would mean that he has been stripping off his jacket for an hour. In fact, I think that sentence can have that interpretation. We have to convert the accomplishment 'he strip his jacket off' into a property that is more or less homogeneous. That could be Dowty's PROGRESSIVE or an iteration operator like 'there is one event after the other'. The more natural reading is, however, that he has been

in the state of having stripped off his jacket for one hour. So the perfect morphology must have a meaning that expresses the resultant state of an eventuality. These readings are most easily obtained for accomplishments/achievements. Adjectival passives only have that reading, as is well known.

Most of the proposals in the literature express resultative readings in purely temporal terms (e.g. Kamp & Reyle 1993, Parsons 1990), but it has been known for a long time that this is problematic. If I am in the state of having stripped off my jacket, then I am not wearing it. This doesn't follow if I am locating myself into some time that is just after *some* stripping off. For the time being, I am ignoring this problem and defining a result operator that says that the state in question abouts the accomplishment/achievement in question:

- (30) A result operator (preliminary)
 $\| \text{RESULT} \| = \lambda P \lambda t [\lambda e [P(e) \succ t \ \& \ P(e)]]$

The following is a good approximation to the meaning of (29a).

- (31) a. $[\text{TP} \text{NOW Pres seit 1 h} [\text{AspP RESULT} [\text{PartP he the jacket off-strip}] \text{have-}]]$
 b. $\lambda t [\text{XN}(t, \text{NOW}) \ \& \ |t| = 1 \text{ h} \ \& \ \text{Res.State}(t)]$, where
 $\text{Res.State} = \lambda t [\lambda e [P(e) \succ t \ \& \ e \text{ is a stripping off of his jacket done by him}]$

As we will see, this RESULT operator is too simple-minded. But I agree with Löbner that the German perfect morphology can express this reading. The conclusion is, then, that in active sentences the present perfect morphology is associated with at least five meanings. Here is a survey of the different functions of the German tense system:

- (32) The T/A-system of Standard German

	PRES	PAST	FUTR
IMPERFECTIVE	Present	Past Present Perfect	Future (= <i>werde</i>)
PERFECTIVE	(Reporter's) Present	Past Present Perfect	Future (<i>werde</i>) Present
XN-PERFECT	Present Perfect Preterite (=Ersatzperfekt)	Past Perfect	Future Perfect
PERFECT	Present Perfect	Past Perfect	Future Perfect (= <i>werde</i> + Aux) Present Perfect
RESULT	Present Perfect <i>bin</i> + Part	Past Perfect <i>war</i> + Part	Future Perfect <i>werde sein</i> + Part

(‘Part’ stands for Past Participle here and in the following charts.) This is an “onomasiologic” typology, i.e. we start from the meaning and see what its expression is. Details aside, rather similar charts are found in Kratzer (1998) and Löbner (2002). It can be

seen from this table that the present perfect is ambiguous in six ways. Presumably, the XN-PERFECT should not be classified as an ASPECT but as a special TENSE. But I will ignore this possible inconsistency in this paper.

It is instructive to compare this system with English, which has almost the same auxiliary system but fills it with rather different interpretations, a notorious source of errors for non-natives like myself.

(33) The English T/A-system

	PRES	PAST	FUTR
PERFECTIVE	(Reporter's) Present	Simple Past	<i>will</i> Present
XN-PERFECT	Present Perfect	Past Perfect?	
PERFECT		Past Perfect	<i>will</i> Perfect Simple Past
RESULT	<i>is</i> + Part	<i>was</i> + Part	<i>will</i> + Part

There are several striking contrasts between the two systems. Whereas the German present perfect is polyfunctional, its role is extremely restricted in English. It is even not clear to me whether there is a morphological realisation of the combination PAST XN. A further peculiarity of English is that the simple past can express the aspectual relation PERFECT in English, whereas this is not possible in German:

- (34) a. I will answer every email that arrived.¹⁷ Abusch (1996)
 b. ≠ Ich werde jede Mail beantworten, die ankam.
 'I will answer every email that arrived before the speech time.'

The German translation is not ungrammatical, but it has a different meaning. The past tense in the relative clause unambiguously refers to a time before the speech time, whereas the English sentence has a meaning where the simple past expresses the combination FUTR PERFECT. Note that the English continuous form doesn't figure in the chart. The English progressive is a special stativiser, exactly as the adjectival passive, which is treated in section 5. The meaning of the progressive operator is not considered in this article (cf. Dowty 1979: 145 ff.).

The thesis that the perfect morphology may be ambiguous gains further support by looking at other languages. In an appendix I give the outlines of the tense/aspect systems of Italian and Russian, which have an entirely different interpretations.

¹⁷ Angela Cook, my Australian informant, comments on the example: "I find this sentence very strange, and I suspect that only an American would say it. I would say 'I will answer every email that has arrived.' – with FUTR PERFECT meaning".

4. German data analysed

4.1 *Seit* under present

The reader will recall that my analysis predicts that such configurations as *seit t* or *seit d* modify a state, which is predicated both of the reference time and the XN introduced by the *seit*-PP. The reader will also recall that the *seit*-PP does not qualify the reference time. Even if the XN is very long, the reference time may be very short or even a point. Here are some attested examples, all taken from the COSMAS corpus (all examples from *Mannheimer Morgen*). This use of *seit* is very common and the examples are legion.

- (35) [Bei der Abstimmung votierten 482 Bürger gestern gegen Norbert Lindner,]
 der sich seit dem Sommer Michaela nennt und seither fast

who himself since the summer Michaela calls and since then almost
 ausschließlich Frauenkleider trägt
 exclusively women's dresses wears
 (M98/811.91047)

The first occurrence of *seit* poses no problem for the analysis. The state 'call himself Michaela' is predicate of the XN, which starts in the summer. The treatment of the second occurrence is a bit less obvious. *Frauenkleider tragen* 'wear women's dresses' is an activity. In order to predicate it of the XN we must convert it into a homogenous property by interpreting it as habitual.¹⁸ The same consideration applies to the following text:

- (36) [Im "Kinder- und Jugendzentrum Bahnhof Göhrde", in unmittelbarer Nähe des
 Naturparks Elbufer-Drawehn,]
 treffen sich seit dem Sommer 1983 immer wieder arbeitslose junge
 meet themselves since the summer 1983 again and unemployed young
 again
 Leute aus Werkstattprojekten und Initiativgruppen, (...)
 people from workshop projects and initiative-groups
 (M89/906.21874)

Sich mit jemandem treffen 'meet someone' is presumably an achievement. The construction requires that it be a state. Therefore we have to interpret this VP as a habit as well. The adverbial *immer wieder* 'always again' triggers this interpretation.

The following example is a "degree achievement", i.e. a change with the subinterval property (cf. Dowty 1972).

¹⁸ This requires a silent HABITUALITY operator, which we will not try to define here.

- (37) [Seit zwei Jahren gedeihen die Rosen bestens, aber]
 die Geranien werden seit dem Sommer immer mickriger, (...)
 the geraniums become since the summer more and more measly
 (M89/901.02822)

Degree achievements are perhaps not true of a point, but they have the subinterval property. A formal analysis of their meaning was given in Stechow (1996a). We can either predicate a degree achievement directly of the speech time, or we can apply a conceptual operation to them, which gives us something like ‘the property of becoming more and more measly’.

An activity under Present and *seit* can be interpreted as ongoing, i.e. by means of Dowty’s PROG-operator. The following example illustrates this case:

- (38) Die Staatsanwaltschaft prüft schon seit dem Sommer
 the Department of Public Persecution examines already since the summer
 tion
 (...), ob die Hertie-Stiftung Geld am Fiskus vorbei geschleust hat.
 whether the Hertie-foundation money around the exchequer led has
 uer

(M99/912.82499)

In other words, the AspP modified by *seit dem Sommer* is not the activity [the Department of Public Persecution investigate whether...]; rather, it is the state PROG [the Department of Public Persecution investigate whether...].

For the sake of completeness, I mention the constructions with *seit*-deletion, which have been discovered by von Fintel & Iatridou (2001).

- (39) Erst seitdem Dieter seine Frau kennt, ist er glücklich.
 Only since Dieter his wife knows, is he happy
 ‘Dieter has only been happy since he has known his wife.’

Looking at the surface structure of the sentence suggests that the LF should be shaped according to the following paraphrase.

- (40) Dieter is happy since the time at which he knows his wife.

But which time should that time be? Presumably it is the time starting sometime in 1964 and reaching up to now. This large time span cannot be the left boundary of his state of happiness. The happiness starts with the beginning of that time. Von Fintel & Iatridou (2001) argue that we obtain the correct reading if we derive the LF from a surface that contains two prepositions *seit*:

- (41) Erst seit ~~seitdem~~ Dieter seine Frau kennt, ist er glücklich.

The second occurrence of *seit* is deleted at PF under adjacency. The interpretation is something like this:¹⁹

- (42) [PRES *seit* t Dieter be happy], where t = the t' [PRES *seit* t' Dieter know his wife]

The syntax of the subordinate temporal clause is generated by operator movement in the sense of Larson (1990), i.e. “the t'” may be thought of as an operator OP_{t'}, which occupies the object position of *seit* and is moved to COMP at LF.

A bit of reflection shows that this is the correct interpretation, for now the subordinate clause has a meaning that marks a beginning, viz.:

- (43) the t'. [t' [XN(t'', NOW) & LB(t', t'')] & Dieter knows his wife at t'']

Gergely Pethő informs me that Hungarian surface syntax behaves exactly as predicted by Iatridou and von Fintel's account: we find ‘since’ both in the main and in the subordinate clause:

- (44) Dieter az-óta boldog, ami-óta ismeri Kati-t.
 Dieter DEM-since happy, REL.PRON-since know.3SG Kati-ACC
 ‘Dieter has been happy since he has known Kati’

4.2 *Seit* under *sein/haben*

The observed *haben/sein*-constructions behave mostly as predicted by our description, with one notable exception: we find combinations with *haben/sein* in the simple past and *seit* that embed achievements/accomplishments. The theory predicts that the embedded aktionsart is cumulative. These data have been analysed as “Ersatzperfekt” in the literature. The simple past is used for stylistic reasons.

The following example is a clear case of what McCawley (1971) would call an existential perfect (E-Perfect, here E-Pluperfect): we have one or several event times within an XN.

- (45) [Seit Februar 1987 hatte er [der Yen] auf dem Nachkriegs-Rekordtief von 2,5 Prozent gestanden, obwohl es in den anderen wichtigen Industrieländern der westlichen Welt] schon seit dem Sommer vergangenen Jahres mehrere Erhöhungen already since the summer of last year several raisings gegeben hatte. occurred had (M89/905.18556)

19 Von Fintel and Iatridou (2001) assume a somewhat different LF.

The LF of the sentence in question must be something like:

- (46) $\llbracket t \text{ XN}(t, \text{PAST}_i) \ \& \ \text{LB}(\text{last summer}, t) \ \& \ \llbracket \text{several } t' \ \llbracket t' \text{ is a raising of the prices}$

This means that several raises of the prices took place within the XN. It is hard to see how this sentence could be interpreted without the XN. We cannot reduce this meaning of *seit* to *seit t*, i.e. the variant that introduces the XN and predicates the AspP of it. The reference time is May 31, and the raises did not take place on that day but within the period reaching from last summer up to May 31. So the XN must be introduced by the *haben*-Perfect and *seit dem letzten Sommer* must specify the beginning thereof.

In the following example we have a frame setter within an XN introduced by the perfect auxiliary *ist*.

- (47) Erstmals seit dem Sommer ist die Arbeitslosenquote
 for the first time since the summer is the rate of unemployment
 in Baden-Württemberg im Dezember gestiegen.
 in Baden-Württemberg in december risen
 (M98/801.02169)

The article speaks of the period between last summer and January 1. The rising of the rate of unemployment takes place in December, which is a part of the XN.

A perfect of result is exhibited by the following data:

- (48) [Die Autobahn-Baustelle existiert zwar schon seit dem Sommer.]
 Seit Mittwoch allerdings haben die Bauarbeiter die vier Fahrspuren
 since Wednesday yet have the road workers the four lanes
 auf drei verengt
 to three narrowed.down
 (M99/909.63951)

The context makes it clear that the narrowing down of the highway was terminated on Wednesday. It follows that the sentence in question is a statement about the present. Its LF is analogous to (31).

E-perfect readings require *haben/sein* + participle, i.e. a perfect construction. If a *seit*-adverbial modifies a preterite, the AspP should be homogeneous according to our theory. There is, however, an exception to this, which is known as the “Ersatzperfekt” in the literature (cf. Latzel 1977, Rathert 1999): if *haben* or *sein* figure as a main verb or a “light verb” in the preterite, they may express an E-perfect reading:

- (49) “Ersatzperfekt”
 a. Seit 1980 war Dieter fünfmal in Venedig.
 since 1980 was Dieter five times in Venice
 ‘Since 1980, Dieter has been five times to Venice’

- b. Seit dem Sommer hatte Dieter dreimal einen Schnupfen.
since the summer had Dieter three times a cold
- c. Dieter war bis jetzt fünfmal in Venedig.
Dieter was until now five times in Venice
- d. Dieter hatte bis jetzt dreimal einen Schnupfen.
Dieter had until now three times a cold

The Ersatzperfekt is a clear example for a mismatch between morphology and semantics because past is semantically NOW + HAVE_{Germ} and not PAST, as one would expect. The LF of (49a) is the following:

- (50) [_{TP} NOW HAVE_{Germ} past [_{AspP} since 1980 5 times PFV Dieter be to Venice]]

4.3 *Seit* under preterite

In section 4.1 we saw examples where *seit* under the present introduces an XN. Normally *seit* under the preterite is analysed exactly alike. An example illustrating this claim is the following:

- (51) Sie kannten sich damals bereits seit 5 Jahren.
'they knew each other then already since 5 years'

The proper logical analysis exhibits the configuration PAST *seit* 5 years STATE. There are, however, many attested examples that cannot be analysed that way. Look at the following two texts.

- (52) In mindestens 20 gleichartigen Fällen trat seit dem Sommer
1997
in at least 20 similar cases performed since the summer
1997
ein 35jähriger Heddesheimer auf den Feldwegen zwischen Heddesheim
a 35 Heddesheimiam on the field.tracks between Heddesheim
years.old
und Ladenburg als Exhibitionist auf (...)
and Ladenburg as an exhibitionist PTC
(M98/811.87389)

- (53) Bereits seit dem Sommer sammelten die Besucherinnen der

already since the summer collected the visitors of.the
 Seniorentagesstätte leere Medikamentenschachteln, (...)
 senior home empty drug boxes
 die sie dann mit Geschenkpapier verpackten und bunten Bändern verzierten.
 (M99/912.80143)

We can try to analyse these sentences as PAST *seit* the summer XP. This works for the second sentence, because the AspP is more or less homogeneous. Sentence (52) is problematic for our theory. This seems to be an E-perfect, but it is not licensed by a main verb *haben/sein*. This example is not captured by our account and is therefore a possible counterexample to our approach.

Some examples look as if *seit t* can modify the reference time:

- (54) Berufliche Gründe machten es “Scotty” seit dem Sommer 1997
 professional reasons made it “Scotty” since the summer 1997
 unmöglich weiterhin am Schlagzeug der Gruppe präsent zu sein.
 impossible furthermore at.the drums of.the group present to be
 (M99/910.66463)

A closer inspection shows that the sentence poses no problem for our semantics. The reference time is October 10 of 1999. *Seit dem Sommer 1997* introduces a period starting in the summer 1997 and ending at the reference time. The modified XP is predicated of that period. So the impression that the adverb modifies the reference time is misleading.

4.4 Some predictions of the theory

Despite the polyfunctionality of the German perfect and the polysemy of *seit*, not everything goes. Certain combinations are predicted as ungrammatical.

- (55) *Dieter erreicht den Gipfel seit 5 Uhr.
 Dieter reaches the top since 5 o'clock

The unmarked function of *seit 5 Uhr* is to introduce an XN starting with 5 o'clock. The AspP modified should be homogeneous, which is not the case. This, however, is not the reading that we are discussing here.

The following two examples are taken from Musan (2000).

- (56) a. Das Theater fing seit 12 Uhr an. (ok for Musan, * for me)
 the theatre started since 12 o'clock PTC
 b. Das Theater hat seit 12 Uhr angefangen.
 the theatre has since 12 o'clock started

For Musan, both examples are equally acceptable. For me and most speakers I have asked there is a clear contrast between the two: the first sentence is unacceptable. The explanation of the oddness of (56a) is exactly as for (55): the AspP is an achievement and cannot satisfy the homogeneity requirement. (56b) is very interesting. We can try to analyse the sentence as an XN-perfect where *seit 12 Uhr* marks the starting point. But then we have the problem that the AspP *das Theater angefangen* should be a state. The natural interpretation is that the PartP has a resultative reading. This would mean that the sentence has the LF $\boxed{\text{PRES XN since } 5 \text{ RESULT VP}}$ While this is a possible approach, we can have a simple account of the fact. We say that *haben*-achievements can have a resultative interpretation similar to the adjectival passive. The LF of the sentence is therefore as in (31a).

The following examples seem to be problematic for the analysis suggested:

- (57) a. * Dieter ist heute seit 1965 verheiratet.
 Dieter is today since 1965 married
 ‘Today, Dieter has been married since 1965.’
 b. * Dieter war zu dieser Zeit seit 1965 verheiratet.
 ‘At that time, Dieter was married since 1965.’
 c. Dieter ist seit 1965 verheiratet.
 ‘Dieter is married since 1965.’

Using the XN-introducing *seit t* defined in (12), we obtain straightforward truth conditions for the sentences. For instance, (57a) means that he is married today and he has been married since 1965. One could try to explain the ungrammaticality pragmatically on the lines of Klein’s (1992) explanation of the Present Perfect Puzzle. It makes no sense to assert (57a) of today. The sentence is true (or false) of yesterday and tomorrow as well. Only those statements P can be asserted meaningfully for an explicitly named time *t* if P can be false (true) at some time *t*’ following or preceding *t*. We need a “topic time contrast”, to use Klein’s terminology. The examples given do not fulfil this pragmatic requirement. Recall that example (15) is entirely acceptable. It differs from the examples in (57) only in having *seit d* instead of *seit t*. The effect is obvious: the truth value of (15) oscillates, but that of (57a) does not.

What about the following contrast, which is taken from von Stechow & Iatridou (2001)?

- (58) a. Since 1990, Tony has sent an abstract to every SALT.
 b. Seit 1990 schickt Tony an jedes SALT ein Abstract.
 c. *Since 1990, Tony sends an abstract to every SALT.

The German sentence (58b) is grammatical and at first sight it seems to mean something like its English counterpart (58a). A closer inspection reveals, however, that this is an illusion. Consider the following contrast:

- (59) a. Since 1990 I have attended three SALT meetings.
 b. *Seit 1990 nehme ich an drei SALT-Treffen teil.

While (59a) is an E-Perfect, the German sentence (59b) is not acceptable in that reading. From this I conclude that the German sentence (58b) does not express a generalised E-Perfect either.²⁰ The German sentence must be interpreted as habitual. So this example is treated like (35) and (36). Universal statements can be interpreted as habits; existential statements cannot.

If this is so, how can we express the meaning of the English sentence (58a) in German? By the same construction, I think:

- (60) Seit 1990 hat Tony an jedes SALT ein Abstract geschickt.
 Since 1990 has Tony to every SALT an abstract sent

So I do not agree with those who claim that German has no XN-Perfect (e.g. Musan 2000 or von Fintel & Iatridou 2001). The examples given are always of the following kind:

- (61) a. Dieter ist seit dem Donnerstag krank.
 Dieter is since the Thursday sick
 b. ?Dieter ist seit dem Donnerstag krank gewesen.
 Dieter is since the Thursday sick been

The contrast in grammaticality seems obvious in these cases. Note, however, that Bäuerle's examples in (29) are exactly parallel, and there the counterpart of (61b) is acceptable. Recall that Rathert (1999) has discovered that the XN-readings of the German perfect do not include the speech time. If we assert (61b) as a statement about PRES, then the context must suggest that the speech time is the moment of Dieter's recovering from sickness. So (61b) should perhaps not be classified as ungrammatical in absolute terms. The difference between the XN-perfect and the XN introduced by *seit t* seems to be that the former can combine with a non-stative aktionsart, whereas the latter can't.

The contrast observed for (60)/(61) is exactly the same as that in (62).

- (62) a. Seit gestern hat Dieter dreimal angerufen.
 since yesterday has Dieter three-times called
 b. *Seit gestern ruft Dieter dreimal an.
 since yesterday calls Dieter three-times PTC

20 This is a sort of Universal Perfect ("U-Perfect"), but not one that distributes to every subinterval of the XN as typical instances of McCawley's U-Perfect do.

5. Perfect of result

The perfect of result is expressed by the adjectival passive (“Zustandspassiv”) and occasionally by active constructions.

- (63) a. Die Bibliothek ist seit 9 Uhr geöffnet.
the library is since 9 o'clock opened
b. Wolfgang hat Diano seit Freitag verlassen.
Wolfgang has Diano since Friday left

Wunderlich (1970) observes that the perfect of result requires a transformative verb, i.e. an accomplishment/achievement. So these aktionsarten must have a logical type that enables us to derive this generalisation. In this section **we** discuss how this can be done.

The most promising proposals for a theory of the perfect of result that I am aware of have been made in Kratzer (1994, 1996, 2000). I will follow her suggestions with one important modification: accessible resultant states will not be particular events/states as assumed by Kratzer but rather properties of states/times. Kratzer's theory has undergone some changes for the last years, which I will briefly review here. One important feature has been retained: the “external” argument of a verb is not generated in the VP but introduced by a separate head called Voice. In view of examples such as (63b) where the external argument figures in the resultant state, this position is presumably exaggerated and I will not take it as an inviolable principle.

In Stechow (1996b) I tried to adapt Kratzer's idea to a somewhat modified version of Dowty's (1979) theory of decomposition. The intransitive construction

- (64) Das Fenster öffnete sich wieder.
The window opened again

had two analyses, the “repetitive” one and the “restitutive” one.

- (65) a. PAST_i PFV \square_e BECOME_e **again** open(the window)
b. PAST_i PFV **again** \square_e BECOME_e [open(the window)]

For convenience, I give the meaning for the functional adverb *again*.

- (66) **again** [official version]
again is of type $\langle it, it \rangle$ or $\langle vt, vt \rangle$. **again**(P)(e) is true if $P(e) \wedge \square_{e'} [\square(e') < \square(e) \wedge P(e')]$, where e is a time or an event, and v is the type of events.

The two LFs in (65) differ only in as much as *again* has narrow scope with respect to BECOME in the first LF but wide scope in the second LF. BECOME_e(P) means that P is false of LB(e) and P is true of RB(e), i.e. of the beginning and the end of the event e, respectively. P is undefined for any interval between these two points. **again**(P)(e) means that P is

true of e with the presupposition that there was an e' before e such that $P(e')$, where e is either an event or a state/time.²¹ So this is a mere respelling of Dowty's theory.

A problem that has kept worrying me for years is the question of how the adjectival passive can be expressed in this framework. The following is a valid argument:

- (67) Das Fenster ist geöffnet. 'the window is opened'
 □ Das Fenster ist offen. 'the window is open'

And the following statement is a plain contradiction for me:

- (68) [#]Das Fenster ist geöffnet, aber zu.
 the window is opened-partic. but closed-adj

It is desirable to derive the adjectival passive from the stem by a semantic operation which reflects the formation of the participle, which is something like $GE-T + \text{öffn} \sqsupset \text{ge-öffn}(e)-t$. Suppose next that the stem of *öffn-* has the following meaning:

- (69) $\text{open}_V := \lambda x \lambda e. \text{BECOME}_e \text{open}_A(x)$ (to be revised)

The index V is used to typographically distinguish the transformative verb from its resultant state, which may be thought as an adjective. In view of the preceding discussion, the meaning of the adjectival passive must be something like this:

- (70) $\text{opened}_A := \lambda x \lambda s [\text{open}_A(x)(s) / \& \lambda e [e \succ s \& \text{BECOME}_e \text{open}_A(x)]]$ (to be revised)

This applies to an x if x is open_A and there is an abutting BECOMING- open_A event, where the latter is presupposed, **which is indicated by the notation /&**. The problem mentioned is that this meaning cannot be derived from the stem meaning (69). The reason is that open_V is a relation between individuals and events. The event e is the becoming and the individual x is the thing that undergoes the change. What the adjectival passive predicates of the undergoer is not the becoming but the result state of the becoming, i.e. the property open_A . This property, however, is not recoverable from the relation expressed by the stem.

To deal with results, Kratzer (1994) took the notion of resultant state as a primitive and formalised accomplishment verbs directly in terms of resultant states. The VP *open the window* would then have the following analysis:

- (71) Kratzer (1994):
 $[\text{VP } \textit{das Fenster öffnen}] = \lambda e. \text{open}(\text{the window})(f_{\text{result}}(e))$

f_{result} is a function that assigns its resultant state to each event. In Stechow (1996c), I objected to this analysis on the grounds that it cannot represent restitutive readings arising with *again*: it is not possible to have the truth condition (65a) for sentence (64) because

²¹ .More accurately, all this should be relativised to worlds. " λe " means that e is located in the index world w . $P(e)$ means that e has property P in w .

Kratzer's VP is a set of events with no accessible resultant state. Kratzer can only have the repetitive reading, which is given by the following LF in her system:²²

$$(72) \text{ PAST}_1 \text{ IPFV } [_{\text{VP}} \text{ again } [_{\text{e}} \text{ open } (\text{the window})(f_{\text{result}}(e))]]$$

The reader may calculate for himself that this is in fact a repetition of an event. In Kratzer (1996:4.6), the need for decomposition in the syntax seems to be admitted for such examples. Kratzer introduces a head *Affix*.

$$(73) \text{ Affix} := [_{\text{P}} [_{\text{e}}] s.P(s) \ \& \ s = f_{\text{result}}(e)]$$

Affix is an "eventizer": it transforms a property of states into a property of events, exactly as my version of Dowty's BECOME. In fact, *Affix* means more or less the same as BECOME. The decomposition of the VP *das Fenster öffnen* is now the following:

$$(74) [_{\text{VP}} \text{ Affix } [_{\text{AP}} \text{ das Fenster offen}]] \\ = [_{\text{e}}] s.\text{open}(\text{the window})(s) \ \& \ s = f_{\text{result}}(e)$$

Since the decomposition is carried out in the syntax now, we have a docking site for the adverb *again* and can represent the restitutive reading of example (64) by means of the following VP:

$$(75) \text{ A restitutive VP} \\ [_{\text{VP}} \text{ Affix } [_{\text{AP}} \text{ again } [_{\text{AP}} \text{ open}(\text{the window})]]]$$

A consequence of this approach is that the lexical entry (71) cannot be maintained, and at least some transformative verbs have to be decomposed in the syntax.²³ So this approach is virtually indistinguishable from the one given in (Stechow 1996b) for active sentences.

Next, let us look at the adjectival passive.

$$(76) \text{ Das Fenster ist wieder geöffnet. (only restitutive)} \\ \text{the window is again opened}$$

The prevailing reading – for me the only reading – of this is the restitutive one: the window is open as the result of a becoming-open event, and it had been open before. It is not presupposed that there had been such an event before.

Adjectival passives are expressed by a "perfectizer" PERF_K in Kratzer (1994):

$$(77) \text{ Kratzer's (1994) perfectiser (to be revised)} \\ \text{PERF}_K = [_{\text{P}} [_{\text{s}}] e.P(e) \ \& \ s = f_{\text{res}}(e)]$$

²². Her actual representation is a bit different, it involves Parsons' (1990) thematic relation HOLDER(s)(x), which means that x is the holder of state x.

²³. Kratzer calls verbs that have that are described via their resultant state "perfective". Perfectivity in this sense characterises Vendler's accomplishments/achievements. This sense must not be confused with our and Klein's use of PERFECTIVE, a term that refers to an aspectual relation.

This operator converts a participial phrase into an adjectival participle, say, something of the category AP. So the structure of the predicative AP before raising of the subject is this:²⁴

(78) $[_{AP} \text{PERF}_K [_{\text{PartP}} \text{das Fenster geöffnet}]]$ ²⁵

If we assume the same analysis as in (71), the meaning of the AP is $\lambda s \lambda e [\text{open}(\text{the window})(f_{\text{result}}(e)) \ \& \ s = f_{\text{result}}(e)]$. This property applies to a state if it is the resultant state of an opening of the window, the result wanted. If we try to analyse (76) by means of these techniques, we see that we do not get what we want. To be concrete, the analysis predicted by the theory does not give us the restitutive reading but a particular repetitive one:

(79) We obtain:

- a. $\text{PERF}_K \text{ again}(\lambda e. \text{open}(\text{the window})(f_{\text{result}}(e)))$
‘The window is in the resultant state of another opening of it’
- b. $\text{again PERF}_K (\lambda e. \text{open}(\text{the window})(f_{\text{result}}(e)))$
‘The window is again in the resultant state of an opening of it’

We want:

- c. $\text{PERF}_K \lambda e [\lambda s [\text{again}(\text{open}(\text{the window}))](f_{\text{result}}(e))]$
‘The window is in the resultant state of an opening of it, and it had been open some time before the event’

We have seen that we can derive (79c) only if we decompose the verb in the syntax, i.e. we have to represent the adjectival participle as

(80) $[_{AP} \text{PERF}_K [_{\text{VP}} \text{Affix} [_{AP} \text{again} [_{AP} \text{open}(\text{the window})]]]]]$

A bit of reflection shows that this is the correct meaning.²⁶

It is interesting to see how this relates to the classical decomposition analysis. Recall that we have given the meaning of the adjectival participle in (70). The problem was that we wanted to predicate the state *open(x)* embedded under BECOME of the resultant state, but this was not possible if we represented the verb *öffnen* in the classical way as BECOME *open(x)* or even as a structure where the state is embedded under CAUSE, the standard representation. In Rapp and Stechow (2000) we tried to solve the problem by defining an operator RESCBECOME (“the result of a becoming”), which operated directly on the stative AP-root of the transformative verb. The rule said that the AP-state was the result of a becoming and it held of the time directly following the becoming event. Obviously, this method is not very elegant.

²⁴ In fact, the subject is presumably a controlled PRO as Kratzer has argued.

²⁵ For syntactic details, see Kratzer (1996) and Rapp (1997).

²⁶ The property expressed turns out to be $\lambda s \lambda e [\lambda s' [s' = f_{\text{res}}(e) \ \& \ \text{open}(\text{the window})(s')] \ \& \ [\lambda s^* [\lambda s^* < \lambda s' \ \& \ \text{open}(\text{the window})(s^*)]] \ \& \ s = f_{\text{res}}(e) \ \& \ \text{open}(\text{the window})(s)]]$.

If we try to localise the source of the problem, then the following diagnostic seems adequate. Adopting Dowty's (1972) Aspect Calculus, each aspectual class is either a property of states/times or a property of events; there is no aspectual class that is a relation between events and states/times. The conclusion I have been drawing in a number of papers is that we need decomposition in the syntax in order get the modification by means of functional adverbs (*again* and *almost*) right. The result is a rather abstract syntax in the style of Generative Semantics (see, for example, McCawley 1971). If we do not want to accept the conclusion, we have to depart from the simple architecture of Dowty's system, and we have to complicate the entries for the verbs a bit. What Klein (1994) calls a 2-state verb is now literally a relation between two things, viz. an event *e* (the preparation phase) and a state *s* (the resultant state).²⁷

Recently, Kratzer has proposed that we have to distinguish between two kinds of transformative verbs (see Kratzer 2000). There are those verbs that have an accessible resultant state and those that don't. Only the former have real perfects of result. *Öffnen* 'to open' should have an accessible resultant state. A verb like *abgeben* 'deliver' does not have an accessible result. A test to distinguish the two is the possibility for the adjectival passive to undergo modification by the aspectual particle *noch immer*:

- (81) a. Das Fenster ist noch immer geöffnet.
the window is still always opened
b. [#]Der Aufsatz ist noch immer abgeben.
the paper is still always delivered

The difference in acceptability follows from a difference in lexical semantics:

- (82) Two kinds of transformative verbs (Kratzer; to be revised)
a. **deliver** := $\lambda x \lambda e [\text{deliver}(x)(e)]$
b. **open_v** := $\lambda y \lambda e \lambda s [\text{cause}(s)(e) \ \& \ \text{open}(y)(s)]$

Both verbs express accomplishments if combined with appropriate objects, but only the latter verb is genuinely transformative because it has an accessible resultant state, whereas the former has not. Note that there is variation among speakers: one might very well construe the verb *abgeben* 'deliver' as creating the result of being in the hand of the recipient. People who analyse the verb this way should find sentence (81b) acceptable.

The theory entails that sentences with transformative verbs must have a rather different LF from those with ordinary accomplishments. For instance, sentence (83a) is represented in the familiar way as (83b) within a Kratzerian framework:

²⁷. Over the years, I have repeatedly tried to work out this idea, but I have never been really content with my results. The paper that comes nearest to what I am saying here is Stechow (1996a).

- (83) a. Dieter gab den Aufsatz ab.
 ‘Dieter delivered the paper.’
 b. PAST_i PVF $\square_e[\text{VoiceP AGENT}_e(\text{Dieter}) \ \& \ [\text{VP deliver}_e(\text{the paper})]]$

AGENT_e(*Dieter*) means that Dieter is the agent of the action *e*. But we cannot represent the sentence *Dieter öffnete das Fenster* ‘Dieter opened the window’ in that simple way because *open_v(the window)* is not a set of events but a relation between events and states. Hence we have to convert this relation into a set of events by means of an “eventizer” EVENT, which existentially closes the event variable. And we have a “stativizer” STATE, which existentially closes the result and gives us the adjectival passive. These operators are found in Kratzer (2000).

- (84) Aktionsart choosers (Kratzer, to be revised)
 a. EVENT = $\square R \square e \square s [R(e)(s)]$ (the eventizer)
 b. STATE = $\square R \square s \square e [R(e)(s)]$ (the stativiser)

The eventive participle (or VP) and the stative participle are now simply distinguished by a different “aktionsart chooser.”

- (85) a. The eventive VP **open**: $\square x [\text{VP EVENT open}_v(x)]$
 b. The stative AP **opened**: $\square x [\text{AP STATE } [\text{PartP open}_v(x)]]$

By a bit of calculation, we find out that the eventive VP is true of an *x* and an event *e* iff *e* is an event that causes the state that *x* is open. The stative AP is true of an *x* and a state *s* if *s* is the state that *x* is open and *s* is caused by an opening event. So the sentence *Dieter opened the window* has the LF

- (86) PAST_i PVF $\square_e[\text{VoiceP AGENT}_e(\text{Dieter}) \ \& \ [\text{VP EVENT open}_v(\text{the window})]_e]$

whereas the adjectival passive has the following analysis:

- (87) a. *Das Fenster war geöffnet.*
 ‘the window was opened’
 b. $[\text{TP } \text{the window } \square_x \text{PAST}_i \text{ was } [\text{AspP IPFV } [\text{AP STATE } [\text{PartP open}_v(x)]]]]$

(The IPFV could safely be omitted.) All this looks very attractive, but I have doubts that we can express the restitutive reading of (64) by this method. Note that the representation of repetitive readings poses no problem for the new theory. We simply apply the modifier *again* to the VP or AP and obtain a good result:

- (88) a. $\square x. \text{ again } [\text{VP EVENT } [\text{open}_v(x)]]$
 b. $\square x. \text{ again } [\text{AP STATE } [\text{VP open}_v(x)]]$

(88b), for instance, is true of an *x* and a state *s* if *s* is a being open of *x* and *s* is generated by a particular event, and another state with the same property occurred in the past. In other

words, the repetition of a state implies the repetition of an event that generates it. I think this prediction is borne out by the facts.

What about the restitutive reading for the eventive VP? In order to modify the result by means of *again*, we have to assume that the adverb can directly apply to the transformative VP in (88a). The best we can have is the following meaning rule:

- (89) Restitutive *again* for Kratzer (2000)? A failed attempt
 $\mathbf{again}_{rest} = \lambda R \lambda e \lambda s [R(e)(s) \wedge \lambda s' [\lambda s' < \lambda (e) \wedge \lambda e'. R(e')(s')]]$, R of type <vt, t>

The LF for the restitutive eventive VP would then be the following one:

- (90) $\lambda x [\lambda_{VP} \text{EVENT } \mathbf{again} [\lambda_{VP} \text{open}_V(x)]]$

This, however, does not give us what we want. The eventive VP applies to an x and an event e iff there is an s caused by e and x is open in s & there is an s': $\lambda (s') < \lambda (s) \wedge x$ is open in s' and there is another event e' such that e' causes s'. This reading, however, is too strong because it implies the repetition of the becoming-open event. This is not the restitutive reading we wanted to obtain.

A very similar approach as Kratzer's has been made in Piñón (1999). Exactly as Kratzer he analyses intransitive *open* as follows:

- (91) Piñón's intransitive *open* [27]
 $\mathbf{open}_{itr} = \lambda s \lambda x \lambda e [Result(e, x, s, Be-open)]$, where
 $Result(e, x, s, P) := Theme(e, x) \wedge e \text{ abuts } s \wedge P(s) \wedge Theme(s, x)$

Piñón does not treat tense, but applying our tense rules, the sentence *the door opened* would be analysed as:

- (92) PAST_i PFV $\lambda e \lambda s. \mathbf{open}_{itr}(e, \text{the door}, s)$

The existential closure of the state variable is achieved by means of a default rule; cf Piñón (1999:(31)). Exactly as before, the only way to possibly represent the restitutive reading for *again* is to apply an appropriate version of the adverb to the verb *open_{itr}* before the existential closure applies. So a possible LF could be this:

- (93) PAST_i PFV $\lambda e \lambda s. \mathbf{again}_{rest}(\mathbf{open}_{itr})(e, \text{the door}, s)$

As before, the best meaning we can have for the adverb is the following one:

- (94) Restitutive *again* for Piñón (1999)? Another failed attempt.
 $\mathbf{again}_{rest} := \lambda R \lambda s \lambda x \lambda e [R(s)(x)(e) \wedge \lambda s' [\lambda s' < \lambda (e) \wedge \lambda e'. R(s')(x)(e')]]$

As under Kratzer's analysis, the repeated state must be the result of a previous opening. So this is not the restitutive reading but the repetitive one.

Jäger and Blutner (1999), who pursue a similar approach to Piñón and Kratzer, are aware of the problem arising with restitutive *again*. They would say that something like (90) or

(93) is the correct LF and that there is an event that generates the resultant state. But the event doesn't occur in our world. It is merely a possible event. The resultant state, however, occurred in the past of our world. To implement the idea, we would probably have to say that STATE and EVENT quantify over actual states/events, while the stativiser occurring in the definition of *again_{rest}* quantifies over possible events only. In order to work this out, we would need a modal framework, and many questions would have to be considered. I do not think that Jäger and Blutner (1999) have developed such a theory and I have commented on their approach in Stechow (2000a). As to Kratzer's approach, I understand her notion of causation as relative to the actual world (viz. the world of evaluation). Then we have the problem mentioned.

For the time being, I propose to overcome the difficulty by changing the logical type of states. I will assume that the property which qualifies the result state is an argument of the relation as well. Thus Kratzer's entry is changed in the following way:

- (95) Verb with result states [official version]
 $\text{open}_V := \lambda x \lambda e \lambda S \lambda s [\text{cause}(e,s) \ \& \ S = \text{open}_A(x) \ \& \ S(s)]$,
 S a property of states/times

The aktionsarten choosers have to be revised accordingly.

- (96) Aktionsart choosers [official version]
 a. EVENT = $\lambda R \lambda e \lambda S \lambda s [R(e)(S)(s)]$, S a property of states/times
 b. STATE = $\lambda R \lambda s \lambda S \lambda e [R(e)(S)(s)]$

Here is the representation of a minimal pairs by means of the official theory:

- (97) a. Das Fenster öffnete sich. [official version]
 'The window opened'
 b. PAST_i PFV EVENT $\text{open}_V(w)$
 iff $\lambda e [\lambda (e) \lambda \text{PAST}_i \ \& \ \lambda s \lambda S [\text{open}_V(w)(e)(S)(s)]]$
 iff $\lambda e [\lambda (e) \lambda \text{PAST}_i \ \& \ \lambda s \lambda S [\text{cause}(e,s) \ \& \ S = \text{open}_A(w) \ \& \ S(s)]]$
 iff $\lambda e [\lambda (e) \lambda \text{PAST}_i \ \& \ \lambda s [\text{cause}(e,s) \ \& \ \text{open}_A(w)(s)]]$
- (98) a. Das Fenster war geöffnet. [official version]
 'the window was opened'
 b. PAST_i IPFV STATE $\text{open}_V(w)$
 iff $\lambda s [\text{PAST}_i \ \lambda (s) \ \& \ \lambda e [\text{cause}(e,s) \ \& \ \text{open}_A(w)(s)]]$

We are now in a position to represent the meaning of restitutive *again* correctly:

- (99) Restitutive *again* [official version]
 $\text{again}_{\text{rest}} = \lambda R \lambda e \lambda S \lambda s [R(e)(S)(s) \ \& \ \lambda s' [\lambda (s) < (e) \ \& \ S(s)]]$, R of type $\langle vSs, t \rangle$, v
 the type of events, S the type $\langle i, t \rangle$

Everything is as before, but the eventive VP with restitutive *again* can now be expressed. Its LF looks exactly like (90), i.e. it is $\Box x[\text{VP EVENT } \textit{again} [\text{VP } \textit{open}_V(x)]]$, but it means something different, which is due to the revisions. The VP is true of an x and an event e iff e has the following property: $\Box e[\text{cause}(e,s) \textit{open}_A(x)(s) \wedge \Box s'[\Box(s') < \Box(e) \ \& \ \textit{open}_A(x)(s')]]$. This is exactly right.

So what about the adjectival passive of a verb without an accessible resultant state like *abgeben* 'deliver'? In this case we have to use the PERFECT-operator, i.e. the aspectual operator defined in (18). It follows that the sentence

- (100) Der Aufsatz ist wieder abgeben.
'the paper is delivered again'

has to be formalised by means of the stative VP $\Box[\textit{again} [\text{AP PERF delivered (the paper)}]]$. The semantics entails that the sentence can only have the repetitive reading. The theory predicts that there is another representation: *again* can have narrow scope with respect to PERFECT. Fortunately, we obtain the same reading under that alternative, too.

Note that the revised theory enables us to formulate a meaning rule for a durative adverb that indicates the length of the result state. In earlier papers I had no satisfactory solution for the problem.

- (101) The shop opened for 2 hours.

Here is the meaning of the adverbial:

- (102) \parallel for 2 hours $\parallel = \Box R \Box D_{<v,<s,<s,t>>>}. \Box e \Box D_v. \Box S \Box D_s. \Box s \Box D_s. R(e)(S)(s) \ \& \ S\text{-phase}(s) \ \& \ \text{duration}(s) = 2 \text{ hours}$

An S-phase is a maximal S-state, i.e. S-phase(s) iff S(s) and there is no larger s' such that s is a part of s' and S(s'). The adverb has to apply to the root-VP, i.e., we have the representation:

- (103) PAST_i PFV EVENT for 2 hours $\textit{open}_A(\text{the shop})$

This statement can be true of a rather short past time, but it entails that the result state lasted for two hours. Presumably, this reading is too strong, because the shop might have been closed after 10 minutes. The result should last the two hours in the normal course of events and therefore has to undergo modalisation. The present account doesn't incorporate this aspect yet, but it is open to such a refinement.

Let us return to examples (63), which have been introduced at the beginning of this section. The most straightforward formalisation of (63a) is

this:

- (104) Die Bibliothek ist seit 9 Uhr geöffnet.
 NOW **seit** 9 [_{AP} STATE **open**_v(*the library*)]

This means that the library is open now as a result of a becoming-open event and it has had that property at least from (the time starting at) 9 o'clock onwards.

Finally, look at (63b), which is repeated for convenience:

- (105) Wolfgang hat Diano seit Freitag verlassen.
 Wolfgang has Diano since Friday left

We are interested in the resultative reading: the leaving took place on Friday and Wolfgang has not been to Diano since Friday. The first thing I want to show is that we cannot obtain the resultative reading if we assume that the external argument is introduced separately in VoiceP by means of the semantic AGENT-relation. *verlassen* 'leave' is a transformative verb with an accessible resultant state. Its meaning of the verb could be something like this:

- (106) First meaning of 'leave' [official version]
 $\mathbf{leave}_1 := \lambda y \lambda x \lambda e \lambda S \lambda s [e \text{ cause } s \ \& \ S = \mathbf{out}(y)(x) \ \& \ S(s)]$

The action that causes the result that Wolfgang has left Diano must have been done by Wolfgang. Therefore, the AGENT has to be introduced into the LF before we generate the resultant state. We convert the VP 'leave Diano' into a class of events by means of the operator EVENT. Then we "activise" the event by introducing an AGENT, which is located in the head of Kratzer's VoiceP. The result after plugging in the object and the subject is the following structure:

- (107) $\lambda_e [\text{VoiceP AGENT}_e(\text{Wolfgang}) \ \& \ [\text{EVENT } \mathbf{leave}_1(\text{Diano})(\text{Wolfgang})]_e]$
 (to be revised)

If we have gone so far, there is no way anymore to stativise this property. The VoiceP has the logical type $\langle v, t \rangle$, but the STATE-operator requires an argument of type $\langle vSs, t \rangle$, where S is short for $\langle i, t \rangle$. We could try to generate a state by means of the PERFECT-aspect and embed the structure

- (108) PERFECT $\lambda_e [\text{VoiceP AGENT}_e(\text{Wolfgang}) \ \& \ [\text{EVENT } \mathbf{leave}_1(\text{Diano})(\text{Wolfgang})]_e]$
 (to be revised)

under the adverbial *seit Freitag*. There are, however, two problems with this. First, the reading is not the resultative one, but a very weak one. Wolfgang might have gone back to Diano even on Friday and the sentence would still be true. The second problem is that this theory would heavily overgenerate in predicting that many sentences have a "resultative" reading which intuitively do not have one. For instance, Musan (2001) claims that the fol-

following example is acceptable in the sense that Eva is in the POST-time of a sleeping for a time span that started sometimes within yesterday:

- (109) Eva HAT seit gestern geschlafen. [5.3]
 Eva HAS since yesterday slept

This interpretation is compatible with the scenario that Eva slept yesterday but she did not sleep after that time, in other words, Eva has not slept since yesterday and, according to Musan, the sentence even implicates this reading. I do not get this interpretation at all. This suggests that the analysis given in (108) is not correct. Let us try to improve it.

I think the failure of our attempt resides in the attempt to exclude the AGENT-relation from the lexical entry. Here is a revised lexical entry for 'leave'.

- (110) Second meaning of 'leave' [official version]
 $\mathbf{leave}_2 := \lambda y \lambda x \lambda e \lambda S \lambda s [\text{AGENT}_e(x) \ e \ \text{cause} \ s \ \& \ S = \mathbf{out}(y)(x) \ \& \ S(s)]$

We can now represent the resultative reading correctly in the following way:

- (111) $[_{TP} \text{NOW} \ \mathbf{seit} \ \text{Friday} \ [_{VP} \text{STATE} \ \text{haben} \ [_{VP} \ \mathbf{leave}_2(\text{Diano})(\text{Wolfgang})]_e]]$

This LF means that Wolfgang has been in the state of being out of Diano since Friday, and this as the result of having left Diano on Friday.

Here is a summary of my theory of the perfect of result:

- (112) Perfect of Result [official version]
 a. The Perfect of result is created by application of STATE to a VP of type $\langle vSs, t \rangle$.
 b. If the embedded verb stem has the type $\langle e, \langle vSs, t \rangle \rangle$, the category of the derived state is AP.
 c. If the embedded verb stem has the type $\langle e, \langle e, \langle vSs, t \rangle \rangle \rangle$, the category of the derived state is VP and STATE is expressed by the auxiliary *haben*.

The adjectival and the verbal construction are not entirely parallel. The adjectival passive has STATE in the AP-head that converts the lexical root into an AP. The copula *sein* is semantically empty and the AP can be used in attributive constructions. The second construction cannot be used attributively:

- (113) a. die geöffnete Bibliothek 'the opened library'
 b. *der Diano verlassene Wolfgang 'the Diano left Wolfgang'

To be sure, the verb *verlassen* 'leave' can have an adjectival passive as well, but this must be derived from the lexical entry \mathbf{leave}_1 , i.e., this adjectival passive has the LF $[_{\text{STATE}} \ \mathbf{leave}_1]$

- (114) die verlassene Stadt ‘the left city’
 the \square_y [_{LAP} STATE **leave**₁(y)(PRO_{arb})] city

PRO_{arb} must mean something like ‘everyone’ here. There is much more to say about these constructions, of course. In particular we should know more about the semantic nature of the subjects in passive constructions.

The outcome of this discussion is that we need two lexical entries for “subject oriented result verbs”, i.e., verbs where the subject figures in the resultant state.²⁸

6. Kamp & Reyle (1993) and Musan (2001) on *since/seit*

In this section I want to mention two recent treatments of *since/seit* neither of which is entirely compatible with what I have been saying in this article. Both proposals try to get along with one meaning for the morphological perfect. The treatments in question are Kamp & Reyle (1993) and Musan (2001). I will argue that Kamp & Reyle have chosen the wrong meaning for the English *have*-perfect, while Musan (2001) will be refuted by giving a present perfect example that cannot be analysed as combination of her meaning of the perfect and her meaning of *seit d*. Musan’s proposal, however, is very close to ours.

Let us start with Kamp & Reyle’s (1993) analysis of *since*. Kamp & Reyle try to analyse the English *have*-perfect as a perfect of result. This notion makes good sense only for accomplishments/achievements, and the meaning they give to the perfect is in fact the RESULT operator defined in (30) (cf. Kamp & Reyle 1993: 565 f.) The present perfect is a combination of PRES + RESULT, and the sentence *Dieter has met the president* is analysed as

- (115) NOW IPFV RESULT Dieter meet the president

in their system. The meaning of *since* is described informally on p. 632:

...*since* \square serves to characterize the state *s* described by a clause in a perfect tense. *Since* \square characterizes *s* indirectly, viz. by characterizing the location time *t'* for the eventuality described by the underlying non-perfect verb phrase. It describes this location time as beginning at the denotation of \square and as ending with, and including the location time *t* for the state *s*. If the underlying verb phrase is stative, then *s* is the result of the onset of the state *s'* characterized by the VP; if the underlying VP is non-stative, then *s* results from the described event.

²⁸ In Stechow (1996c) I had to assume a special syntax for this kind of verbs in order to get the case rules right.

There is no technical implementation of the rule in the book, but its effect is illustrated by some DRSs. The *since*-rule introduces an XN with \square as its left boundary. If the VP is in the perfect, the resultant state of the perfectless VP is predicated of the XN. In our system, the perfect version of the former example would have the following analysis:

- (116) a. Dieter has met the president since 1970.
b. PRES since 1970 RESULT Dieter meet the president

This means that Dieter met the president in 1970, not thereafter. This is not a very plausible scenario as Kamp & Reyle admit in footnote 66 on page 632. The more salient reading is an E-Perfect, where the meeting occurs between 1970 and now. This reading is particularly clear if we add an adverb of quantification such as *two times*:

- (117) Since 1970 Dieter has met the president two times.

It is not clear how the E-Perfect could be expressed in this system. Another problem is the analysis of states under *have*. Kamp & Reyle's standard example is a sentence of the following kind:

- (118) Dieter has lived in Düsseldorf since 1975.

States do not have a result. Therefore the result must somehow be introduced by the *since*-rule. Kamp & Reyle consider the beginning of the *since*-interval as an event that generates the result 'Dieter live in Düsseldorf'. So a state is classified as a result by stipulation in Perfect contexts. To my mind this short discussion shows that the proposal is not successful.

The reason for their failure lies in the attempt to reduce every use of the perfect to the resultative meaning. As we have seen, the resultative meaning is needed for the adjectival passive, but it is not adequate for the present perfect, which has the XN-meaning. An analysis along the lines of Dowty (1979), Kratzer (1996) and Iatridou & Izvorski (1998) solves the problem without stipulations, but it has to assume a fancy meaning for the present perfect.

A second analysis of *seit* that is rather similar with my proposal has been advocated by Musan (2000) and Musan (2001). I want to argue that Musan's makes occasionally the wrong predictions. It should be simplified along the lines indicated in this paper.

Musan analyses all occurrences of the German Perfect as a combination of PRES + PERFECT. PERFECT has a somewhat different meaning from ours; it can give us a time that is either before or up to the reference time (her "tense time"), possibly including it. She uses the notation \square for this temporal relation. Her meaning for the PERFECT-operator is this:

$$(119) \quad \text{PERF}_M := \lambda P \lambda t \lambda t' [t' \sqsubseteq t \ \& \ P(t')]^{29} \quad (\text{Musan's version})$$

Musan's PRES is a bit different from our NOW: it denotes a time including the speech time. Another difference is that Musan always locates the semantic aspect above the perfect, whereas in my system the perfect either is a semantic aspect itself, or it is a semantic tense located above one. This is a major difference, but I will not discuss the issue here. For the present purposes we note that XN-readings of the perfect are possible in virtue of the meaning of PERFECT_M. For instance, the sentence *Eva hat geschlafen* may have the following analysis (120) in this system:

$$(120) \quad \text{PRES PFV PERF}_M \text{ Eva sleep} \quad (\text{cf. Musan 2001: 2.3}) \\ \text{iff } \lambda t [\text{NOW} \sqsubseteq t \ \& \ \lambda t' [t' \sqsubseteq t \ \& \ \lambda t'' [t'' \sqsubseteq t' \ \& \ \text{Eva sleeps at } t']]]$$

This analysis makes the meaning of the sentence very weak; presumably the event time can be any time whatsoever.³⁰ For instance, the semantics does not exclude the following question/answer pair as well formed.

- (121) Question: Was machst du heute nachmittag?
 what do you today afternoon?
 Answer: Ich habe einen Ausflug gemacht.
 I have an excursion done

The dialogue is odd. A good answer should use the present or the future. Therefore we need non-semantic principles to block the use of the perfect in this context. Let us, however, ignore these difficulties and let us accept the Musan's perfect semantics for the sake of the argument.

As to the meaning of *seit t* or *seit d*, it is very similar to ours but Musan introduces a further condition to the extent that the since-interval has to reach up to the tense time. Neither Musan (2000) nor Musan (2001) spells this idea out formally. If we try to make it precise, then the PP presumably contains an anaphoric variable for the right boundary of the since-interval. A formal account of the meaning rule for positional *seit t* given in Musan (2001) could be this:³¹

29 My interpretation of Musan's PERFECT is this:
 $\text{PERF}_M := \lambda P \lambda t \lambda t' [t' < t \ \& \ t' \text{ abuts } t \ \& \ \text{XN}(t', t) \ \& \ P(t')]$.

30 Here is an example. NOW is Monday morning. The intended event time *e* is the same time one year later. Let the tense time *t* be a time stretch including NOW and *e*. Let the aspect time be a time in the tense time but after *e*. In such a scenario, the sentence is true. A similar scenario can be figured out for any reference time.

31 Here is a quote of the meaning rule for *seit t*, which is given in Musan (2001: 5.1):
 "a. When the preposition *seit* takes a positional complement *P* the resulting adverbial *seit P* introduces a time interval *t* that 1. starts at the left or the right boundary of the time interval provided by *P* and 2. ends at the left or right boundary of the tense time of the clause.

- (122) $\| \text{seit}_p \| =$
 $\square P \square t \square t^* \square t' \square t'' \square t^{**} [XN(t'', t') \ \& \ LB(t, t'') \ \& \ RB(t^*, t'') \ \& \ t^{**} \square t'' \ \& \ P(t^{**})]$
 (Musan)

where t is the beginning of the since-interval t'' , t^* is the reference time/tense time, and t^{**} is the event time contained.

Note that the comments on the different roles of the five different temporal parameters are metalinguistic. There is no formal way to make sure that t^* is the reference time. Presumably, this is a syntactic condition. Sentences of type (15) are correctly analysed by this method. To give an example, Musan's LF for (123a) is (123b):

- (123) a. Wir kennen uns heute seit 18 Jahren.
 b. $\text{PRES} \square t \square t \square \text{today} \ \& \ \text{PFV} \ [\text{seit}_D(18 \text{ years})(t) \ \text{[we know each other]}]$
 Musan (2001: 5.5)

This is the correct meaning if we spell out the meaning of durative seit_D properly. In Musan's system, the rule is like (122) with the difference that the object of the preposition does not give us the beginning but the length of the XN introduced. But what about the following example?

- (124) Wir sind im August genau seit 12 Monaten verheiratet gewesen.
 we are in.the August exactly since 12 months married been

The sentence is uttered in December and true. Intuitively this means that in August, we had been married for 12 months. According to Musan's proposal, the seit_D -interval must start 12 months before August and reach up to December. So the interval has a maximal length of 12 months and of 16 months at the same time. Here is Musan's LF:

- (125) $\text{PRES} \square t \square \text{PFV PERF}_M \ \text{in August} \ \text{seit}_D(12 \text{ months})(t) \ \text{we are married}]$
 $\square t \square [\text{NOW} \square t \ \& \ \square t' \square t' \square t \ \& \ \square t'' \square t'' \leq t' \ \& \ \text{in}(t'', \text{August}) \ \& \ \square t^* \square [XN(t^*, t'') \ \& \ |t^*| = 12 \text{ m} \ \& \ \text{RB}(t, t^*) \ \& \ \square t^{**} \square [t^{**} \square t^* \ \& \ \text{married}(\text{we}, t^{**})]]]]]$

Let us identify t and t' with NOW. We assume that NOW \square December. Then the formula entails:

- (126) $\square t \square \text{December} \ \& \ \square t'' \square t'' \square \text{August} \ \& \ \square t^* \square [XN(t^*, t'') \ \& \ |t^*| = 12 \ \& \ \text{RB}(t, t^*)]]]$

This is a plain contradiction. The problem arises from the fact that the participle time is rather distant from the tense time NOW. The XN introduced by *seit* should reach to the perfect time, not to the present time. So we should give up Musan's additional stipulation and adopt a semantics of our type: the meaning of *seit* will make it sure that the right

b. A positional adverbial *seit P* is truthfully applied to a time interval t if and only if t is (possibly improperly) located within the time interval introduced by *seit P*."

boundary of the since interval is the local evaluation time. We need some further stipulation that prevents sentence (13b) from being grammatical. Recall that my own representation is entirely unproblematic. It is something like:

(127) PAST in August *seit* 18 months we are married

The meaning of *seit* is rather simple after all. We do not need the complicated rule (122), which depends on three temporal parameters. Our rule depends on two temporal parameters and is empirically superior. The idea underlying both analyses is, however, the same.

7. Conclusion

I have argued that *seit* has several different, though closely related meanings and that the perfect morphology is interpreted by several combinations of TENSE + ASPECT. Here are the combinations we have found out to exist.

1. The semantic tense is PRES, PAST or FUTR: *seit* \square introduces an XN and predicates the AspP of it. P must be homogeneous and the semantic Aspect is IPFV. Recall that \square is either a time span or a duration. PAST may be realised by the present perfect. The adjectival passive is subsumed under this configuration.
2. *Seit* \square can have the same use as English *since* \square , i.e. it modifies an XN. This XN must be introduced by the auxiliary *sein/haben*. This setting is compatible with both PFV and IPFV.
3. The perfect of result is not an aspect but an aktionsart chooser. It makes a state out of a $\langle v, St \rangle$ -verb. Usually, the perfect of result is an adjectival phrase, but “subject result”-verbs can have a perfect of result as well. In this case, the result operator is located in the auxiliary *haben*. The perfect of result combines with the XN-introducing *seit*.

Here is the list of the admissible combinations:

- (128) German *seit* \square
- a. TNS morphology *seit* \square IPFV AspP, with TNS morphology = NOW present, PAST past, PAST *haben*, FUTR present, FUTR *werden*
 - b. NOW present *haben* HAVE_{Germ} *since* \square PFV/IPFV AspP
 - c. NOW HAVE_{Germ} past *since* \square PFV/IPFV AspP

The perfects of result is not contained in the enumeration. The occasional mismatch between morphology and meaning emerges clearly from this list: the present perfect figures as a PAST TENSE in (128a) and as a PRESENT HAVE_{Germ} TENSE in (128b). In (128c), past is realised as NOW + HAVE_{Germ}, the Ersatzperfekt.

The conclusion of this article is that the present, the perfect, the present perfect, and the adverbial *seit* □ are ambiguous. Is there a way to avoid these ambiguities? That would be desirable on methodological grounds, but I have doubts that this can be done. Fabricius-Hansen (1986) has tried to describe the different meanings of the temporal morphology by a battery of context sensitive rules which roughly say: “In this context, tense □ means x, and in that context, tense □ means y, ...”. This technique fails if adverbs like *seit* □ are ambiguous as well and mean something different depending on the meaning of the tense morphology they co-occur with. The disambiguation is, so to speak, reciprocal. Kamp & Reyle (1993) try to do the disambiguation by means of syncategorematic rules: the same adverbial is introduced by several syntactic rules and gets a different interpretation each time. But how do we know that these rules introduce enough context?

My account is “context-free” and leaves the question of how we actually do the disambiguation open. The singular meanings are like pieces of a puzzle. If they fit together, a clear picture emerges from initially unordered parts.

Appendix: The TA-systems of Italian and Russian

This appendix gives a survey of the tense/aspect systems of Italian and Russian. Italian is morphologically very similar to German and English, but the interpretation of the perfect morphology is entirely different. Russian has no perfect morphology at all in the active, but it can express PERFECT aspect. The point of the comparison is to show that the tense/aspect architecture is not typologically ad hoc.

Let us look at Italian first. A tentative typology is this:

(129) The Italian T/A-system

	PRES	PAST	FUTR
IMPERFECTIVE	Present	Imperfect	Future
PERFECTIVE	(Reporter's) Present	Present Perfect	Future (Present)
PERFECT	Present Perfect?	Past Perfect	<i>avrò</i> + Part
RESULT	Part	Part	<i>sarò</i> + Part

One of the characteristics of this system is that Italian has aspectual morphology. The difference IMPERFECTIVE/PERFECTIVE is encoded in the Imperfect/Passato Remoto distinction (*mangi-avo* ‘eat-IPFV.PAST.1SG’ vs. *mangi-ai* ‘eat-PFV.PAST.1SG’). The Passato Prossimo looks like the German or English Perfect, but it seems linked to the PERFECTIVE. In particular, it does not seem to allow for XN-readings. The following examples

illustrate some consequences of the system with examples taken from Giorgi & Pianesi (2001):

- (130) a. (Alle tre) Mario mangiava una mela (e la sta mangiando tutt'ora).
 (At three) Mario ate.IPFV an apple (and he is still eating it)
- b. * (Alle tre) Mario mangiò/ una mela (e la sta mangiando tutt'ora).
 ha mangiato
 (At three) Mario ate.PFV/ an apple (and he is still eating it)
 has eaten

The contrast follows from the analysis of the first sentence as PAST IPFV ACCO(MPLISHMENT) and the second as PAST PFV ACCO. A prediction of the system is that the imperfect may occasionally be combined with an achievement.

- (131) Reinhold raggiungeva la vetta.
 Reinhold reached.IPFV the top

According to Fabrizio Arosio, the sentence expresses the reporter's past, i.e. the narration of a sequence of achievements told at the moment spotted. If we analyse the sentence as PAST IPV ACH(IEVEMENT), then the reference time must be a point. This seems to be borne out by the facts.

Finally, let us have a look at Russian. The accepted view is that verbs with prefixes (without the secondary imperfective derivative *-yv*) have perfective morphology. The general picture seems to be that perfective morphology selects accomplishments/achievements (Forsyth 1970, Schoorlemmer 1995, Filip 2000, Paslawska & Stechow 2001). The imperfective morphology is a "privative opposition" (Jakobson 1932) and is, in principle, compatible with all aspectual classes (Forsyth 1970, Schoorlemmer 1995). The unmarked aspectual relation licensed by the perfective aspect is PERFECTIVE, but PERFECT is possible as well. The choice of PERFECT is also often possible with imperfective VPs (Forsyth 1970). Here is a survey of the system.

- (132) The Russian T/A-System

	PRES	PAST	FUTR
IMPERFECTIVE	Present Imperfective	Past Imperfective	<i>budu</i> + Imperfective
PERFECTIVE	(Reporter's) Present?	Past Perfective Past Imperfective	Present Perfective
XN?	Past Imperfective	Past Imperfective	
PERFECT	Past Imperfective	Past Perfective Past Imperfective	Present Perfective
RESULT	Part Perfective	<i>byl</i> + Part Perfective	<i>budet</i> + Part Perfective

The chart shows the polyfunctionality of the imperfective morphology. This morphology implements at least six meanings, and the difficult descriptive problem is to say which is the right one in a given context. The following examples illustrate the ambiguity of the perfective morphology with respect to the licensing of the aspectual relation (PERFECTIVE/PERFECT):

- (133) a. Masha vyshla v vosem' chasov.
Masha left.PART at eight o'clock
'Masha left at eight.'
b. [TP PAST_i past [t at eight [AspP PFV pfv [VP Masha leave]]]]

In order to obtain the PAST PERFECT reading, it is natural to insert the aspectual adverb *uzhe* 'already'. This adverb modifies a state (cf. Löbner 2002), and the PERFECT-relation converts an accomplishment/achievement into a state. Here is the analysis of the PAST PERFECT reading:

- (134) a. V vosem' chasov Masha uzhe vyshla.
'At eight, Masha had left.'
b. [TP PAST_i past [t at eight already [AspP PFV pfv [VP Masha leave]]]]

Note that it is not the adverb *uzhe* that carries the PERFECT-information. *Uzhe* can also modify states that are not interpreted as posterior to some event (*Natasha uzhe spit* 'Natasha is already sleeping').

The same point can be made for the Present Perfective morphology: it expresses the combination FUTR PFV or FUTR PERFECT:

- (135) a. V vosem' chasov, Mash (uzhe) uedet.
At eight o'clock Masha (already) leave.PRES.PERF
b. [TP FUTR_i pres [t at eight [AspP PFV pfv [VP Masha leave]]]]
'Masha will leave at eight.'
c. [TP FUTR_i pres [t at eight already [AspP PERFECT pfv [VP Masha leave]]]]
'At eight, Masha will have left.'

The poverty of the Russian tense morphology has the effect that the aspectual morphemes are ambiguous.

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