

Perfects as Feature Shifting Operators

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Preface

This ms. was started as a paper, but then it grew to its current length and even now it isn't quite finished. What follows are a few words describing the project and its origins and a makeshift table of contents, in the hope that this will provide some minimal orientation to anybody who wants to look into this in its present state.

The original purpose of what follows was to deal with a problem that arises for 'pure result state' accounts of the perfect, which treat perfects as operators that transform event and state descriptions into descriptions of corresponding result states and make these the target of location in time by tenses and temporal adverbs. In the form in which we endorsed this approach for many years ((Kamp and Reyle 1993), (Reyle, Rossdeutscher and Kamp 2007)) it entails that a sentence like *I have submitted my essay today* can be true even if the submission itself took place before today. Some speakers argue that this sentence has a reading on which can be true on such a scenario. or others this is hard or impossible. But from all the evidence available to us on this point it seems to us that the sentence must have a reading on which it entails that ms. was submitted on the day of utterance. (It is a further matter, but one which does not directly affect the need for a correction to our earlier result state account, whether the sentence does or does not have an interpretation that does not require this.)

The following pages are the result of trying to implement one solution to this problem. When they are described in these innocuously sounding terms their number must seem excessive, and quite possibly absurd. What happened is something like this: As we proceeded to work out the details of the solution that we are proposing, it became necessary to rethink many of the assumptions we had been making over the years about how the semantic representations of sentence constituents are built from the representations of their constituents. So much of what follows is concerned with such 'compositionality' questions, partly pertaining to what happens below the point

where perfects make their semantic contributions and in another part to what happens above it. And, more importantly, as we went along we became increasingly aware of the many interactions between perfects and other constituents that a viable theory of perfects at this juncture of time should have something to say about. The interactions that we had been paying almost exclusive attention to in our earlier work on temporal reference were those between perfects and ‘temporal locating adverbs’ like *in 2001*, *on the first of March*, *next week* or *today* and, in (Reyle et al. 2007), also ‘frequency adverbs’ such as *often*. But questions on what is the right account of perfects turn heavily on interactions between perfects and other types of temporal expressions, most notably with English *since*- and *for*-phrases (and their counterparts in other languages) and the interaction between perfects and various forms of quantification. The importance of the first of these interactions has rightly been stressed by many who have studied perfects in recent times and provides what appear to be the strongest arguments in favour of so-called ‘Extended Now’ accounts, or ‘Perfect Time Span’ accounts. It seems that it is to accounts of this type that most current students of the perfect subscribe. (Certainly this is so for those who have recently expressed themselves on the topic in print.) In view of this no proposal for an account of perfects that is (or appears to be) of a significantly different kind can afford to ignore the question how it compares to accounts of the ‘Perfect Time Span’ type. But to make a responsible job of this it is necessary to articulate precisely what the compositional semantics is of *since*- and *for*-phrases, and that in a way which is consistent with the general architecture for the construction of semantic representations adopted here. That proved a task in itself, and one that could be carried out only after a good deal else was in place.

The interaction between perfects and quantification is important for a slightly different reason. These interactions too play a significant part in current discussions of the perfect, but a different one. Rather than pointing in the direction of one account rather than another, they complicate the picture of the different things that sentences with perfects can mean – i.e. of the spectrum of different truth conditions that is covered by sentences involving such interactions. The perhaps most familiar and simplest distinction that points in the direction of this complication is the distinction between ‘the existential perfect’ and ‘the universal perfect’. In many cases this and similar distinctions underestimate the complexity and diversity of the interaction between perfects and the various devices for quantification that are found in languages like English and that they also tend to be misplaced within the general landscape of construction involving perfects. Only when the full complexity of this matter has been acknowledged and been located within

a general theory of the semantics of constructions with perfects will it be possible to account for many data that otherwise remain puzzling and recalcitrant. At the time of writing this temporary guideline (May 2012) the chapter on ‘quantificational perfects’ still has to be written, and the same is true for a chapter about adverb attachment, an issue that rears its head almost from the start and that has been kept out of sight, often by force, during the chapters of the present incomplete draft.

What follows is therefore still seriously incomplete. But not only that. Everything that follows will have to be gone over and combed through at least one more time; and a good part of the ms., Ch. 5 onwards, is a truly first draft, driven by the urgent (and yet unfulfilled) desire to get everything we think needs saying on this topic down in some form or other. For this reason too what follows cannot be more, and should not be taken as more, than an interim report.

A final reason why this text is as long as it is already at this point is that an account of perfects cannot be just an account of present perfects. All serious current semantic accounts of perfects assume that the perfect forms are, just as the traditional terminology implies, composed of the perfect as such (however it is to be analysed) and a finite or infinite tense form. Thus a present perfect is as the term says the present tense of a perfect, a past perfect a perfect in the past tense and so on. That is also one of the attractions of result state analyses of perfects (both the defective version we adhered to for so long and the one developed below): the perfect itself always involves the same operation – that changing event descriptions into descriptions of their result states – irrespective of whether the form is that of a present, past, future, infinitival or gerundival perfect and the tense, whether present, past or future, infinitival or gerundival, then locates this result state according to the same principles that are operative when the tense is not part of perfect verb morphology.

This is one reason for wanting a theory of all, and not just of present, perfects. But unfortunately the generalisation from present to arbitrary perfects is not as straightforward as the general assessment of the last paragraph suggests. For at least the English Present differs from the other English perfect forms in certain ways that also set it aside from the present perfects of other languages (such as, in particular, German, the other language that is targeted in the investigations reported here). Since some of the notorious puzzles about the English Present Perfect have to do with these special properties and any current account of the English Perfect is therefore expected to have

something to say about what this difference between the Present Perfect and other perfects (the non-present perfects of English and all the perfects of most other languages) consists in, a detailed exploration of non-perfect forms is a *sine qua non* too. This by itself proved a non-trivial task, which accounts for about one third of the present ms.

In the provisional table of contents that follows we have lifted all the subdivisions one level up. ‘Sections’ have been promoted to ‘Chapters’, ‘Subsections’ to ‘Sections’ and so on all the way down. (You will be dismayed to learn that the phrase ‘all the way down’ is not used vacuously.) In this, but only in this way, does the table of contents depart from the contents that it is the table of.

Chapter 1

Introduction

What is a perfect? The way you will want to answer this question may depend on your perspective. If your primary concerns are syntax and morphology, then you are likely to want an answer in morphological terms; if your central interest is semantics, then you will be looking for a characterisation in terms of meaning – something like a common contribution that all perfects make to the meanings of the sentences in which they occur, and that set them apart, irrespective of how they happen to be realised morphologically, from other sentence constituents.

For many languages a morphological definition seems to work well enough. This is so in particular for languages with *analytic* perfects – languages in which perfects are formed as combinations of an auxiliary verb (which we will refer to as a *perfect auxiliary*) and a certain form of the verb itself, usually referred to as its past participle. Among the languages with analytic perfects are English (with perfect auxiliary *have*), German (which has two perfect auxiliaries, *haben* ('have') and *sein* ('be')), French (which is like English in that it has only perfect auxiliary, the verb *avoir*, which normally translates into *have* when both verbs are used as main verbs) and many other European languages as well. In any of these languages the *finite perfects* are those in which the perfect auxiliary bears finite tense (and the infinite perfects are those in which it does not). The tense morphology of the auxiliary suggests a correspondence between non-perfect and perfect verb forms: to the simple present tense corresponds the present perfect (in which the tense of the perfect auxiliary is a simple present), past perfect corresponds to simple past, future perfect to simple future, and so on.

There are also languages in which perfects are *synthetic*. In these languages the perfect is not formed with the help of auxiliaries, but only through mor-

phological marking on the verb itself. For such languages morphology-based definitions of their ‘perfects’ can be somewhat less transparent than for languages with analytic perfects, because of entanglements between perfect morphology and tense morphology. However, since this paper focusses on English and German, synthetic perfects will be of no direct concern to us, and we won’t mention them any more.

Straightforward as morphological definitions of the perfect may be for languages in which the perfect is expressed analytically, a full justification doesn’t seem possible without some appeal to meaning. Usually languages with analytic perfects also have other constructions involving auxiliaries and non-finite verb forms. And that raises the question what it is that makes an auxiliary a ‘perfect auxiliary’ (as opposed to, say, a future or modal auxiliary)? The only way to answer *that* question is by some kind of reference to meaning. One way to do this is to focus on sentences in which the auxiliary is in the simple present: If an utterance of such a sentence at a time t is judged to be true only if an eventuality (i.e. event or state) of the kind described by the sentence occurred at some time before t , then this can be taken as an indication that its auxiliary is a perfect auxiliary. The appeal to meaning need not necessarily take this particular form. But some such appeal is inevitable; for the concept of a perfect is ultimately a semantic one; so a merely morphological definition, devoid of any kind of semantic back-up, just cannot carry the entire load by itself.

For a semanticist, morphology is first and foremost the implementation of an underlying semantic concept. He will look for a primary characterisation of perfects in terms of meaning, and, more specifically, for a characterisation in terms of the contributions that perfects make to the meanings of the sentences which they are part. The quest for such a characterisation has led to a range of different proposals ((McCoard 1978), (Dowty 1979), (Mittwoch 1988), (Moens and Steedman 1988a), (Parsons 1990), (Klein 1992), (Klein 1994), (Klein 2000), (Iatridou, Anagnostopoulou and Izvorski 2001), (Musan 2002), (von Stechow 2002), (Alexiadou, Rathert and von Stechow 2003b), (Portner 2003), (Swart 2007), (Higginbotham 2008), (Rothstein 2008), (Higginbotham 2009)). Among these proposals there are those which treat perfects as descriptions of result states: a perfect of a given verb phrase VP describes a state that results from the occurrence of an eventuality of the kind described by VP. This result state is then located by tense in the same way that tenses locate the eventualities¹ described by the verb phrases of non-

¹ We follow what has become a tradition in the tense and aspect literature: to use

perfect sentences. (For analytic perfects the tense is, as noted, the tense of the auxiliary.) In particular, a present perfect locates its result state as holding at the utterance time n (so that the eventuality of which this state is the result state must have occurred or obtained before n); likewise, a past perfect will locate its result state as holding at some past time, and so forth.

Result state accounts of the perfect are attractive for several reasons: (i) the characterisation they provide of what it is to be a perfect is simple and straightforward, and independent of any assumptions about morphological realisation; (ii) by the same token they provide a simple characterisation of the contributions that perfects make to the semantics of the clauses and sentences in which they occur; (iii) they capture the systematic parallels between perfect and non-perfect forms: present perfect and simple presents, past perfects and simple pasts, future perfects and simple futures, and so forth. It is such considerations that persuaded us, more than two and a half decades ago, to adopt an account of the perfect that was of this type. We have not only advocated such an account but have given explicit formulations of it more than once ((Kamp and Rohrer 1983), (Kamp and Reyle 1993), (Reyle et al. 2007)).

Unfortunately this account encounters a serious problem. The way this problem arises for us has to do with certain assumptions we made in formulating the formal framework for dealing with the semantics of tense and aspect generally and in embedding our result state account of the perfect within it. But these assumptions seem quite natural once one had adopted the general idea of a result state analysis (and for other reasons, that we cannot go into here, as well), so it is not obvious how the problem could be avoided.

The problem is exposed by the sentences in (1.1):

- (1.1) a. Today Fritz has submitted his paper.
 b. Heute hat Fritz seine Arbeit eingereicht.
 c. Aujourd'hui Fritz a soumis son article.

The German sentence in (1.1b) and the French sentence in (1.1c) are straight translations of the English sentence in (1.1a) and the point that these sentences make about the perfects of their languages is the same that (1.1a)

the term 'eventuality' to refer to the superordinate category which subsumes both events and states. (Other theories include additional subcategories, such as that of processes, as distinct from both states and events, but the theory we will develop in this book assumes that states and events are the only kinds of eventualities. We will use the term 'process' occasionally, but only informally.)

makes about the perfect in English.

The point is this: According to the intuitions of native speakers the sentences in (1.1) are true only if Fritz submitted his paper within the period of time denoted by the adverb *today, heute, aujourd'hui*. This assessment clashes with the assumption that the perfects in (1.1) describe a state resulting from an event of Fritz submitting a paper and that this state is located both by the present tense (i.e. as holding at n) and as holding at the time t' denoted by the adverb. Accounts may differ depending on what they say about the relation between the result state s and the adverb denotation t ; some interpret this relation as inclusion ($t' \subseteq s$), others merely as overlap between s and t' . But neither yields truth conditions that match the intuitions just mentioned. The first version contradicts the assumption that the submission took place today. The second doesn't contradict it, but doesn't entail it either; and entailment is what we want.²

It has been argued that the German present perfect is no longer distin-

² The facts concerning (1.1) are more delicate than our assessment of their truth conditions in the main text allows for. For many native speakers of German a sentence like (1.1.b) allows, when it is used in a suitable context, also for a 'pure result state interpretation, which does not require that Fritz submitted his paper today. And for at least some English speakers the same is true for (1.1.a). In (Reyle et al. 2007), we relied on the existence of this option, adopting a pure result state account for the perfect while tacitly assuming that some kind of pragmatic strengthening is responsible for the intuition that the submission itself took place on the day (1.1.a) is uttered.

We do no longer think, however, that this is the correct way of viewing the data. Not only does the pure result state reading of a sentence like (1.1.b) seem to require a special kind of context; it also seems to us that *when* such a reading is available, it *entails* that the event described by the main verb took place *before* today. And if that is right, then the pure result state reading and the reading described in the main text are incompatible, and that means that neither can come about through pragmatic strengthening of the other.

It is worth noting that in German pure result state readings are more readily available for perfects when they are formed with the auxiliary *sein* than when they are formed with *haben*. A special subcategory of the *sein*-perfects with pure result state readings is the so-called *Zustandspassiv*. *Zustandspassiv*-constructions always involve transitive verbs, whose theme arguments have been promoted to grammatical subject. They are morphologically distinct from the perfects of regular passives and their semantics is obligatorily that of a result state perfect. As a matter of fact pure result state interpretations of *sein*-perfects are not limited to the *Zustandspassiv*; such interpretations are also possible for certain intransitive verbs which take *sein* as perfect auxiliary. We refer to this wider category of pure result state interpretations for German *sein* perfects as the *Zustandspferkt*.

The *Zustandspferkt* will be discussed in Section 5, where we will propose that it should be treated as a grammatical construction in its own right. As we see it, pure result state interpretations of German *haben* perfects (and any perfects of English) constitute a different (though of course related) case, which requires a somewhat different treatment.

guishable from a simple past. In fact, in some German dialects (spoken in the South of Germany) the present perfect form has almost completely supplanted simple past tense morphology. (A similar development has taken place in French, where the *Passé Composé* (exemplified in (1.1c)) has fully supplanted the *Passé Simple* in spoken language. For extensive discussion of a general tendency for analytic forms to encroach upon the territory of synthetic forms see (Dahl 1985).) The view that German perfects have become equivalent to non-perfects can take one of two forms, a stronger and a weaker one. According to the stronger view German perfect forms have turned into forms that behave semantically as non-perfects and that should therefore be analysed semantically in exactly the same way as the non-perfect forms to which they have been assimilated. In particular, present perfects are to be treated semantically as simple pasts. On this view there is of course no problem with sentences like (1.1b), and almost everything that we will be saying about German perfects below will be irrelevant. However, at least for northern varieties of German, in which the present perfect and the simple past coexist, this view does not seem very plausible and in this study we will not consider it any further.

On the second, weaker view German present perfects are ambiguous between simple pasts and ‘true perfects’ (in a suitable semantic sense of the term). In contrast to the strong view, this view fails to offer a remedy against the problem presented by (1.1b). It gives us the option of analysing the perfect in (1.1b) as a simple past, and that analysis entails that the submitting event took place within today. But so long as it doesn’t exclude the problematic analysis, which allows the submission to have taken place before today, that won’t be good enough.

The sentences in (1.1) suggest that a pure result state analysis of the kind we have advocated on previous occasions won’t do. But they also suggest the direction in which an improvement should be sought. What we need is an account which combines two intuitions: (i) the intuition that a perfect presents the event complex it describes from the perspective of the result state, and (ii) the intuition that what an adverb such as *today* serves to locate is the event complex as a whole, the complex event which includes both the event proper (in (1.1) this is the actual submission) and the result state to which it leads).

How can we turn this suggestion – that the semantics of sentences with perfects involves both these intuitions – into a coherent story and a functioning theory? For that we need a number of ingredients. Most of these can be

found in earlier work (much of it by others and some of it our own). But the final ingredient is, we believe, a novel one.

One way to think of result state analyses is provided by the concept of the ‘event nucleus’, as it has been developed in the work on tense and aspect of Moens and Steedman ((Moens 1987), (Moens and Steedman 1988b)). The nucleus of a verb, verb phrase or higher verb projection is the complex of eventualities that that verb, verb phrase or higher projection is used to describe. The paradigmatic case is that of the nucleus of an ‘accomplishment’ verb phrase, such as *write a letter*: it consists of (i) a preparatory phase, the activity of writing the letter, (ii) the culmination point, the conclusion of the preparatory phase which consists in the letter’s completion, and (iii) the state resulting from the preparatory phase and its culmination, the state that consists in the letter having been completed. For verbs, verb phrases and higher projections falling within other aspectual classes the nucleus will be composed differently. For instance, the ‘achievement’ VP *submit his/a paper* would normally be assumed to have a nucleus consisting just of the event of submitting – for achievements preparatory phase and culmination collapse, so to speak – and of the following result state.

Among the uses that Moens and Steedman make of the nucleus in their theory of tense and aspect is their account of the aspectual transitions that may occur in the course of computing the meaning of a sentence from its parts. These transitions occur when the computation passes from one projection of the verb to the next one higher up. An example is the transition from the nucleus of an accomplishment phrase like *write a letter* to the nucleus of the corresponding progressive *be writing a letter*. Put in terms of nuclei this is the transition from the full nucleus described above to the ‘rudimentary’ nucleus that consists of just the preparatory phase of the first full nucleus. Another transition is the one involved (at least according to result state accounts) in the formation of perfects. Perfects too, according to these accounts, involve the application of an operator which takes one verb projection – a non-perfect phrase – as input and returns another projection – a perfect phrase – as output.

Arguably it isn’t an integral and necessary part of this nucleus-based view of the perfect as aspect-modifying operator that the result state which it delivers as output is the target of temporal location both by tense and by temporal adverbs higher up in the syntactic tree. But if the result state is the only eventuality that the perfect passes up to the level or levels where location by tense and by adverbs takes place, then this conclusion is hard to

avoid. And since that is precisely what leads to conflict with the intuitive truth conditions of the sentences in (1.1), it is precisely what we do *not* want.

How are we to respond to this conclusion? One possible response is to give up on the result state analysis altogether. But we are reluctant to do that; for the idea that the perfect shifts the temporal focus from the eventuality described by the main verb to its result state seems to us fundamentally correct; and the fact, noted above, that such an analysis makes it possible to treat the tenses of finite perfects in the same way that they are treated when occurring in non-perfect constructions seems to confirm this intuition.

For these reasons we want to modify our earlier result state analysis rather than give it up lock, stock and barrel. But then, how should our earlier analysis be changed? To see more clearly what our options are, let us list the central features of the general theory of aspect and temporal reference within which our earlier account is embedded.

(i) At some point in the computation of the semantics of a finite clause the semantics of the relevant projection of the verb gets linked to a time t that is provided by tense.

(ii) Likewise, if the clause contains a temporal adverb (such as *today*) the semantics of the verb projection gets linked to the time denoted by the adverb.

(iii) The perfect is an operator that turns non-perfect phrases into perfect phrases (and thereby turns the semantics of a non-perfect phrase into that of the corresponding perfect phrase); moreover, in a clause in which the tense form is a perfect this transition takes place *before* the linking to t mentioned in (i) and also before linking to the denotation of a temporal adverb (in case there is one).

(iv) The semantics of a projection of the verb takes the form of a single eventuality (either a single event or a single state). It is this eventuality that gets linked both to the time t introduced by tense (see (i)) and to the time denoted by a temporal adverb in case there is one (see (ii)).

(v) It is the aspectual status of the eventuality that gets located by tense (and by a temporal adverb if there is one) which determines the nature of the link. If the eventuality is an event, it is included in the locating time t ; if it is a state, then t is included in it.

(vi) Present tenses link the event or state contributed by the verb projection that tense combines with to the utterance time n ; past tenses link this event or state to some time in the past of n .

(vii) The present perfect is to be analysed (just as its name suggests) as a present tense.

Given these assumptions, it is clear that interpretation of the sentences in (1.1) yields the results we want to avoid. In fact, they more or less dictate a result state account of the perfect that assigns them the truth conditions of pure result state perfects that we want to avoid: If temporal linking is to be to the utterance time n , then what is linked in a present perfect clause cannot be the event described by the main verb of that clause; it must be something which follows that event, and what could that be if not a state resulting from the event? But once this has been conceded, our goose is cooked. For assumptions (ii) and (iii) require that adverb linking involves the same event or state as linking by tense. So if that event or state is the result state, then the framework doesn't permit any additional linking constraints for the described event: In particular, there is no way of accounting for why the events described by the verbs in (1.1a-c) must be understood as having occurred within today.

The inevitable conclusion is that at least one of the assumptions (i)-(vii) will have to go. But which? The assumptions (i), (ii), (iii) and (v) are widely shared (see e.g. (Alexiadou et al. 2003b)), and we would be loath give up any of them. And assumptions (vi) and (vii) provide the rationale for seeking the kind of analysis that pure result state accounts were meant to give us (but can't as they stand); by giving up either of them we would be throwing out our baby with the bath water. So our only real option is to abandon assumption (iv).

But what should take its place? Our informal discussion of the sentences in (1.1) points in the direction we should go. Let us focus again on (1.1.a). On the one hand, we saw, it is the entire nucleus of *submit a paper* that must be included within the time contributed by today. This means that this entire nucleus must be available at the point where the connection is made. On the other hand, if it is true that present perfects are instances of the present tense, then something should be linked to the utterance time n – in the sense of being either included in it or including it or overlapping it – and it seems intuitively clear that if such a relation is to obtain between n and any part of the nucleus, then that part could only be its result state. The implications

for the computation of the semantics of tensed sentences are that, for these sentences at least,

- the full nucleus must be carried along as the computation proceeds;
- additional information is needed to tell us which part of the nucleus is to be linked to the time contributed by tense and which part to a temporal adverb in case it is present;
- linking to the time provided by tense and linking to the denotation of a temporal adverb are two distinct operations, each governed by its own principles.

Treating tense linking and adverb linking as distinct operations, which may apply to different parts of the nucleus, has consequences for the over-all architecture of our account. It was already noted that nuclei – more accurately: representations of those nuclei – are introduced by verbs and that these representations are then ‘carried upwards’ as the semantics of a sentence is stepwise computed from its constituents. As they are carried upwards to the point where they are temporally bound, the representations may be subject to modification by various kinds of aspect operators. In some cases no modification will occur – examples are simple past tense sentences like *Mary is tired.* or *Today Fritz submitted his paper.* and here the linking to tense and to the temporal adverb is not affected by intervening operators, so the linkings target those components of the nucleus that are marked for these purposes, ‘per default’. These default markings originate with the lexical verb of the sentence, and thus should be given explicitly or implicitly as part of the verb’s semantic representation in the lexicon. (In the formal implementation that will be outlined in Section 2 the markings will be implicit in the lexicon, but will appear explicitly as soon as the semantic representation from the lexical entry of the verb is entered into the sentence representation under construction.) However, in the sentences that are of direct relevance to this investigation at least one aspectual change, due to the application of a perfect operator, will have taken place before linking occurs, and often enough there will have been aspectual modifications before the perfect produces its.

To summarise: In order to capture the semantic interactions of the Perfect with tense and temporal adverbs correctly we must treat these interactions as pertaining to different components of the semantic representations of verbs and their projections. For the construction of the semantic representations of sentences this entails that we have to keep track of which components are earmarked for which interactions. Thus in the semantic representations that

are carried along in the semantic computation from the verb to the points where these interactions have their direct impact on the semantic representation of the sentence, two parts of the nucleus must be marked for potential temporal location, one for location by tense and the other for location by adverbs.

In order to forestall outright dismissal of the task we have just outlined for ourselves, let us note already at this point that there is a family of treatments of the present perfect which do not suffer from the difficulty that pure result state analyses encounter in connection with the sentences in (1.1). The common underlying assumption of these treatments is that the evaluation of a present perfect is with respect to an *eXtended Now* (XN), an interval of time which starts at some time before the utterance time n and ends at it or in its close vicinity. (Perfects of different languages appear to vary with regard to exactly how the end point is related to n). According to XN theories the principal semantic constraint imposed on the present perfect is that the event complex described by a present perfect verb form stands in a certain relation to the XN. In many sentences the XN is only implicit. But it can be specified explicitly, and that is so in particular when a present perfect is accompanied by a temporal adverb such as *today*. Among the facts that XN treatments are in a position to account for is the point of departure of this paper – according to each of the sentences in (1.1) the event of submitting the essay must have taken place within the part of today that ends at the utterance time. This follows if the account specifies that the event complexes that are offered as inputs to the perfect are included within XN, an assumption that many XN accounts make, or that follows from other assumptions they make.

Our decision to modify the result state account in the way this paper explains, rather than abandoning it in favour of an XN account, is connected with certain difficulties with XN accounts that are revealed by cross-linguistic studies of the perfect. (Here we are indebted in particular to (Rothstein 2008), which compares the perfects of English, German and Swedish.) Some of the difficulties become visible upon a closer comparison of English and German. We address this issue in Chapter 9.

1.1 The wider ambitions of this book

As we explained above, this study started as an attempt to repair an error in the result state account of French, English and German perfects that we have

proposed and repeatedly endorsed in our earlier work. But as our repair work became more concrete, its horizon gradually widened. ('receded' is a better word for what we felt as we exploring our options.). As the work progressed, the emerging proposal, which was initially meant to fix one particular flaw in an analysis of open particular linguistic phenomenon started to gain new dimensions. First, it led us to a characterization of the 'concept of a perfect' - as a type of operator that can be instantiated in different ways and of which the perfects of English, German, French (as well as many other languages) can be seen as particular instantiations. We see this as a contribution to the Theory of Tense and Aspect in its own right, irrespective of its success in fixing the glitch that we set out to fix (which it does as well).

Even more generally, we like to present this study as an example of the type of syntax-semantics interface that we and others have been pursuing over the past decade and more. This interface assumes syntactic sentence structures which we hope will be acceptable to most syntacticians (if, probably, not all of them).³ The semantic representations we will use are based on the Discourse Representations Structures (DRSs) of DRT. (The final representations assigned to complete sentences are DRSs in the familiar sense of (Kamp and Reyle 1993), (Kamp, van Genabith and Reyle 2011). But the structures of sub sentential constituents, via which those final representations are reached, tend to be more complicated.) The interface takes the form of a mapping from syntactic structures to semantic representations that is defined bottom-up – bottom-up DRS construction has, we believe, by now almost fully replaced the original top-down algorithms of (Kamp 1981b) or (Kamp and Reyle 1993). The bottom-up algorithm assigns semantic representations to all the constituents that enter into the semantic composition. As noted, these representations can be fairly complex. One reason for this is that they often carry presuppositional as well as non-presuppositional information and the two kinds of information have to be kept separate, which complicates the notation. It is only when all presuppositions have been resolved or accommodated and thereby disappeared from the sentence representation, that this representation reduces to a DRS of the more familiar kind.

³We are not syntacticians and our competence in this area is very limited. We have relied to some extent on expert advice in the syntactic structures we are using. What matters directly for our needs (here and elsewhere) is that the syntactic structures we adopt are satisfactory as input to the syntax-semantics interfaces that are our direct concern. Ideally, of course, these structures should also satisfy all relevant syntactic constraints. Whether they do, and if not, how serious their revision would have to be are questions we must leave to others.

The composition principles used in this book are unabashedly representational: they exploit the formal properties of the input representations (those of the daughter nodes of the syntactic configuration whose mother node is being assigned its semantic representation). No effort is made to state these composition principles as operations on ‘semantic values’ (that is, on denotations of the daughter representations in models for the representation language). In fact, we doubt that such a restatement would be possible; but we can see no real gain from doing this, even this could be done.⁴

Any account of how perfects work must make explicit (i) where in the course of building the semantics of the sentences that contain them they do their work, (ii) how they do their work given the inputs they receive in the positions they occupy in the syntactic structure, and (iii) what is done ‘higher up’ with the output representations they deliver. These are questions that can only be answered by an account which embeds what it has to say about perfects firmly in a semantics construction that covers the full distance from the lexical leaves of the syntactic sentence structure all the way up to the sentence root node. In other words, a truly satisfactory account of any perfect will have to make more or less the entire compositional process explicit in which that perfect makes its contribution at the point where it does.

We follow the widely accepted and, we believe, well-motivated view that perfects are situated above the projection level usually referred to as Aspect and below the level of Tense (the locus of finite tense in the case of finite sentences). Assuming that the perfect is located below Tense is consistent with the intuition that finite perfects are just what their name suggests: finite tenses – past, present or future – applied to pre-finite tense structures which contain a perfect (as opposed to pre-finite structures without perfects).

More problematic, but at least as important, are the levels that on this view precede a perfect in the bottom-up construction. It is the construction steps at these levels that determine what input representations perfect operators receive. Of particular importance are the spectral properties of these

⁴ One reason why we doubt that the construction algorithm we will present could be restated in terms of operations on semantic values is that it makes an essential use of certain *coercion mechanisms*. One such mechanism is central to our treatment of English and German perfects – it comes into action when a perfect operator is made to apply to the representation of a state (rather than an event): the state representation first has to be modified into an event representation and it is to that event representation that the perfect operator then applies. It seems very unlikely to us that this mechanism could be described in terms of some suitably refined notion of semantic value.

inputs. (As just noted, there is a big difference between what perfects do with representations of states (that is, in our terminology, representations with imperfective aspect) and what they do with input representations of events (representations with perfective aspect). One factor in the aspect of the input representation is the ‘Aktionsart’ of the verb. But in languages like English and German that is only one among many: much can happen to aspectual properties in the course of computing the input representation to a perfect from the lexical semantics of the verb, as other factors make their impact, at different subsequent points.⁵)

In English one of these factors is the presence or absence of a progressive. The progressive produces makes it impact directly below the perfect, and thus has, you might say, the last word about the input. It operates on event (i.e. perfective) representations representations and turns these into state (i.e. imperfective) representations. However, other aspect-modifying operations can occur at lower levels, between the lexical verb and the level of the progressive. A full compositional account of English aspect must deal with what can happen at those levels too. In German, which doesn’t have a progressive of the kind English does, the possibility of multiple aspect-modifications arises as well, and the problem does not seem any simpler.
//

As far as these problems are concerned the account we present in this book is a bit of a halfway house. As it became clear to us that we wouldn’t be able to say about the perfect what we wanted to say about it without taking other stages of the computational process into account as well, the account increasingly took on the shape of a general syntax-semantics interface, in which the computational steps involving perfects and those adjacent to them get special attention, but in which the other levels get their due as well. But that impression – we say that by way of warning – is only partly justified. Many fact the can affect aspect on the way from verb to pert are not analyzed the way they should, or they are simply ignored. In these respects the account is seriously incomplete.

We do not think it would have made sense to go into the details that the presentation of this book finesses. But of course these details will have to be filled in at some point before this account can lay claims to being a general model of tense and aspect in English or German. If it comes across as such

⁵ Languages differ on this point. For instance, in Slavic languages such as Polish, Russian or Czech aspect at higher projection levels tends to be determined largely by the choice of the lexical verb. REFERENCES.

a theory as it is, be on your guard!

1.2 The structure of the book

The structure of the book is as follows. In the next chapter we introduce the reader, by going through a few examples in considerable detail, to the central features of the syntax-semantics interface we will be using throughout; this will be the formal background to the way in which our account of English and German perfects will be developed.

Chapter 3 is devoted to that feature of the English present perfect which sets it apart both from the present perfects of many other languages (German being one of those) and from the non-present perfect forms of English itself: its incompatibility with adverbs whose denotations lie entirely in the past of the utterance time. Chapter 3 only deals with the difference between English and German present perfects; non-present perfect forms will not be considered until Chapter 6. Chapter 4 is devoted to the conceptual clarification of the notion of a ‘result state’. In particular we will address in this section the distinction between target states and formal result states in the terminology of (Parsons 1990). Chapter 5 can be seen as an interlude. It is devoted to a use of the perfect which we call the *Zustandspferkt* (cf. 2).//

As noted already, Chapter 6 deals with non-present perfects. Past perfects and other non-present perfects are important for this study for two reasons. On the one hand there are important differences between the English present perfect and its other, non-present, perfect tense forms: In a certain respect the English non-present perfects behave like the German perfects (both present and non-present), with the English present perfect looking like the odd one out. On the other hand the analysis of non-present perfects is methodologically important because it brings into play a dimension of the theory of temporal reference that is hidden from view so long as one only looks at present perfects. We are referring to the ‘Reference Times’ first introduced by Reichenbach ((Reichenbach 1947)). We will argue that Reichenbachian Reference Times are needed: but once they have been adopted, a number of the principles that were introduced earlier to deal with the present perfects need to be adapted.

Chapters 7 and 8 belong closely together. They build up to a comparison with Perfect Time Span accounts of the perfect, which is reached at the end of Chapter 8. The preparation for this discussion invokes a detailed analysis of

how perfects and other tense forms combine with durative adverbials such as *since*- and *for*-phrases and their German counterparts. (This is necessary, as some of the strongest arguments in favor of the PTS approach has den the way it handles combinations of *since*- and *for*-phrases with the English Present Perfect.) Chapter 7 can be seen as a preliminary to the quite detailed explorations of Chapter 8. serves as preparation to the next chapters. It is quite short and addresses the question how best to define the notion of an ‘extended now’.

Chapter 9 raises a question which, at that point, will have been long overdue: What are the possible syntactic positions of temporal adverbs and what semantic implications does this have? Up to Chapter 9 it is assumed that temporal adverbs are adjoined high up in the syntactic tree (to T(ense) P(hrase), and within the syntax-semantics interface we are using that means that they perform their locating function, after perfect operators have done their and also after temporal location by tense. Chapter 9 looks at the question what happens when it is assumed that adverbs can also be adjoined lower down, below the level at which perfects are assumed to operate.

Chapter 10 deals with quantificational and generic uses of perfect verb forms. This is a topic that has (to our knowledge t) been unjustly neglected. The topic is important in the context of this study because English generic and quantificational perfects often seem to contradict the classical observation that English present perfects are incompatible with adverbs referring to times in the past: Such adverbs can occur in general and quantification perfects. Part of our task will be to explain how such occurrences are compatible with the classical constraint, provided it is correctly stated.

For a study the length of this one a section called ‘Conclusion’ seems almost an aesthetic obligation. We have bowed to the convention, but exploited the opportunity to briefly discuss three directions in which the proposals of this book could be extended. Two of these extensions are ‘upwards’ and one ‘downwards’. The first ‘upwards’ direction is towards multi-sentence discourse and texts. To get a grip on the capacity that tenses and other temporal expressions have of relating the contents of their sentences in systematic, predictable ways to the content of the sentences preceding them was the main original motivation behind DRT. But in this study no use is made of what a ‘dynamic’ theory like DRT can contribute to this dimension of temporal reference. Second, and also ‘upward’, though in a somewhat different sense, there is the extension to embedded occurrences of tensed sentences – in particular occurrences as complements of attitudinal verbs and verbs of saying. Notoriously, the tenses of such complement sentences and their ‘matrix verbs’

interact in complex ways that on the one hand are somewhat reminiscent of the ways in which the tenses of sentences in a discourse relate them to the preceding sentences, but which on the other hand are also subject to their own specific constraints (for instance, the constraints that govern such constructions in ‘sequence of tense’ languages like English and German). The extension in the ‘downward’ direction is one that descends into the inside of the verbs and other lexical items. In the present study words are treated as ‘lexical items’ – black boxes with a morphology and a semantics that are not analyzed into further smaller components. In recent years much has been discovered to discredit this practice. We now know quite a bit about the internal morpho-syntactic and semantic structure of individual verbs and other types of words). For a study like the one of this book these explorations of sub lexical structure are of special interest because the internal structures of verbs determine their aspectual properties. Thus, when such an account of sub lexical structure is incorporated into an account of the kind presented here, it is no longer necessary to specify Aktionsarten as a stimulative part of the lexicon, since the new component tells us what they are.

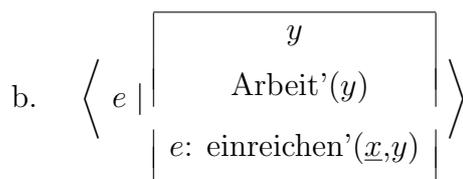
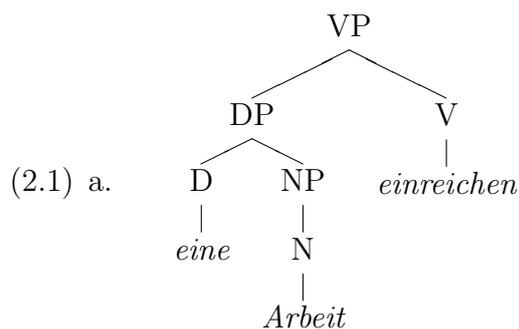
By combining all these extensions we should eventually arrive at a comprehensive system in which the semantic representations of discourses and texts can be computed all the way from the smallest meaningful sub-lexical constituents. But that is a goal in the far distance. What we present in this book is an edifice of much more modest proportions.

Chapter 2

Semantic representations for the sentences in (1.1)

In this section we look in some detail at a way of implementing the account of the perfect that we sketched in Section 1. Since from here on we will only be concerned with the perfects of English and German, we will just consider the English sentence (1.1a) and the German sentence (1.1b). The French sentence (1.1c) will play no further role.

We start with (1.1b), which is our paradigm problem for the account of the German Perfect given in (Reyle et al. 2007). And we begin by having a look at the representation of the nucleus for the German *eine Arbeit einreichen* (lit. *a paper submit*). We assume for this VP the syntactic structure given in (2.1a). (2.1a) is assigned the semantic representation in (2.1b).



(2.1b) represents the VP *eine Arbeit einreichen* as introducing an event e to the effect that the subject \underline{x} submits some paper y . (The underlining of the symbol ' \underline{x} ' indicates that at this point the subject argument is just an argument slot, which is to be filled later by the discourse referent contributed by the grammatical subject; ' \underline{x} ' itself is not a discourse referent.)

The problem with the 'pure' result state analysis of the perfect can now be identified a little more closely. Within the representational semantics we use as our framework the assumption that the perfect operator transforms the representation provided by its input into a representation of the result state comes to this ((Reyle et al. 2007), (?)): Suppose that the representation of *eine Arbeit einreichen* is as in (2.1b). Here the presence of e in the 'binding store', which precedes the actual representation of the VP's 'propositional content', indicates that e still needs to be 'bound'. Various mechanisms can be responsible for the binding of discourse referents and – depending on the mechanism – the binding can take different forms. If no operators intervene between the VP and the point where linking takes place to the time t_t introduced by tense – as in the sentence *Fritz reichte seine Arbeit ein* ('Fritz submitted his paper') – it is the linking to t_t that causes e to be bound (existentially). But binding of e can also take place when (2.1b) serves as input to some intervening operator. In such cases binding takes the form of λ -abstraction, which transforms the input representation into a term that denotes the property of being an event satisfying the constraints that the input representation imposes on e . This is what we assumed in (Reyle et al. 2007) both for the Perfect and for the Progressive. (And in essence it was also the assumption made in our earlier work ((Kamp and Reyle 1993))). We still believe this is a viable approach to the Progressive, but the considerations of Section 1 indicate that for the Perfect it won't do. To see this, consider what happens when the perfect operator as it is defined in those earlier papers is applied to (2.1b) as its operandum. The result of this application is as in (2.2).

$$(2.2) \left\langle s \mid \text{Res}(s, \lambda e. \begin{array}{c} y \\ \text{Arbeit}'(y) \\ e: \text{einreichen}'(\underline{x}, y) \end{array}) \right\rangle$$

Note that in this representation e has been removed from the binding store and been made into the binder of the λ -operator, while the result state dis-

course referent s has come to replace it in the store. This means that at the point when temporal linking takes place, s will be the discourse referent available for this purpose. That is, it will be the only discourse referent available both for linking to tense and for linking to any temporal adverb. But as we have seen, that is not what we want; for adverb linking we need separate access to e .

The relation ‘Res’ in (2.2) is a relation between token states and eventuality types. It says of the state that occupies its first argument slot that it is the result state of the type of eventuality characterised by the property which fills its second slot. However, the perfect operator is veridical: a state can stand in the result relation to an eventuality type only when there exists a token eventuality of that type of which the state is the result state. And of course, the converse holds as well. Thus the representation in (2.2) can be simplified, without change in truth-conditional meaning, to one that does not involve λ -binding. This simplification makes use of a different result state relation ‘res’. ‘res’ is a relation between token states and token eventualities. Using the res-relation we can rewrite (2.2) equivalently as (2.3).

$$(2.3) \left\langle s \mid \begin{array}{c} e \ y \\ \text{Arbeit}'(y) \\ e: \text{einreichen}'(\underline{x}, y) \\ \text{res}(s, e) \end{array} \right\rangle$$

In (2.3) e is still bound, by virtue of its occurrence in the universe of the DRS used to characterise s . It is just a small additional step to delay existential binding of e , by putting it too in the store rather than in the universe of the DRS. This is what we will do presently, but first let us see where we get when we stick with (2.3).

The problem presented by the sentences in (1.1) can now be described in more formal terms. Suppose that (2.3) is all that the perfect operator delivers as output and passes on to the next node, and that it is this structure that is the input to linking with t_t . Then the element to be linked with t_t (and thereby bound) will be s . To see what this comes to we first have a closer look at the semantics for the sentence in (2.4a), which is like (1.1a) except that the adverb has been dropped and the definite direct object *seine Arbeit* has been replaced by the indefinite *eine Arbeit*.

Following the computation recipe just sketched, we get for (2.4a) the representation given in (2.4b).

- (2.4) a. Fritz hat eine Arbeit eingereicht.
(lit. Fritz has a paper submitted)

b.

$f \quad t \quad s \quad e \quad y$
Fritz'(f) $t = n$ $t \subseteq s$ Arbeit'(y)
e : einreichen'(f,y) res(s,e)

- (2.5) a. Heute hat Fritz eine Arbeit eingereicht.
 (lit. Today has Fritz a paper submitted)

f	h	t	s	e	y
Fritz'(f)	day(h)	$n \subseteq h$	$t = n$	$t \subseteq s$	Arbeit'(y)
b.					
e : einreichen'(f,y)					
res(s,e)					
($h \subseteq s$)					

There are no problems with (2.4a); its truth conditions are correctly captured by (2.4b). The difficulties start, as expected, with (2.5a) (which is like (1.1b) except for the change of *seine* into *eine*). Since only the result state s is available for linking with the time t_{loc} provided by *heute*, the question is: how should s and t_{loc} be related? Intuitively it is clear what we want to say about s : it should start somewhere within t_{loc} . (Since s must also overlap with n , this entails that it starts somewhere within t_{loc} but before n .) For the case at hand that might arguably be good enough: if we assume that paper submissions are punctual events, then it follows from the assumption that the result state of a given paper submission starts from the point in time t that the event occurred at. So if the result state began somewhere within today, then the submission itself must have occurred within today too. For other VPs, however, this way of securing that the event is located within the time denoted by a temporal adverb will not work. Take a genuine accomplishment VP like *write a letter*. If the start of its result state is situated within today, then that will entail that the final part of the event of writing the letter falls within today as well. But that isn't good enough; *all* of the event must be within today.

This confirms the conclusion drawn earlier: we cannot construct the linking relations that are needed for a sentence like (2.5a) if e is existentially bound at a computation stage which precedes the stage of temporal adverb linking.

By now it should be reasonably clear what kind of changes are required in the rules for computing the meanings of sentences like (2.5a). The representation construction for such a sentence, with its temporal adverb and its main verb in the perfect tense form, must keep distinct parts of the nucleus accessible for linking until linking takes place. The simplest and most principled way to make sure of this is to assume that the nucleus is carried along as the computation proceeds, with discourse referents for its different components

that remain unbound, until tense and adverb linking occurs.

To repeat, on its way from the point where it is introduced by the lexical entry for the verb to the point where tense and adverb linking occur the representation of the nucleus may encounter one or more ‘aspectual’ operators. These operators can modify the event complex introduced by the verb and some of them always do. The perfect itself is one such operator, but it is not the only one. Another operator is the operator ‘PROG’, which transforms *perfective* into *imperfective* event structures. Operators like PROG will play only a secondary role in this essay. But they are important insofar as they can modify the event complex representation before it reaches the stage of tense and adverb linking and also before it reaches a perfect operator. Our decision to assume that different parts of the nucleus remain accessible until tense and adverb linking entails that the effect of operators other than the perfect will also have to be carefully rethought. We will tackle this problem as we go along. But it should be stressed that the general revision we are about to propose requires rethinking the modus operandi of those other operators too, and not just the workings of the perfect.

In those cases where no aspectual modifiers intervene between the introduction of the nuclear event complex and temporal linking, the components of the nucleus that are involved in tense and adverb linking are selected by default. One example is the sentence in (7).

- (2.6) Heute reichte Fritz eine Arbeit ein.
(lit. Today submitted Fritz has a paper.)

In order to focus more clearly on the formal task before us it will be useful to compare this sentence with (2.5a). (2.6) and (2.5a) have the same truth conditions. But the ways in which these truth conditions are arrived at are quite different.

As indicated, we assume that in the computation of the semantics for (2.6) no nucleus-affecting operators intervene between the point of introducing the lexical semantics of the verb and that of linking to tense and adverb. So the components involved in linking will be the very same that are determined by the lexical entry of the verb. These are determined as in our earlier work (e.g. (Kamp and Reyle 1993)): both kinds of linking involve the referential argument of the verb. In the case of an event verb like *einreichen* or *submit*, this is the punctual culmination event e , and its linking takes the form of temporal inclusion within both the time t_t introduced by the tense and the

time t_{loc} introduced by the adverb. On the additional assumption that $t_t \subseteq t_{loc}$ this leads to the relations ‘ $e \subseteq t_t \subseteq t_{loc}$ ’. The function of the past tense is to locate t_t in the past of n .

(2.5a) differs from (2.6) in two respects. First, its tense is present, not past. This means that the time t_t that is introduced by tense is now identical with n rather than preceding it. And second, there is an intervening occurrence of the Perfect operator. Given all that we have said about the sentences in (1.1) it ought to be clear what effects the operator should produce: (i) it should make the result state s into the component responsible for tense linking, and (ii) it should allot the task of adverb linking to a part of the nucleus which guarantees that the event e ends up as included within t_{loc} .

To turn the different informal principles that we have been collecting along the way into a set of rules for the construction of semantic representations we need representation formats that permit us to state those rules. Once again, the best way to do that is to go through a couple of illustrative examples in sufficient detail. Our presentation of these examples will not be strictly formal, but we trust that the construction principles they illustrate can be recognised clearly enough.

2.1 Some DRS Constructions (preliminary)

We start with (2.7), the English equivalent of (2.5a) and thus a minor variant of our very first example sentence (1.1a).

(2.7) Today Fritz has submitted a paper.

As our starting point for the DRS construction for (2.7) we assume that its syntactic structure is as in (2.8).

Asp, has one of two values, which we denote as ‘Prog’ and ‘Default’. Prog is an operator which turns an input phrase with non-progressive morphology into an output phrase with progressive morphology. The semantic operation comes with the presupposition that its input must be an event description; and when the input is an event description, then the operation turns it into the description of the corresponding ‘progressive state’. It seems that the details of this operation are still not fully understood. (See the brief discussion in Section 1 and the references given there.) But since in the explorations of this essay the progressive operator will play no essential part, this need not worry us. Suffice it to observe that the output of the operator, if defined, is always imperfective, which in our terminology means no more (or less) than that the output representation has the form of a state description, with the implications for temporal linking that this assumption carries. (We will return to this point later on.)

The other value of Asp, ‘Default’, is, like -Perf, a vacuous operator, which passes both syntax and semantic representation unaltered up to the maximal projection AspP. In all examples that we will consider Aspect will have this value. So in all these cases the question whether the semantic representation associated with AspP is the description of an event or a state will be determined by the lexical properties of the verb.

This brings us to the lexical entries for verbs, and in particular to the entry for *submit*, the verb of our current example. The format for the lexical entries for verbs we will use is by and large that of (Kamp and Roßdeutscher 1994b), (Kamp and Roßdeutscher 1994a) in which the ‘referential argument’ is presented below an orthographic presentation of the lemma and the non-referential arguments to its right, together with information about their syntactic realisation. The central part of the entry, however, is its semantic representation (both for our purposes then and for our purposes now). And it is with regard to these semantic representations that the entries we will be assuming here differ from those of the earlier proposal. Again it is easiest to explain what these differences come to at the hand of an example. The lexical entry for *submit* is given in (2.9).

(2.9) a. submit (verb) nom acc
 e x y

b. $\left\langle ec, e_{tlt,alt}, s \mid \begin{array}{l} e: \text{submit}'(x,y) \\ \text{res}(s,e) \\ ec = e \oplus_{ev} s \end{array} \right\rangle$

K_{submit}

As for all verb entries in the format adopted here the semantic representation consists of a DRS – here K_{submit} – preceded by a store.¹ In (2.9) the core of the descriptive content is the condition ‘ $e: \text{submit}'(x,y)$ ’, which says that the events described by the verb *submit* are events satisfying the predicate ‘submit’ . In addition – here the new proposal differs from the earlier one – the referential argument e is represented as a component of the nucleus ec , which is made up from e together with the result state s . (We use ‘ \oplus_{ev} ’, a kind of mereological sum operation, to express that ec is composed of the parts e and s .) The condition ‘ $\text{res}(s,e)$ ’ makes explicit that s is the result of e .

All three discourse referents e , s and ec have been put into the store, so that they will be available for further manipulations once the semantic representation of the entry has been imported into the representation of a sentence containing the word. We will see the point of this stipulation below.

As we said, e , s and ec are discourse referents. These discourse referents are introduced by the verb itself. They must be distinguished from the argument place markers \underline{x} and \underline{y} (graphically distinguished from discourse referents through underlining). Argument place markers (or, as we will also often refer to them, ‘argument slots’) are not arguments as such but mark slots that must be ‘filled with’ (that is, literally speaking, replaced by) real arguments later on in the course of the DRS construction, at some point after the lexical representation has been inserted. Usually the discourse referents that will eventually fill the argument slots in the semantic representations of lexical predicates are introduced by the argument phrases with which the predicates are combined in well-formed clauses. In particular, this will be

¹ This is not quite accurate. The general format of our representations also allows for the representation of presuppositions, which are ‘left-adjoined’ to non-presuppositional DRSs (i.e. DRSs that are representing information that is not presupposed but ‘asserted’, such as for instance the DRS in (2.9)). It will be clear what this comes to when we get to the representation of presuppositions.

the form that lost filling will take in all the examples considered here.

In (2.9) the referential argument e bears both the subscripts ‘*tlt*’ and ‘*alt*’. The meaning of this is that e is singled out both for tense linking and, when applicable, for adverb linking. So it will be e that will be located eventually by both tense and any potential adverb, unless one or the other of these subscripts is moved to some other discourse referent in the course of constructing the semantic representation for the clause.

The marking of e with these two subscripts is an instance of the general principle that in the lexical entry of a verb it is always the referential argument that bears these two subscripts. In view of this principle there is in fact no need to mark referential arguments explicitly, and from now on we will omit the two subscripts from lexical entries. However, we will always introduce the subscripts as soon as the lexical entry of a verb is inserted into the semantic representation of a clause which contains the verb as lexical constituent.

In the representations of certain ‘simple’ sentences the subscripts remain with the referential argument of the verb up to the point where temporal linking takes place. In such cases the predications made by the present proposal coincide with those made by earlier ones. Differences arise when intervening operators along the computation path move subscripts from one component to another. This is, as we have been arguing, the effect produced by a perfect.

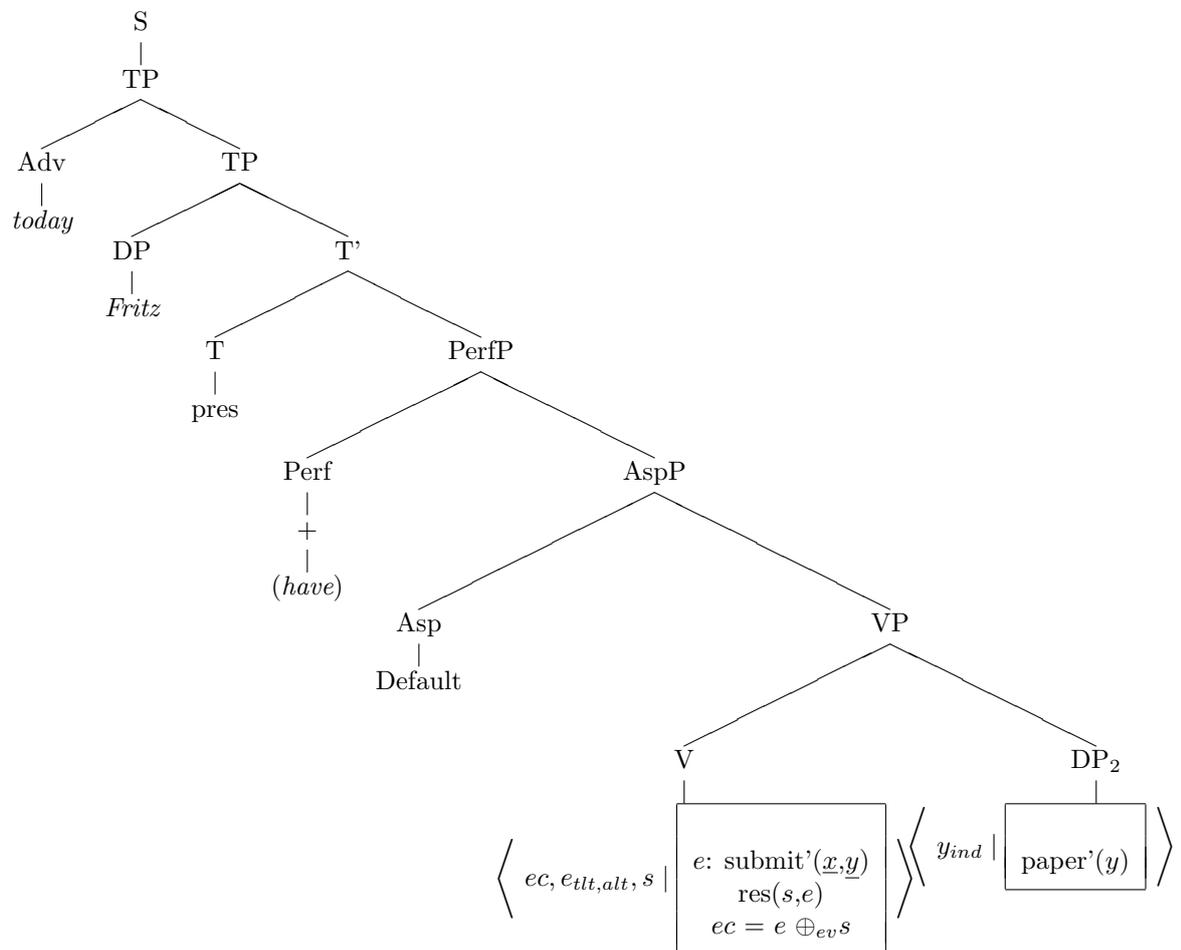
The first steps that have to be performed in constructing the semantic representation of (2.7) from the syntactic structure in (2.8) involve replacing the lexical items attached to leaves of (2.8) by the semantic representations of their lexical entries. For the moment we will limit ourselves to lexical insertion for the words that make up the VP of (2.8). Moreover, we deal with the direct object phrase *a paper* in one go, omitting the step which constructs its representation from those of the words *a* and *paper*. (2.10) gives the representation for *a paper*.

$$(2.10) \left\langle y_{ind} \mid \boxed{\text{paper}'(y)} \right\rangle$$

The subscript ‘*ind*’ is a shorthand for the conditions that constrain the binding of discourse referents representing indefinite NPs with *a* as determiner. A fully general account of these conditions is a long and quite complicated story, but it is one that doesn’t need telling here. For the sentences we will

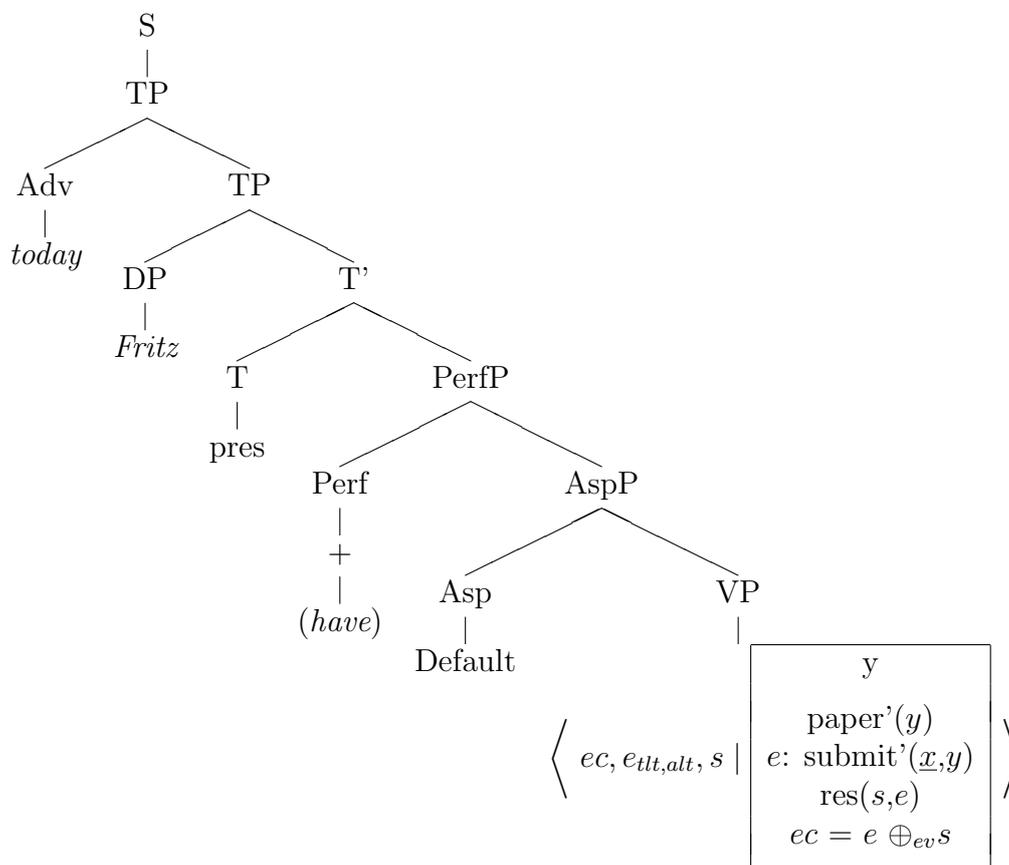
consider the net effect of the conditions is that the discourse referent representing the indefinite is bound through being inserted into the universe of the main DRS. (Cases with subordinate DRSs in the universes of which the referential arguments of indefinites might end up do not occur in our examples.) In the DRS constructions we present this insertion takes place when the representation of the direct object is combined with that of the verb. Insertion of (2.10) and the semantic representation of (2.9) in (2.8) leads to (2.11).

(2.11)



The next step, combining object DP and verb into the representation of the VP, is a straightforward case of argument insertion, in which the slot \underline{y} is filled with the discourse referent y . Moreover, as mentioned above, we take the combination operation to be responsible also for the binding of y . The result is as in (2.12).

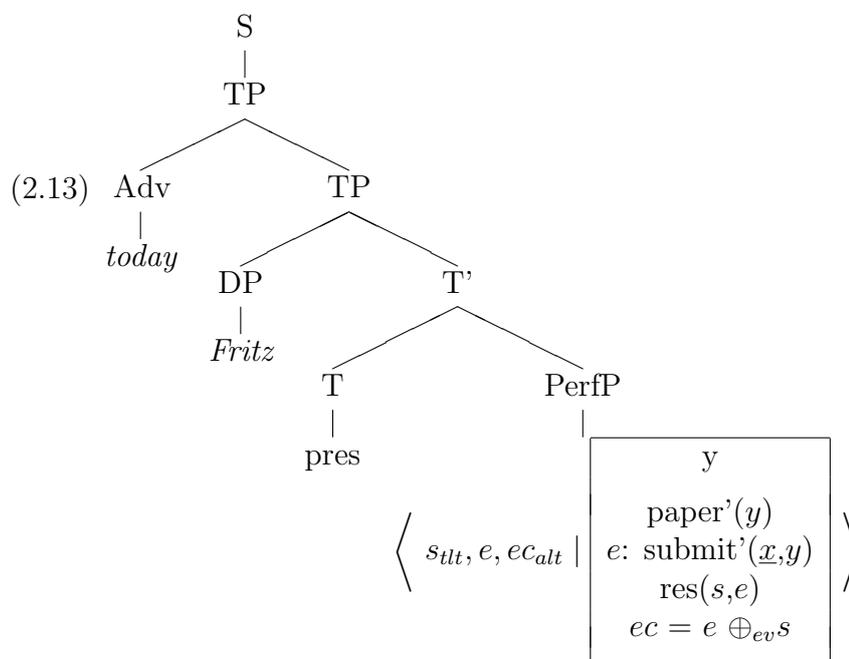
(2.12)



Nothing happens when we pass from the representation of VP to that of AspP – that is the meaning of the Asp value ‘Default’. The crucial operation takes place in the following transition, from AspP to PerfP. This is where the new conception of what it is to form a perfect shows its true colours. Rather than turning an event representation into a corresponding result state representation, the operator just changes the input representation into one in which the focus of temporal perspective has been shifted from event to result state – formally: in which the subscript ‘tlt’ has been shifted from e to s .

But is this all that the Perfect operator should do? That is a subtle question, but it is one that will play an important part in our further deliberations. For the time being we just postulate our answer to it: The English Perfect effects not only a shift of ‘tlt’ from e to s but also a shift of ‘alt’ from e to ec . The reason for this stipulation will become clear as we proceed.

The result of applying these two steps – the vacuous transition from VP to AspP and the non-vacuous one from AspP to PerfP – to (2.12) is given in (2.13).

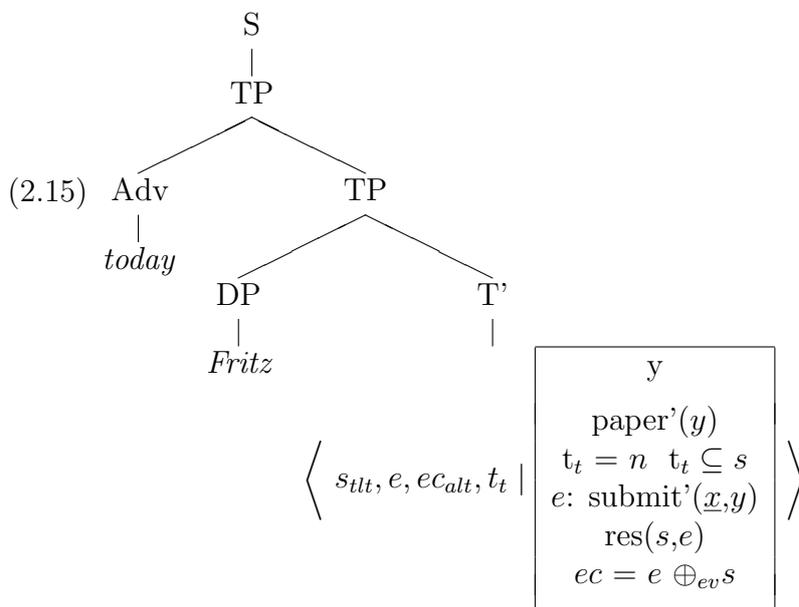


The next step combines the representation of PerfP, the syntactic complement of T, with the tense information present at T. Here we follow the lead of our earlier work: The tense is assumed to introduce a time discourse referent t_t representing the ‘location time’ of the relevant discourse referent presented by the complement of T. The tense imposes a temporal location constraint on t_t ; for instance, the present tense of (2.7) requires that t_t be identified with the utterance time n . On the other hand the operation links the relevant discourse referent ev from the representation of the complement – this is the discourse referent currently bearing the subscript ‘tlt’ – to t , either by way of the condition ‘ $ev \subseteq t$ ’, in case ev is an event discourse referent, or by way of the condition ‘ $t \subseteq ev$ ’ when ev is a discourse referent for a state. In the present instance ev is the state discourse referent s , so it is the second of these conditions that is selected.

Since the general principle that is at work here is a crucial ingredient of the account we are developing, it deserves an explicit statement:

(2.14) The time discourse referent t_t that is introduced by T is used to locate the tlt-marked discourse referent in the binding store of the complement to T.

In the light of these observations it should be clear how we get from (2.13) to (2.15).



The next task is to integrate the subject DP into the T' representation. Here we adopt the original DRT account of proper names, according to which a proper name N introduces a discourse referent x into the main DRS universe while adding a condition 'N(x)' into the main condition set to indicate that x represents the (real) referent of N.

After this step comes one that is again relevant to the issue under discussion. It concerns the temporal TP-adjunct *today*. As proposed in ((Reyle et al. 2007)) temporal locating adverbs like *today* contribute a time discourse referent annotated with the subscript 'loc' to indicate their locating function. As we have said already, we adopt this annotation in this paper as well. So let t'_{loc} be the discourse referent representing the denotation of *today* in the sentence representation we are constructing. According to the present account the function of a discourse referent with subscript 'loc' is to locate the discourse referent in the representation of the adjunction site that is singled out for adverbial location by the subscript 'alt'. In (2.13) this is the discourse referent ec representing the nucleus introduced by *submit*. Here too the linking relation that establishes the location should depend on whether this discourse referent is an event or a state discourse referent; in the former case the condition should be ' $ec \subseteq t'_{loc}$ ', in the latter it should be ' $t'_{loc} \subseteq ec$ '.

But what is the status of ec ? This is a question we haven't yet addressed, and it is one to which the answer is not self-evident. ec is the composition of an event e and a state s ; but what does that make it from the point of aspect? This is a second question to which we will give the answer first, deferring discussion of the issue till later:

(2.16) Discourse referents for nuclei introduced by verbs whose referential argument is an event have the status of events.

The general principle that governs the choice of the discourse referent that is the target of location by t'_{loc} can be formulated in the same terms as (2.14). The statement is given in (2.17).

(2.17) Let t_{loc} be the time discourse referent introduced by a temporal adjunct of TP. Then the role of t_{loc} is to temporally locate that discourse referent in the binding store of the adjunction site TP which bears the subscript 'alt'.

In order to combine the semantics of *today* with that of its adjunction site we need not only a representation for the latter – this representation we already have; see (2.14) – but also a semantic representation for *today* itself. There is a slight twist to this matter, about which we will be rather quick, since it is ancillary to our real interests at this point. The word *today* has two different uses, as a DP (as in the sentence 'Today was the best day of my life') and as a temporal adverb, the use it has in (2.7). We assume that the connection between these two uses is as follows: when *today* is used as temporal adverb, this adverb takes the more specific form of a Prepositional Phrase, with a silent preposition. Thus the occurrence of *today* in (2.7) is on a par with *on Monday*, as it occurs in 'On Monday Fritz submitted his paper'. In both cases the preposition – *on* or silent – expresses a relation of temporal inclusion between the time contributed by the DP it governs and the referential argument of the semantic representation for its adjunction site, with the direction of the inclusion determined by whether that argument is an event or a state. We further assume that the words *Monday* and *today* function as singular terms with a semantics that makes them look like a kind of hybrids²

² We are using the word 'hybrid' in a rather loose way here. The term is motivated most directly by the semantics of the names of the days of the week, of which *Monday* is one. When I say 'Fritz came on Monday.', I normally use *Monday* to refer to some particular Monday. This may be a Monday in the vicinity of a time that was previously introduced into the discourse; but it can also be, and often is, the nearest Monday to the utterance time, either in the past, when the sentence is in the pasty tense, as in our example, or in the future in a future tense sentence. *today* doesn't behave in quite this way, and should arguably be classified as an indexical true and simple. But such distinctions do not matter for what we want to say here.

between indexicals and proper names and that the DPs of these PP consist just of those terms and nothing more. For the semantics of the DP we take this to entail that the representation resulting from lexical insertion for the term is passed up without modification to the DP node.

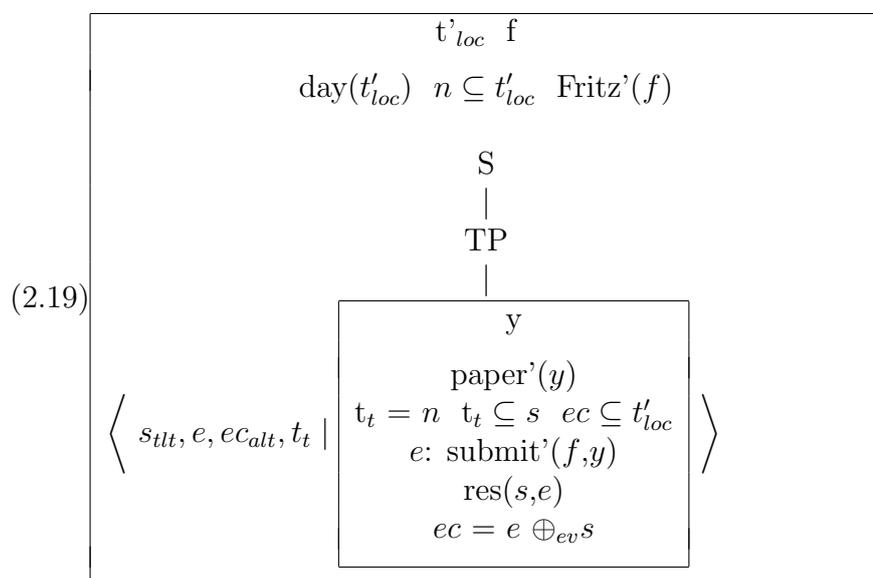
All that we need in addition to these assumptions is a lexical entry for the word *today* as singular term. This entry is given in (2.18).

$$(2.18) \left\langle t \mid \begin{array}{c} \text{day}(t) \\ n \subseteq t \end{array} \right\rangle$$

Both the DPs *today* and *Fritz* are definite DPs. It is one of our assumptions that all definites are presuppositional and furthermore that the presuppositions of proper names (such as the DP *Fritz*), indexicals and terms that might be considered hybrids between them (such as *today*) must always be resolved at the highest representational level. In order not to complicate our representations unnecessarily at this early stage, we will, for now, shortcut the representation and subsequent resolution of these presuppositions and simply assume that *Fritz* and *today* establish their discourse referents at the highest level of the representation that is being constructed, i.e. in the universe of the main DRS.³

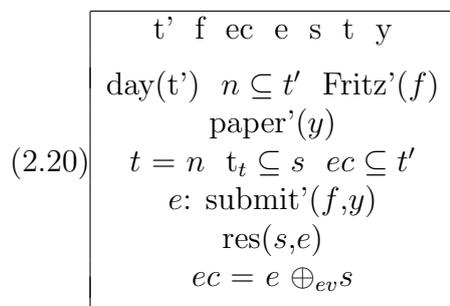
Processing the DP *Fritz* and the Adverb *today* in the manner indicated leads to the representation in 2.19).

³ This is also where these discourse referents will end up according to the presuppositional account. Presuppositions will become important later on, in connection with our specific proposals about the perfect, and at that point they will be included as explicit parts of our representations until resolution will have taken place.



With the adverb linking of ec the temporal binding of the nucleus and its components is complete. Since at this point all constraints that the sentence imposes on the discourse referents that represent the nucleus and its components, there is no further need to keep them in store. Exactly when binding the discourse referents that are still in store at this point occurs and which part or feature of the remaining syntactic structure should be made responsible for it, is a matter on which we want to defer commitment. (The syntactic structure we have been using is a reflection of this refusal to commit ourselves in that it doesn't display a Complementiser position (as head of the S- or CP-projection.) As a stopgap we assume that all remaining discourse referents in the store are bound by a default mechanism, which takes the form of transferring them from the store to the universe of the DRS adjoined to its right. The truth conditional effect of this is, as always in DRT, that of existential quantification.

When the store is disposed of in this way, the inner DRS in of (2.19) can be merged with the outer one. What results is a single DRS, shown in (2.20).



2.2 The German Perfect

Sentence (2.7), for which we constructed the semantic representation in Section 2.1, allows for a literal translation into German, given in (2.21).

(2.21) Heute hat Fritz eine Arbeit eingereicht.
(lit. Today has Fritz submitted a paper.)

That (2.21) has the same truth conditions as (2.7) is what one would expect given that *heute* has the same semantics as *today*. Or, to put the matter more accurately, this is what one would expect on the assumption that the German Perfekt occurring in (2.21) should get the same analysis that we have given to the Present Perfect of (2.7).

But is this last assumption really right? This is not an easy question and we won't be able to discuss it until the next section. In the present section we deal with some points that are preliminary to that discussion.

It is often claimed that in the course of time the German Perfekt has acquired a use that is indistinguishable from that of a simple past. In fact, in the dialects of Southern Germany the Perfekt has supplanted the simple past form (the so-called 'Präteritum') almost completely, and even in the German that is spoken in the more northerly parts of Germany the Perfekt is often preferred in situations where (on anybody's understanding of the semantic differences between present perfect and simple past) the Präteritum ought to have done just as well. At the same time, however, the Perfekt has retained its ability to play the part of a true perfect. This can be seen among other things when one tries to translate German into English: often the best (and only satisfactory) way of rendering a Perfekt is to translate it as an English Present Perfect.

Observations such as these have been taken by many to show that the Perfekt in contemporary German is 'ambiguous' between a true perfect and a simple past. Exactly what this claim comes to will depend on how the notions 'true perfect' and 'simple past' are precisely understood. But even if we suppose that these terms have been given precise definitions (and that according to those definitions they are genuinely distinct), there are different ways in which the ambiguity claim can be interpreted. A simple, though not particularly plausible interpretation would have it that the totality of German Perfekt sentences is partitioned into two subclasses, that of the sentences whose Perfekt has to be analysed as a true perfect and that of those whose

Perfekts are to be analysed as simple pasts. Less implausible is the claim that how the Perfekt of a given sentence is to be analysed may depend on the context in which the sentence appears. On this view there might still be sentences whose Perfekts require a true perfect analysis in all contexts, and similarly there might be sentences in which the Perfekt would always have to be analysed as a simple past. But, centrally, there would be sentences for which the analysis will vary with context and thus will have to be analysed differently in different situations. According to this view only some Perfekt sentences are ambiguous, and not just the Perfekt form as such. With regard to sentences whose form allows for either analysis a further distinction can be made: (1) The sentence may be such that which analysis is given to its Perfekt makes no difference to the interpretation that is assigned in the end to the sentence as a whole. (In particular, the choice of analysis might make no difference to the truth conditions that are assigned by the resulting interpretation.) (2) The two analyses do lead to significantly different interpretations (in particular: to interpretations that determine distinct truth conditions).

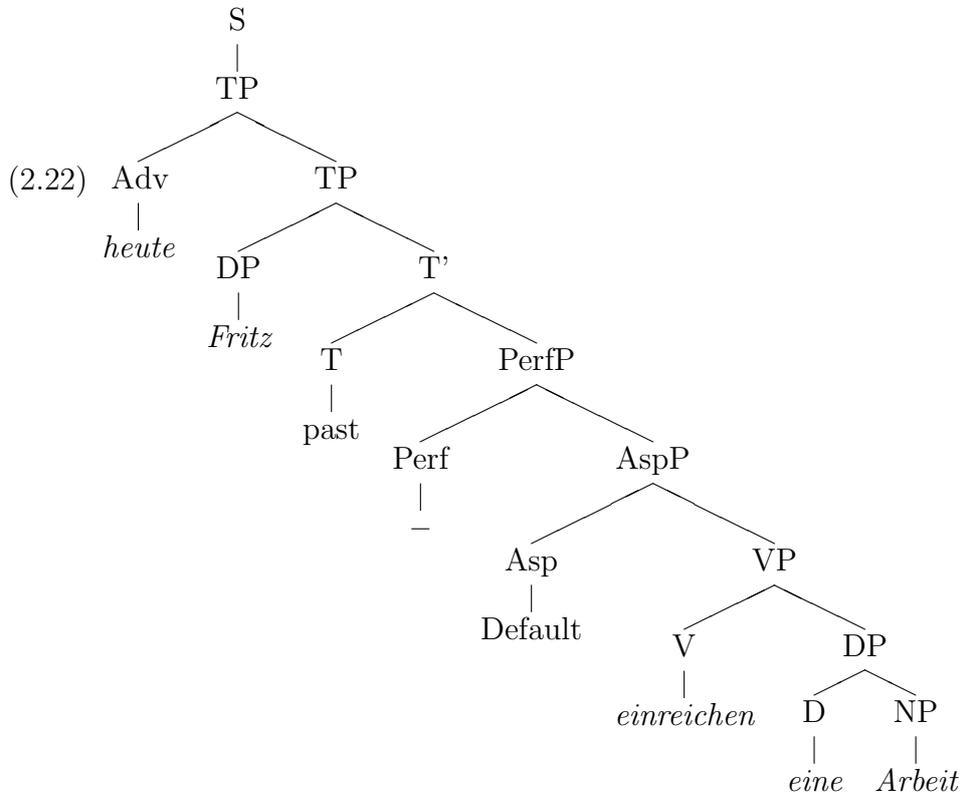
This second version of the ambiguity claim gives us a three-fold division of the class of German Perfect sentences. This is also true of a third version, which must nevertheless be distinguished from the one we have just described. According to this third version there are Perfect sentences that are ambiguous between a true perfect and a simple past analysis irrespective of context – no matter what the context may be like in which they are used, either analysis is always available. And besides these there may also be sentences whose perfects must always be analysed as true perfects and others whose Perfects must always be analysed as simple pasts. This third version also singles out certain Perfekt sentences as ambiguous, and doesn't just treat the Perfekt as form. As far as we can tell, those who have claimed the German Perfect to be ambiguous between a true perfect and a simple past interpretation have tended not to distinguish between these different interpretations of the claim. Here we will focus on just one version, which strikes us as reasonable, and which we suspect may be what many advocates of the ambiguity thesis would assume if confronted with the question what version they would endorse. According to this version there are many German Perfekt sentences that are ambiguous between a present perfect analysis and a simple past analysis, but some sentences among these will yield the same truth conditions in some and perhaps in all contexts. In addition to these there are presumably also sentences in which the Perfect only allows for a present perfect analysis, and, similarly, sentences whose Perfekts only allow for an analysis as simple pasts. But the version we adopt is not committed

to the existence of these last two categories.

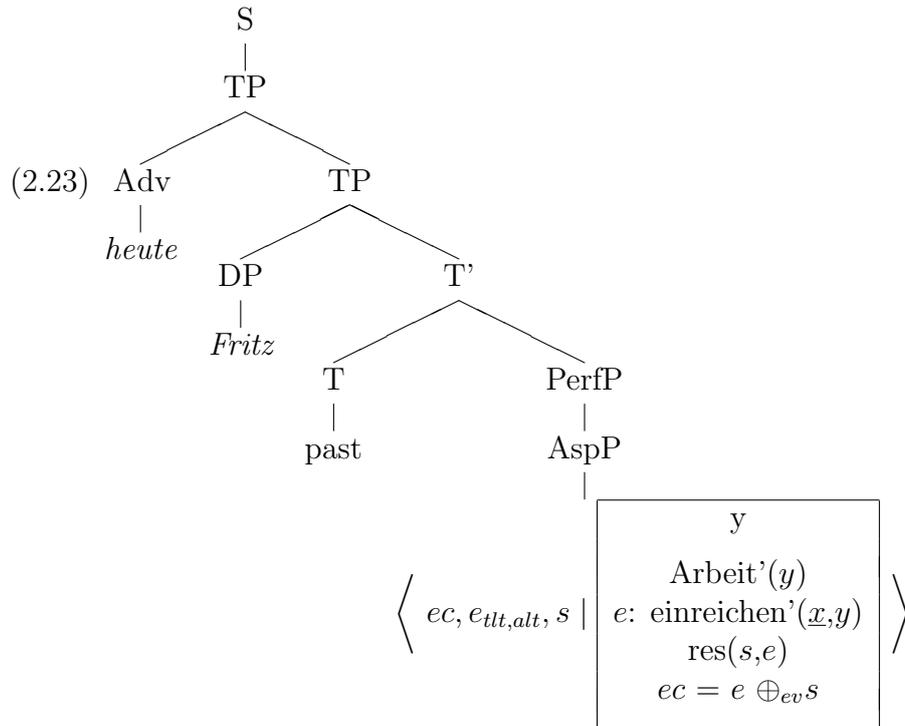
One sentence for which it seems reasonable to assume ambiguity in the sense just explained is (2.21). Let us see what the implications are of its being ambiguous in this way.

First suppose that the Perfect of (2.21) is analysed as a present perfect, and, more specifically, that it is analysed like the present perfect of (2.7). It seems plain without further argumentation that this will lead to a DRS for (2.21) that is isomorphic to (2.20). But what happens when the Perfekt of (2.21) is analysed as a simple past? This deserves closer attention.

In (2.22) we give a simplified syntactic structure of (2.21), in which we have suppressed the movements that are responsible for the ‘verb second’ word order of German main clauses and which therefore displays the subject *Fritz* erroneously as preceding the auxiliary *hat*. We have also ignored the details involved in the form of what we are analysing as a simple past tense: the construction involving a past participle and the auxiliary *haben* (just as we have ignored the morphological details of the formation of the English Present Perfect in our treatment of (2.7)).

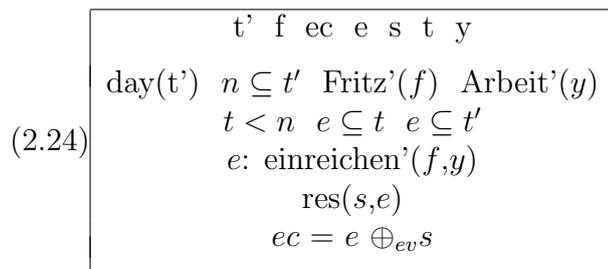


Up to the level of AspP the semantic representation construction determined by (2.22) is identical with the one shown for (2.7). So we begin our exploration of the DRS construction for (2.22) at the point where the AspP representation has been established. The tree is given in (2.23).



As explained in Section 2.1, the value -Perf means that the representation of AspP is passed on without modification to PerfP. This means that at the next step, in which the PerfP representation is combined with the information on T, it is e that is located by the tense time t_t . And since e is an event, the location condition now takes the form ' $e \subseteq t_t$ '. Another difference at this point is that the tense information PAST locates t_t in the past of n : ' $t_t < n$ '. Finally the contribution of *heute* is, just as that of *today* in (2.7), viz. that e is temporally included in the denotation of *today*.

The representation that results from these operations is given in (2.24).



(2.24) and (2.20) determine the same truth conditions. But it is useful to see exactly why. First we show that (2.20) entails (2.24).

Suppose (2.20) is given. We must show two things:

- (i) e is included within t' , and
- (ii) there exists a time t'' that can play the part of t in (2.24) – in other words, a time t'' such that $t'' < n$ and $e \subseteq t''$.

(i) rests on a principle about the logic of mereological sum operation \oplus_{ev} which we have not so far had occasion to state but which is plausible enough:

(2.25) If an \oplus_{ev} -sum is temporally included within some time t , then the summands are also included within t .

Using this principle we can infer from the conditions ' $ec = e \oplus_{ev} s$ ' and ' $ec \subseteq t'$ ' of (2.20) that $e \subseteq t'$.

Second, we have to show that there exists a time t'' such that $t'' < n$ and $e \subseteq t''$. Let t'' be the duration of e , i.e. that part of the time axis during which e is going on. Then, by definition, $e \subseteq t''$. Second, we have to show that $t'' < n$. On the one hand we can infer from $\text{res}(s,e)$ that $e \supset\subset s$. This inference is licenced by a general principle to the effect that when s is a result state of e , then s abuts e on the right. The following Meaning Postulate makes this connection explicit,

$$(2.26) \quad \boxed{\begin{array}{c} e \ s \\ \text{res}(s,e) \end{array}} \Rightarrow \boxed{e \supset\subset s}$$

From $e \supset\subset s$ we can infer that $e < s$. This conclusion follows from the definition of $\supset\subset$ given in footnote 4), according to which one of the defining conditions of ' $e \supset\subset s$ ' is that $e < s$.⁴ On the other hand (2.20) tells us that $n \subseteq s$. But $e < s$ and $n \subseteq s$ entail that $e < n$.

⁴ (a) For any times t and t' , $t \supset\subset t'$ iff (i) $t < t'$ and (ii) there is no t'' such that $t < t'' < t'$.

(b) For eventualities ev and ev' , $ev \supset\subset ev'$ iff $\text{dur}(ev) \supset\subset \text{dur}(ev')$, where $\text{dur}(ev)$ is the *duration* of ev , i.e. the interval of time occupied by ev .

(Likewise for ' $ev \supset\subset t'$ ' and ' $t \supset\subset ev'$ ')

For details see e.g. (?)

We now turn to the entailment from (2.24) to (2.20). Assume (2.24). We have to show that there is a state s' and a compound ec' such that the following conditions are fulfilled:

(i) $ec' = e \oplus_{ev} s'$; (ii) $ec' \subseteq t'$; (iii) $n \subseteq s'$; (iv) $\text{res}(e, s')$ The simplest way to obtain such s' and ec' is to define s' as the result state of e that ends at the end of t' , and then to define ec' as $e \oplus_{ev} s'$. It is then easy to verify that the conditions (i)-(iv) all hold.

What remains to be shown is that the above specification of s' is legitimate. What needs to be verified in this connection is whether result states can be cut to any desired temporal size, in the manner we have just done. The justification for this kind of operation rests on two assumptions. The first is the following principle, which can be regarded as one of those which govern the logic of result states:

(2.27) Suppose that s is the result state of an event e and that t is a period of time which is included within the duration of s and starts at the same time as s . (In other words, t is an initial segment of the duration of s .) Then there is a result state s' of e whose duration is t .

The second assumption is this: given that when e is an event such that $e < n$, then there exists a result state of e that extends at least as far as the end of today. This second assumption is satisfied as long as we understand by a result state of an event e a state whose obtaining at some time t is justified simply in virtue of the fact that e occurred previous to t (i.e. that t lies in the future of e). Such formal result states ('resultant states' in the sense of (Parsons 1990)) can extend into the future of e as far as you like. In fact, the maximal formal result state of e continues to the end of time.

Principle (2.27) appears to be needed to complete the inference from (2.24) to (2.20). But its justification rests on the assumption that the result states involved in the semantics of the perfect are *formal* result states. Is this identification really legitimate? Is it formal result states that enter into the semantic analysis of perfect forms, or does this analysis presuppose some other conception of 'result state' – of result states that stand in a different, more intimate relation to the events that act as referential arguments to the verb? This question is raised, and discussed at some length, in (Parsons 1990) and it has gradually gained prominence since then. (For instance, in Kratzer's work on the semantics of past participles(see (Kratzer 2000), (Kratzer 2005)). It is the central topic of Section 4.

2.3 One difference between the English Present Perfect and the German Perfekt: The Present Perfect Puzzle

Perhaps the most notorious fact about the English Present Perfect is that it is not compatible with adverbs that denote intervals which lie entirely in the past of the utterance time. For instance – to make a point that has been made countless times before (see in particular (Klein 1992), (Klein 1994)) – sentence (2.28.b) is ungrammatical, whereas our original (1.1a) and (2.7) – the variant of our original (1.1.a) for which we constructed the DRS (2.20) and which we repeat here as (2.28.a) – are not.

- (2.28)a. Today Fritz has submitted a paper.
 b. * Yesterday Fritz has submitted a paper.

The account presented in the last section provides a ready explanation for this restriction. Recall our final representation (2.20) for (2.28.a), which we repeat here as (2.29).

$$(2.29) \quad \begin{array}{l} t' \text{ f e c e s t y} \\ \text{day}(t') \quad n \subseteq t' \quad \text{Fritz}'(f) \\ \quad \text{paper}'(y) \\ t = n \quad t_t \subseteq s \quad ec \subseteq t' \\ e: \text{submit}'(f,y) \\ \quad \text{res}(s,e) \\ \quad ec = e \oplus_{ev} s \end{array}$$

The temporal conditions of (2.29) are consistent. This was shown implicitly by our derivation of (2.29) from (2.24): when e is located before n but temporally included within today and s is assumed to stretch from the end of e to the end of today, and ec is the sum of e and s , then all conditions are satisfied. But when *today* is replaced by *yesterday*, turning (2.28a) into (2.28b), then we get a contradiction. For now ec must be included within yesterday, and since $ec = e \oplus_{ev} s$, then it follows from (2.30) (repeated below) that s is included within yesterday as well.

- (2.30) If an \oplus_{ev} -sum is temporally included within some time t , then the summands are also included within t .

There is one aspect of the contradiction contained in the DRS for (2.28.b) which has given rise to confusion during previous presentations of this material. In our argumentation for the equivalence of (2.20) and (2.24) we made use of the assumption that for any given event e there are many result states, which differ from each other in their respective durations. This means in particular that if e happened somewhere within yesterday, then there will be one result state of e which is also included within yesterday; and there will be another (longer) result state of e which lasts beyond n and thus includes n . But this doesn't make the contradiction go away. For the contradiction rests on the fact that it is *the same* discourse referent s that must satisfy both of the two conditions ' $s < n$ ' and ' $n \subseteq s$ '. Expressed more informally: the perfect operator treats the event complex ec as a structure consisting of an event and some particular result state s that must *simultaneously obey both the constraint imposed by tense and that imposed by the result state*.⁵

On the assumption that the operator expressed by the German Perfect functions like that for English the contradiction we found in the representation for (2.28b) arises just as much for the German sentence (2.31), when its tense morphology is analysed as involving the same perfect operator that was applied in making the transition from (2.12) to (2.13).

(2.31) Gestern hat Fritz eine Arbeit eingereicht.

(2.31), however, is perfectly grammatical. Given the assumption we made in the last section – that the present perfect form in German is ambiguous between a perfect operator and the Simple Past – this is not surprising. For on this assumption it should be possible to give (2.31) a simple past analysis, in which case the constraints imposed by tense and adverb do not clash. But is that all there is to it? 'Yes and no'. Here is what looks like another possibility: The German Perfect is, like the English present perfect, an operator that manipulates the features 'tlt' and 'alt'. But the two perfect operators

⁵ The contradiction appears to be one of that particularly glaring sort that we often find with sentences that come across as ungrammatical (as opposed to grammatical but self-contradictory). Other examples are sentences in the simple future tense which contain an adverb that can only refer to some time in the past, such as 'He will come yesterday'. In this respect (2.28b) and the future tense sentence just quoted differ from, say, 'John and Bill will both submit their paper before the other does'. At least to us this last sentence doesn't seem grammatically ill-formed; it just tries to describe an impossible state of affairs. Exactly what is responsible for this difference we do not know. But it is clear that some kind of answer to this question is needed. For without it the mere fact that the representation for (2.28b) is contradictory won't establish that (2.28b) is grammatically deviant. This is a problem about which we will have nothing more to say in this essay.

2.3. ONE DIFFERENCE BETWEEN THE ENGLISH PRESENT PERFECT AND THE GERMAN

differ in that the German operator leaves ‘alt’ with e instead of shifting it to ec . It is easy to see that on this assumption we still get what we want for (1.1) – the submitting event must be included within today – while on the other hand the contradiction found in (2.20) is no longer forthcoming. This is because the condition ‘ $ec \subseteq t'$ ’ of (2.20) is now replaced by ‘ $e \subseteq t'$ ’: for e to be included in yesterday is perfectly compatible with n being included within s .

So it looks as if there are at least two different adjustments of our account of the English Present Perfect that would account for the acceptability of (2.31): either

(2.32)(i) we treat the German Perfekt as ambiguous between a true perfect (the same operator that is also expressed by the English Present Perfect) and a simple past; or

(ii) the German Perfekt is not ambiguous, but it differs from the English present Perfekt in leaving ‘alt’ at e .

But how much of a difference is there between these two options? Note that if the German Perfekt is treated as a simple past, which locates the referential argument e of the verb in the past of n , then it *follows* that the formal result state s of e – the state s that consists in e having taken place earlier – must hold at n . On the other hand, if the perfect operator denoted by the Perfekt is analysed as shifting ‘ $tl't$ ’ to s while retaining ‘alt’ at e , then the present tense that is part of the Perfekt will locate s as holding at n , and that entails that e must have occurred at some time before n . And if, once more, s is a formal result state, then the occurrence of e before n is *all* that the Perfekt amounts to.

On the basis of the data considered so far it is difficult to see how to choose between these two options. The second option has a certain advantage of simplicity; it does not postulate an ambiguity; so, if it is correct, then no ambiguity needs to be postulated, and if no ambiguity needs to be postulated, then no ambiguity should be postulated. What might be seen as speaking against option (ii) is that it forces us to adopt a different semantics for the perfect operators of German and English. However, there are additional reasons why the second option is to be preferred. The first is that the German Präteritum cannot always be replaced by the Perfekt without a change in grammaticality or meaning. Convincing examples are not all that easy to

come by, for reasons that are orthogonal to the concerns of this paper. But here is one that we find quite persuasive ourselves.

(2.33) An dem Tag kaufte sich Karl eine Fahrkarte nach Zürich. Er war sich der Gefahr, in der er sich befand, keineswegs bewusst.

- a. Schon seit zwei Wochen **beobachteten** sie ihn Tag und Nacht und sie **warteten** nur noch auf eine günstige Gelegenheit, ihn im Ausland zu beseitigen.
- b. Schon seit zwei Wochen **haben** sie ihn Tag und Nacht **beobachtet** und sie **haben** nur noch auf eine günstige Gelegenheit **gewartet**, ihn im Ausland zu beseitigen.

(On that day Karl bought a ticket for Zürich. He was totally unaware of the danger he was in.

- a. For two weeks already they **were observing** (English: they had been observing) him day and night and all they **were waiting** for was a good opportunity to eliminate him in some other country.
- b. For two weeks already they have **observed** him day and night and all they **have been waiting** for was a good opportunity to eliminate him in some other country.)

The simple pasts in (2.33a) are naturally interpreted as referring to the time introduced by the first sentence of (2.33). This is only marginally possible for the present perfects in (2.33b) and only when the transition from the first two sentences of (2.33) to the sentence of (2.33b) is seen as one from a past tense discourse to one in the historical present. In other words, the difference between the German Präteritum and the German Perfekt is that the former unproblematically allows for an ‘anaphoric’ interpretation, on which it locates the eventuality described by its verb at a past time introduced in the preceding discourse. The Perfekt is not capable of this. In this it behaves like a present tense. (That an interpretation of (2.33b) which comes close to that of (2.33a) is possible at all rests on the possibility of using present tenses to describe past times – that use of the present tense known in the literature as the ‘historical present’; but that is one that applies to all forms of the present tense and is not specific to the present perfect.⁶

⁶ In fact, (2.33b) is not completely equivalent to (2.33a) (even if we ignore the ‘vividness’ effect that is distinctive of the historical present). The closest equivalent to (2.33a) that makes use of the historical present would have simple presents in lieu of the simple pasts

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The circumstance that no matter how we interpret (2.33b) a difference in meaning with (2.33a) remains shows that the Präteritum isn't literally included among the possible readings of the Perfekt (let alone its only meaning). That rules out option (i).

On the other hand the *prima facie* objection to option (ii) – that it forces us to adopt different analyses for the perfects of German and English – does not have much force. There can be no dispute about the difference between the grammatical (ref34) and the ungrammatical (2.28b). So there must be some difference between the respective tense forms of English and German. It has often been argued that the difference must have to do with the present tenses of the two languages. In particular, attempts have been made to pin the difference between (ref34) and (2.28b) on the fact that the German present tense has a futurate meaning – one can say, for instance, ‘Morgen gibt es schönes Wetter’, using the present tense *gibt*, to state that it will be nice weather tomorrow, something one cannot do in English (‘There is nice weather tomorrow.’ is somewhere between bizarre and ungrammatical.) But as argued persuasively in (Rothstein 2008), such an explanation is refuted by a language like Swedish, in which the present tense shares the futurate use with German, but which patterns with English in that the Swedish equivalent of (2.31) and (2.28b) is ungrammatical, like (2.28b).

In view of these data an explanation of the difference between (2.31) and (2.28b) in terms of a general difference between the present tenses of English and German does not seem promising. Rather, the explanation is more likely to have to do with a difference between the English and German perfects – with a difference between those components of the English and German present perfect forms that have to do with their being perfects rather than their being presents. There is no reason to see the conclusion – that there is more than one perfect operator – as speaking against such a solution. For one thing, as will be discussed at some length in Section 5, German has besides the perfect discussed so far another perfect which behaves like a true result state perfect. (Also recall footnote 2.)

in (2.33a), not present perfects. The difference in meaning may not be very salient, but it is there. This can be seen most easily for the second verb, *warten*. (2.33a) says that the people referred to as ‘sie’ were waiting (for an opportunity to do away with Karl) *at the time when he was buying the ticket*. (2.33b), in the historical present interpretation that we need to come close to the meaning of (2.33a), says that at that time they had been waiting for such an opportunity.

The upshot of these considerations is thus that there are different perfect operators – so far at least one for English and two for German. If that is right, then it raises two questions: (1) What is it that makes all these ‘perfect operators’? and (2) What is the range of different perfect operators that are found in different human languages? In the light of our explorations so far we venture the following answer to the first question:

(2.34) *Perfect operators* are those operators which shift location by tense (represented in our framework by the feature ‘tlt’) from the eventuality described by the verb – more accurately, but also more theoretically loaded: from the referential argument of the semantic representation that the operator receives as input – to the corresponding result state.

According to this characterisation, perfect operators may differ in what they do with the adverb location feature ‘alt’. So far we have encountered three possibilities: (i) ‘alt’ is shifted to ec (English perfect); (ii) ‘alt’ is left at the referential argument ev of the input representation (ordinary German perfect); (iii) ‘alt’ is shifted, jointly with ‘tlt’, to the result state (German ‘Zustandsperfekt’).

What can be said in defence of (2.34)? Obviously an answer to question (1) cannot be simply true or false. The question asks for an explication of a notion of which we have only an intuitive grasp (to the extent that we have any grasp of it at all); and it is unlikely that all who have worked on and thought about perfect-like constructions have the same intuition. (2.34) is our proposal for how the notion of a ‘perfect’ should be understood. That proposal can be useful only to those who accept the theoretical assumptions it presupposes. So, implicit in the proposal is the suggestion that these assumptions form a useful basis for investigating perfect constructions, and, more generally, the tense-and-aspect systems within which these constructions are embedded. Here we can do no more than put the proposal forward, as the natural generalisation of our investigations about the perfects of English and German.

Given our answer to question (1), an answer to question (2) would have to be a specification of the different things that perfects can do with ‘alt’. Perhaps the three possibilities described above are all there is. (It is not clear what other options there could be.) But as things stand we are in no position to come up with an explicit answer to this question. Such an answer will have to be the result of a cross-linguistic investigation that we have not undertaken and that we ourselves would not be equipped for.

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In all that we have said up to this point there is one blatant loose end: What is it for a state to count as the result state of an event? We have only hinted at this question when, in the course of arguing for the semantic equivalence between the simple past and present perfect interpretations of sentences like (1.1b), we made the assumption that the result states involved are ‘formal result states’. But what is the justification of that assumption? And what are the possible alternatives? These are the questions that will be discussed in the next section.

Chapter 3

Result States vs. Target States

According to the account developed in this essay perfects are operators that shift the feature *tt* to a ‘result state’. But what really *is* a result state?

A distinction of increasing importance, both in the literature on the perfect and in discussions of other issues in the general domain of aspect, event structure and argument structure, is that between *formal result states* and *target states*. Formal result states have already made their appearance in this paper. A formal result state of an event *e* is a state that obtains just in virtue of *e* having happened; it starts the very moment that *e* ends and can go on for any amount of time after that. As this characterisation implies, formal result states have no substance independently from the events that they are the result states of. Target states, on the other hand, can be characterised in ways that show a certain independence from the events of which they are result states.

To get a better sense of what sorts of states target states are it is best to begin with a simple and uncontroversial example. Consider the event description ‘*x* leave Paris’. This phrase describes events that produce certain state changes, viz. changes from the state of *x* being in Paris to that of *x* not being in Paris. The latter states – those of *x* being in some other place than Paris – constitute an example of target states. More precisely: If *e* is an event of *x* leaving Paris, then the state *s* of *x* not being in Paris that results from *e* is a target state of *e*.

As this example indicates, the identification of a target state is to some extent independent from the event of which it is a target state. Whether a state of the type of the target state obtains at a time *t* can be determined just by inspecting the world at *t* – is *x* in Paris at *t* or is she not? But of

course this is only half of the story. The fact that a state s of x not being in Paris obtains at t doesn't by itself make s a target state of some leaving event. For one thing, it might have been that x had never set foot in Paris before s . In order that a given state s of x not being in Paris is a target state of a given event e of x leaving Paris, state and event must also stand in the right temporal relation. We will assume that all result states, target states included, right-abut the events of which they are the result states.

To repeat, the way in which events are related to their target states is fundamentally different from the relation between events and their formal result states. The latter relation is a purely formal one – a formal result state is what it is only in virtue of the event having occurred immediately before it. In contrast, the relation between events and their target states is a matter of causality: s is a target state of e only if e and s are independently identifiable entities that stand in some appropriate causal relation.

With this difference between formal result states and target states comes a second one, which is of particular importance to the concerns of this paper. Formal result states, we noted, can last for as long as one likes. But the life of a target state may be truncated by subsequent events. For instance, no target state of an event e of x leaving Paris can last beyond a return of x to Paris subsequent to e .

3.1 Formal Result States

A formal result state s of a token event e consists in nothing more than that e has previously occurred. But on the conception of states adopted in this paper this condition is not enough to identify a formal result state uniquely. The identification of a formal result state also requires a specification of its duration. Half of that specification, viz. the starting point of the state's duration, is fixed: As indicated above, we assume that if s is a formal result state of e , then s begins at the point in time where e ends. But what about the end of s 's duration? Here we are faced with more than one option. Since the only real constraint on s being a formal result state of e is that s starts at e , s could in principle go on forever after, and one option would therefore be to assume that each event e has a unique formal result state which starts at the end of e and goes on until the end of time. But this assumption would conflict with a general assumption that governs the use that we have made of states and events in earlier work, viz. that every eventuality (i.e. event or state) has a finite duration. This assumption suggests another option, viz.

that for any interval of time t such that $e \supset \subset t$ (i. e. t abuts e on the right) there is a formal result state of e whose duration is t . This option is the one we adopt. It is stated more formally in (3.1).

(3.1) For any token event e and time t such that $e \supset \subset t$ there is a unique formal result state s of e such that $\text{dur}(s) = t$.

We need some way of expressing the formal result state relation within the DRT-based formalism in which the semantic representations of this paper are couched. To this end we add to our formalism a 2-place functor ‘Fres’, which maps pairs consisting of an event e and a time t such that $e \supset \subset t$ onto the formal result state of e whose duration is t . And in addition we introduce a 2-place predicate ‘fres’, which holds between a state s and an event e iff s is a formal result state of e . Evidently Fres and fres are related by the Meaning Postulates in (3.2).

$$(3.2) \text{ a. } \boxed{\begin{array}{c} e \ t \\ s = \text{Fres}(e,t) \end{array}} \Rightarrow \boxed{\begin{array}{c} e \supset \subset t \\ \text{fres}(s,e) \end{array}}$$

$$\text{ b. } \boxed{\begin{array}{c} s \ e \\ \text{fres}(s,e) \end{array}} \Rightarrow \boxed{\begin{array}{c} t \\ e \supset \subset t \\ s = \text{Fres}(e,t) \end{array}}$$

We retain the predicate ‘res’ used in Section 2, but from now on this predicate will serve as a cover term for all types of result states, both the formal result states discussed here and the various kinds of *target states* to be discussed in the next sections. That formal result states are one kind of result state is stated explicitly in (3.3).

$$(3.3) \boxed{\begin{array}{c} e \ s \\ \text{fres}(s,e) \end{array}} \Rightarrow \boxed{\text{res}(s,e)}$$

To summarise: For every token event e and time such that $e \supset \subset t$ there is a unique formal result state $\text{Fres}(e,t)$. This state stands in the formal result state relation to e – $\text{fres}(\text{Fres}(e,t),e)$ – and thus counts as a result state of e in the more general sense of ‘res’; expressed within our formalism: $\text{res}(\text{Fres}(e,t),e)$.

3.2 Target States

Formal result states are virtually empty of content. The content of a formal result state of an event e is merely that e abuts it on the left. But perfects often want result states of a more substantial sort. (This is notably the case for the English Present Perfect. For discussion see Section 4.) We will refer to such more substantial result states generally as *target states*.¹

The notion of target state we are after is illustrated by the following example. Suppose once again that e is an event of person x leaving Paris. A target state of this event is one that consists in x not being in Paris (i.e. in x 's being in some place disjoint from Paris). The first point about target states that this example reveals is that in general target states cannot be identified with the targets that agents set themselves when they engage in certain actions. For instance, when x performs the action of leaving place p , her 'target' may be to get to some specific place p' away from p . But in the sense in which we are using the term 'target state' here, the state that consists in x being in p' does not qualify as a target state of the event e of her leaving p . The target state of that event is the more general state of x not being in p .

Our example of a target state also illustrates a number of features that distinguish target states from formal result states. The first, already noted, is that the durations of the target states of an event e may be confined within some given period of time. When e is an event of x leaving Paris, then e will result in the obtaining of a target state which consists in x not being in Paris. But this state can last only for so long as x stays outside Paris.

The second feature of the concept of a target state is that it involves not only the token event e of which a given state s is a target state, but also an event *type* (typically given by an event description) of which e is an instance, and as an instance of which e is being conceptualised. To see this, consider the following variant of our first example of x leaving Paris. This time x leaves France by way of the bridge across the Rhine between Strasbourg and Kehl. (Kehl is a small town opposite Strasbourg on the German side of the Rhine.) By this act x not only leaves France, she also leaves the *Département du Bas-Rhin* (of which Strasbourg is the capital) and the larger region *Région Alsace* of which the *Département du Bas-Rhin* is a proper part. Suppose now

¹The term 'target state' may not be optimal, as it carries connotations that do not fit some of the result states that we will subsume under it. But the term has gained some currency in the tense-and-aspect literature, which seems to licence the use that we are going to make of it.

that not long after this crossing x returns to France by crossing the Rhine in the opposite direction, using the bridge between Freiburg and Colmar. Then at that point any state that could be described as x 's not being in France (or, for that matter, as her not being in Alsace) comes to an end, but not the state of her not being in the Département Bas-Rhin. (Colmar is the capital of a different *Département*, the *Département Haut-Rhin*.) What does this tell us about the target states of the event of x 's crossing the bridge between Strasbourg to Kehl? That depends on what we want to say about the identity conditions of events. For someone who maintains that an event of leaving France is different, ipso facto, from any event of leaving the Département du Bas-Rhin (and likewise from any event of leaving the *Région Alsace*) matters are quite straight-forward. For him x 's crossing of the bridge between Strasbourg to Kehl amounts to the occurrences of countless different events, three of which can be described, respectively, as 'x leaves France', 'x leaves the Département du Bas-Rhin' and 'x leaves the Région Alsace'. On this view of event identity it would then be natural to posit that each of these events comes with its own family of target states. In particular, if t' is the time of x 's return to France by crossing the Rhine to Colmar, we may distinguish between three different states whose duration is the interval ($t_{end(e)}$, t') from the end of e to t' : a state which instantiates the predication 'x is not in France', one that instantiates 'x is not in the Département du Bas-Rhin' and one that instantiates 'x is not in the Région Alsace'. And these can be understood as target states of three different events.

This is a view of event identity that commits us to a fine-grained ontology of events. Such an ontology has had its advocates [references; Alvin Goldman? Kim?]. But how plausible is it? Let us attend more closely to x 's crossing of the bridge between Strasbourg and Kehl. What happens during this crossing is something quite concrete: x proceeds, by some form of locomotion – in some kind of vehicle, on foot, on bike or horseback, or in whatever other way it is possible to cross this bridge – from the French side to the German side. This motion event, the particular way in which x or her vehicle moves from one end of the bridge to the other, is the stuff that the crossing event is made of; it is that event we are talking about when we speak of x moving from A to B, whether we choose to identify A as France or as Alsace or as the Département Bas-Rhin. These are just three different descriptions of one and the same event.

It is this second, rougher-grained conception of event identity that we adopt in this essay. More generally, we allow for the possibility that one and the same token event can be presented under different descriptions. Exactly what

the identity conditions of events are is something we leave as an open question. But we assume that these identity conditions allow for the possibility that a single event can be described in different ways, and more particularly in ways that differ in what they say about the results that the event leaves behind.

For someone with such a conception of event identity and at the same time a conception of state identity according to which states are identified in terms of characterising conditions, the logic of the target state relation is more complicated. It is possible that the same event e can be described in more than one way, and that each of those descriptions determines its own family of target states. One way to capture this complication is to introduce a target state predicate that is 3-place, relating a state s , an event e and an event type (or event description) E that e instantiates. The formal predicate we introduce to this end is 'tast'. Thus 'tast(s,e,E)' says that s is a target state of e , conceived as an instance of the event type represented by the term ' E '.

That target states (like formal result states) constitute a species of result state can again be expressed in the form of a Meaning Postulate:

$$(3.4) \quad \boxed{\begin{array}{c} e \ s \\ \text{tast}(s,e,E) \end{array}} \Rightarrow \boxed{\text{res}(s,e)}$$

The third feature that distinguishes target states from formal result states is also one we have mentioned before: there is a sense in which target states are identifiable independently from the token events of which they are target states. Consider again the target states of events of x leaving Paris. These, we said, are states that consist in x not being in Paris. Whether s is such a state depends on two factors: (i) s must right-abut an event e of x leaving Paris and (ii) for any instant $t' \subseteq t$ the condition ' x not be in Paris' must hold at t' . The first of these conditions mentions e , but the second does not. In other words, what makes s a target state of e is a combination of two facts: s must stand in the right temporal relation to e , viz. right-abut e and s must instantiate a certain state description in which e plays no part.

The 'independent' condition that characterises the target states of the instances e of an event type E may be independent of e , but they are clearly not independent of E . On the contrary, as our informal discussion of the target states of leaving events has shown, the condition is determined by E .

Formally we can think of this dependency as a partial function TAST from event types to state types. That is, if TAST is defined for the event type E – intuitively, if E is an event type whose instances come with target states – then TAST(E) is the event-independent state type that all target states of instances of E must satisfy. Here we will assume a slightly different function TAST, which maps *descriptions* of events that come with target states to *descriptions* that must be satisfied by the target states of the events instantiating the event descriptions. We will not try to spell out this function in detail (e.g. by providing a general algorithm for converting E into TAST(E)). As we will see in the next section in connection with the verb *submit*, that wouldn't be easy. In some particular cases it is easy to see how to obtain TAST(E) from E. But in others it is not.

There is an obvious logical relation between the functor TAST and the predicate *tast*, which we can make explicit in the form of a Meaning Postulate:

$$(3.5) \quad \boxed{\begin{array}{c} e \ s \\ \text{tast}(s,e,E) \end{array}} \Rightarrow (\forall \text{TAST}(E))(s)$$

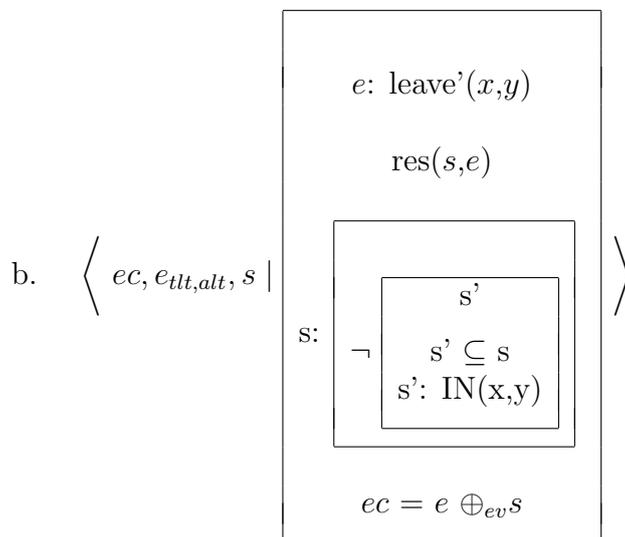
3.3 Lexical Entries for Target State Verbs

The target states we have discussed so far were all target states of events described with the help of the verb *leave*. Any sentence with *leave* as its main verb that asserts the occurrence of a leaving event – the verb need not be in the perfect – entails the occurrence of such a state, consequent upon the event (and following it seamlessly). Clearly it is the lexical verb *leave* that is responsible for this, and its lexical entry should make that clear. (3.6) gives a lexical entry for *leave* that does this. And this is the lexical entry for *leave* that we will adopt.

In fact, instances of event specifications in which the specified event is the referential argument of *leave* generally come with target states to the effect that the leaver is no longer in the place she left. In all such cases the description of the target state is related in the same way to the semantics of the verb. In cases of this kind, where target state descriptions derive in a systematic and apparently direct way from the verbs occurring in the corresponding event descriptions, we speak of *lexical target states* and of the verbs responsible for them as *target state verbs*. Furthermore, we make the fact that it is the verb itself that gives rise to the target states of its

referential arguments explicit by including the target state description into the semantics of the verb's lexical entry. For instance, we assume that the entry for *leave* has the form given in (3.6).

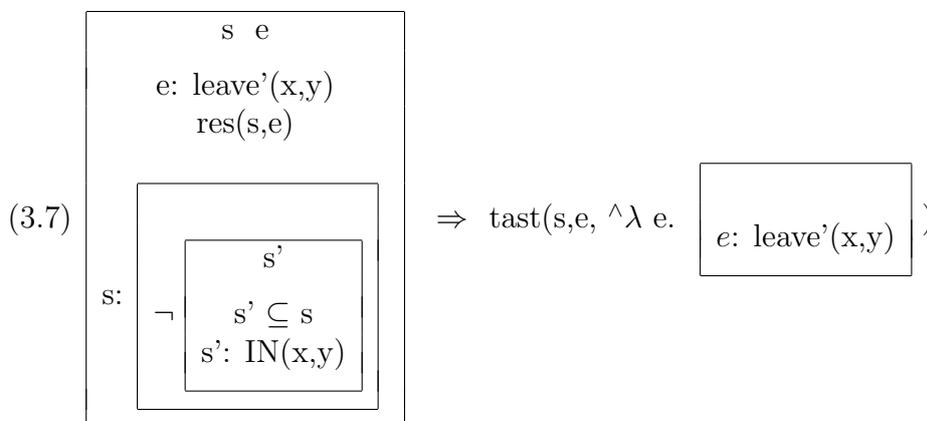
(3.6) a. leave (verb) nom acc
 e x y



(N.B. The negated DRS that specifies the state s in (3.6.b) is the way of expressing in our representation formalism the condition that throughout the duration of s x is never in y .)

Verbs whose lexical entries specify a target state, in the way (3.6) does for *leave*, will be called *target states verbs*.

Result states that are mentioned as such in lexical entries like (3.6) satisfy the central characteristic of target states in that they are instances of event-independent state descriptions. We can make the fact that they are target states formally explicit by means of Meaning Postulates associated with the entries of target state verbs. By way of example, the Meaning Postulate associated with (3.6) is given in (3.7).



When the semantic representation of a target state verb gets inserted for an occurrence of the verb in some sentence, then the discourse referent for the result state will be carried along to higher verb projections, and in simple sentences with perfect tense morphology it will typically end up playing the result state part in the input to the perf. operator and become the carrier of *itt*.

This scenario closely corresponds to the representation constructions for the sentences in (1.1) in Section 2. In fact, the main verbs of those sentences, English *submit* and its counterpart *einreichen* in German, are in our opinion also target state verbs and we will treat them as such. A difference with the target state verb *leave* is that for *submit* it is more difficult to find a general event-independent characterisation for the result states of its instances. For a start, it is clear that the entry (2.9) that we proposed for *submit* in Section 2 does not provide a proper point of departure. The target states of submitting events are to the effect that, in some appropriate sense, the submitted entity *y* is within the possession and/or under the control of the individual or institution *z* to whom or which *y* has been submitted. So the entry for *submit* has to bring the recipient into play explicitly, even if the syntactic realisation of this role is optional (in that *submit* can be used without an overt realisation of the role by way of an argument phrase).

Once the argument *z* has been incorporated into the lexical entry of *submit* we can start looking for a characterisation of the target states of submitting events in terms of a relation between *z* and the submitted entity *y*. But which relation should that be? That varies, with the kind of entity that is being submitted and with *z*'s powers and obligations towards such submissions. Without more specific knowledge of these particulars it isn't possible to be more precise about the relation between *y* and *z* that results from *y*'s submission.

This means that in a general statement of the lexical entry of *submit* we can do no better than provide a kind of 'stopgap' characterisation of this relation. In the different contexts in which the verb is actually used context-specific information may enable the interpreter to replace this stopgap characterisation by a more explicit one. By way of stopgap characterisation we adopt the condition 'Control&Responsibility(*z,y*)'. With that, the entry we get for *submit* is the one given in (3.8).

3.4. RESULT STATES BETWEEN LEXICAL INSERTION AND ASPP; NON-LEXICAL TARGET

(3.8) a. submit (verb) nom acc (to-PP)
 e x y z

b. $\left\langle e_c, e_{tlt,alt}, s \mid \begin{array}{l} e: \text{submit}'(x,y,z) \\ \text{res}(s,e) \\ s: \text{Control\&Responsibility}(z,y) \\ ec = e \oplus_{ev} s \end{array} \right\rangle$

3.4 Result states between lexical insertion and AspP; non-lexical target states

The two verbs that we have explicitly discussed, *leave* and *submit*, are both lexical target state verbs. They are just two of many such verbs. But there are also many verbs that are not target state verbs. Among the non-target state verbs are entire aspectual classes - the activity verbs and state verbs of the Aktionsart classification of (Vendler 1967a) and the semelfactives in the sense of e.g. ((Smith 1991)). Only achievement and accomplishment verbs can be target state verbs in our sense. Whether all of them are – and, if that is not the case, which of them are and which are not – are questions to which we briefly turn at the end of this section.

When a verb *V* is not a target state verb, no target state gets introduced when the lexical semantics of *V* is inserted for an occurrence of *V* in the sentence for which a semantic representation is being constructed. However, it is still possible in such cases that a target state will get introduced at some later point. One type of example of this is the combination of a motion verb, such as *walk*, with a goal phrase, such as *to the station*. In and of itself the lexical meaning of *walk* does not determine any target state: there is no general way in which the world has changed because someone has engaged in a bit of walking. An entry for *walk* which reflects this intuition is that in (3.9), in which no target state is mentioned.

(3.9) a. walk (verb) nom
 e x

b. $\left\langle e_{tlt,alt} \mid \begin{array}{l} e: \text{walk}'(x) \end{array} \right\rangle$

On the other hand the complex phrase *x walk to the station* does appear to have target states – states to the effect that *x* is at the station. To reflect this second intuition, the result of combining the semantic representations of *x walk* and *to the station* should contain a target state of this type, as shown in (3.10)²

$$(3.10) \left\langle e_{ult,alt}, s \mid \begin{array}{c} z \\ \text{the-station}'(z) \\ e: \text{walk}'(x) \\ \text{res}(s,e) \\ s: \text{AT}(x,z) \end{array} \right\rangle$$

The rule for combining these representations has to be stated in such a way that a result state is included in the rule's output representation. This rule, for which we do not give an explicit formulation here, is one of a range of compositional rules that introduce target states into their output representations. Detailed accounts of representation construction for substantive fragments of English will have to make explicit which compositional operations lead to the introduction of what kinds of target states. But those are tasks that go beyond the scope of this paper.

The path leading from insertion of the lexical semantics of the main verb of a sentence to the input representation of a perfect operator may not only involve composition steps that introduce target states, but also operations that take previously introduced target states out of action. One prominent example of such an operation is the Progressive, which turns event representations into representations of 'progressive states' (see e.g. ((Vlach 1992))). On the analysis of the progressive we have proposed elsewhere (Reyle et al. 2007) the effect of the progressive operator is to turn its input representation $\langle e, \dots \mid K \rangle$ into a representation of the form $\langle s', \dots \mid 's': \text{PROG}(\wedge e. K \cup \begin{array}{c} e \dots \\ \square \end{array}) \rangle$; this says that *s'* is a state that consists in the going on of a process that is intended to turn into a complete event of the kind described

²Strictly speaking the definite DP *the station* gets its interpretation via the resolution of a referential presupposition. In the interest of perspicuity we ignore this complication. In Section 2 we circumvented a similar difficulty by replacing the original DP *his paper* by the corresponding indefinite *a paper*. In principle a similar manoeuvre would have been possible for the present example as well, but here the result is rather awkward.

3.4. RESULT STATES BETWEEN LEXICAL INSERTION AND ASPP; NON-LEXICAL TARGET

by the input (or which will or would become such an event but for unforeseen interferences). When the store of the input representation contains some target state discourse referent s , then this discourse referent will also be bound within the argument of PROG, just as e itself. It thereby becomes ‘invisible’ to operators higher up, including perf operators in case there are any. For instance, if we assume that the semantic representation of the VP *write a letter* is as in (3.11.a), then the representation of the corresponding progressive *be writing a letter* will be as in (3.11.b).

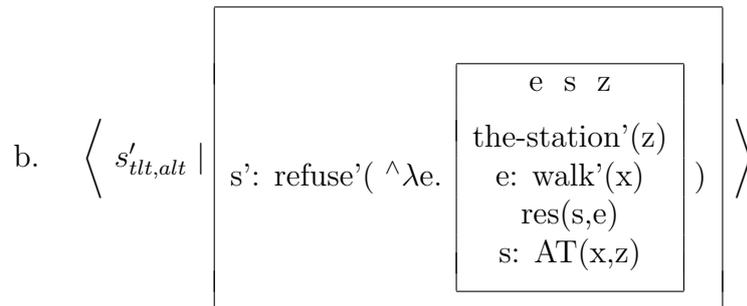
$$\begin{array}{l}
 (3.11)\text{a.} \quad \left\langle ec, e_{\text{tlt,alt}}, s \mid \begin{array}{c} y \\ \text{letter}'(y) \ e: \text{write}'(\underline{x},y) \\ \text{res}(s,e) \\ s: \text{complete}(y) \\ ec = e \oplus_{ev} s \end{array} \right\rangle \\
 \\
 \text{b.} \quad \left\langle s'_{\text{tlt,alt}} \mid \begin{array}{c} s': \text{PROG}(\wedge \lambda e. \begin{array}{c} y \\ \text{letter}'(y) \ e: \text{write}'(\underline{x},y) \\ \text{res}(s,e) \\ s: \text{complete}(y) \\ ec = e \oplus_{ev} s \end{array}) \end{array} \right\rangle
 \end{array}$$

Whether or not the result state s mentioned in (3.11.a) is a lexical target state or one that has been added at a later stage – that is a question to which we will return below, but which does not matter now – in (3.11.b) this state has become inaccessible to a possible perf operator. In fact, s does not stand in a result state relation to the state s' , which is the carrier of *tlt* in (3.11.b), and of course that is a consequence of s ’s being bound within the argument term of PROG.

The progressive is one of several operators that may intervene between V and AspP and that render result states of their input representations inaccessible to subsequent operators. Other operations that do this are the ones connected with verbs that take infinitival or gerundive clauses as complements, among them inchoative verbs like *begin* and *start* and ‘prevention verbs’ such as *prevent*, *refrain from* or *refuse*. Consider for instance the construction of the semantic representation for sentence (3.12.a). One of the steps in this

construction consists in applying the semantic representation of the verb *refuse* to the semantic representation of the phrase *to walk to the station*, which is like the representation for *walk to the station* given in (3.10).³ Like applications of the Progressive, this step requires intensional abstraction over the referential argument *e* of (3.10), with the effect that the state *s* can no longer play the part of result state in the output representation, given in (3.12.b).

(3.12)a. Mary has refused to walk to the station.



(3.12.a) is an example in which a target state first gets added at a post-lexical construction stage and then subsequently gets eliminated as a potential recipient of *ult*. Such ‘flip-flops’ occur in the representation construction of many sentences, sometimes more than once, and as far as we can see there is in principle no upper bound to how often this can happen. The study of the various operations involved in such flip-flops is part of the general theory of aspect, and as such doesn’t belong to this paper. The point of this section is just to document the general fact that the presence of a result state in the input to a perf operator depends on more than lexical insertion alone. What happens between lexical insertion and the application of perf operators will become relevant again in Section 9 (??), where we will look more closely at the role and scope of temporal adverbs.

When discussing the phrase *be writing a letter* we raised the question whether the result state in the semantic representation of *write a letter* is a lexical target state or one that gets added later on. That question is nothing but the question whether or not *write* is a target state verb, and that question is just a special instance of the more general one: which verbs are target state

³*x* is linked to the higher subject *Mary* and will be identified with the discourse referent for that subject, which will be inserted into the first argument slot of *refuse'* in one of the next construction steps.

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verbs and which are not?

Focussing on *write* helps to recognise some of the complexities of this general issue. A first reaction to the question whether *write* is a target state verb might be that of course it is one; for isn't it evident that events of writing something lead systematically to an associated result state, viz. that of the something existing? But no sooner has this been said than we realise that not all uses of *write* involve direct objects denoting the product of the described writing effort. *write* can also be used as an intransitive verb, as in *she wrote on the blackboard*, *she wrote through the night* and so on. Such clauses do not mention anything that could serve as argument of the target state predication. And in fact, they can be true descriptions of occasions in which there isn't any finished writing product. So, if we want to insist that in phrases like *write a letter*, *write* behaves as a target state verb even so, and make this explicit by adding a target state to the semantics of its lexical entry, then the lexicon will have to distinguish between such transitive uses of *write*, whose semantics has a target state, and its intransitive uses, which require an entry whose semantics does not specify a target state. This seems *prima facie* awkward, and may speak in favour of an alternative approach in which the target state of *write a letter* is introduced only when the verb *write* is combined with the direct object phrase *a letter*.

This second solution, according to which neither intransitive nor transitive *write* is a lexical target verb, finds support from work on the internal syntactic and semantic structure of words, and, more particularly, of verbs ((Hale and Keyser 2002), (Kratzer 2000), (Kratzer 2005), (Rappaport Hovav and Levin 2010)). Widely accepted among those engaged in this work is the view that transitive *write* – a so-called 'non-core transitive' – is constructed from an underlying unergative intransitive verb through addition of a direct object position. In a compositional semantics based on word analyses of this kind the target state of *write a letter* only enters into the representation when the basic, intransitive *write* is combined with its direct object. Within such a conception of the syntax and semantics of words there is no room for lexical entries of the kind we have been proposing. At best such entries would be more or less successful approximations to what are seen as the correct analyses of the lexical material they intend to cover.

In our own recent explorations of the lexicon we too have adopted such a structural stance. Nevertheless, we have decided to stick in this paper with a more 'old-fashioned' lexicalist approach which makes use of lexical entries of the kind we have proposed so far. Since we do not take these lexical entries

to be the last word on lexical syntax and semantics in any case, most debates over exactly how they should be formulated are otiose here; all that we want from a lexical entry is that in conjunction with the compositional principles of representation building it yields intuitively correct input representations to perf operators.

Here then our provisional conclusion: it has proved somewhat more convenient for us to adopt a lexical semantics for transitive *write* and other non-core transitives as including target states. But we do so on the understanding that the contrast between transitive and intransitive *write* will be naturally resolved in an account based on a theory of the syntactic and semantic structure of individual words.

3.5 Aspectual Oppositions

The last section was devoted to the origin and subsequent fate of result states from lexical insertion to the semantic representations associated with AspP (which in our set-up are the inputs to perf operators). We only touched upon some instances of what is a much more complex and diverse story. But in its turn that story is only part of the larger story about the lexical and compositional dimensions of ‘Aspect’.

It is not easy to extract a concise and coherent picture from the literature of exactly what ‘aspect’ is, or what falls under it. Our own preferred catchphrase characterisation is that aspect pertains to the properties of event structure (whereas ‘tense’ has to do with the location of the event structures along the time axis, either in relation to the utterance time or to other salient times or events); or, in a slightly more specific formulation: subject of the theory of linguistic aspect are the linguistically relevant properties of event structures described by verbs and their projections. But what this exactly comes to depends on a host of further assumptions – about what the event structures are like that are described by different verbs and their projections and about the ways in which the event structures described by complex expressions depend on the event structures described by their constituents. Some of these assumptions manifest themselves in the formalisms that different theories adopt for representing event structure. Each formalism has its particular resources for describing aspectual distinctions, and quite often these resources are limited so as to fit some specific theoretical purpose. The formalism we are using in this paper is no exception. It has been chosen to

cater for the particular problems, relating to the semantics of perfects, to which this essay is devoted.

In this formalism two aspectual distinctions stand out. They are stated in (3.13).

- (3.13)a. The distinction between event descriptions and state descriptions.
 b. The distinction between event descriptions that include a result state and event descriptions that do not.

(3.13) makes use of the notions *state description* and *event description*. Meant is the following. The semantic representation of a verb or verb projection is an *event/state description* if its referential argument is an event/state. In our formalism the referential argument of a representation is identified by a discourse referent that occurs in the store of the representation. When the store contains more than one element, it is usually intuitively clear enough which of the store elements is the referential argument of the representation. In cases where confusion threatens the referential argument can be singled out explicitly, eg. by attaching the subscript *ref.arg.* to it.

Do these two binary distinctions tie up with any of the familiar oppositions from the Aspect literature? An exhaustive discussion of this question falls outside the limits of this study. But there are a few aspect-related notions that have gained a special prominence within the literature. A comparison of the distinctions in (3.13), however brief, with these notions may help to situate our own position more clearly within the wider context of the literature on tense and aspect.

Prominent in the literature are the following oppositions:

- (3.14)a. Homogeneous-Antihomogeneous⁴
 b. Perfective-Imperfective
 c. Telic-Atelic

In addition to these pairs of complementary notions there are the different *Aktionsart* categories, which play a prominent part in theories of lexical aspect. Of the various *Aktionsart* categorisation schemes that have been proposed,

⁴The more common term for *antihomogeneous* in the literature is *inhomogeneous*. We prefer *antihomogeneous*, as it conveys more clearly that *homogeneous* and *antihomogeneous* are mutually exclusive, but not complementary (*inhomogeneous* is not just the negation of *homogeneous*, but something stronger; see definition (3.15) below).

the one most widely used is that of Vendler, with its fourfold division into accomplishment, achievement, activity and state verbs. We have referred already more than once to these Aktionsart categories, and will continue to do so, trusting that their meaning will be familiar enough from the literature.

Comparing these notions with the distinctions in (3.13) isn't straightforward. In one part this is due to a certain lack of precision and consistency in the use of the terms occurring in (3.14). Exactly what different authors mean by the oppositions in (3.14) depends in good part on the assumptions they make about event structures and the linguistic relevance of their various properties. A second complication has to do with the level at which these terms are supposed to apply – do they denote properties of lexical verbs, or of complete clauses that can be built from those verbs, or of phrases situated somewhere between these along the path of representation construction from lexical insertion to AspP? And a third factor is that it isn't always clear from the way in which these terms are used whether they are supposed to apply to *token* eventualities (i.e. to particular events or states, with their particular location on the time axis) or to eventuality *types*.

This last factor is the easiest to deal with. It doesn't need much reflection to see that it is eventuality types to which these terms apply, whatever certain statements in the literature may suggest, and we will treat them as such without further argument. Within the setting adopted in this paper, in which the relevant eventuality types are always given by eventuality descriptions (the semantic representations associated with the relevant projections of the verb), this means that aspectual distinctions must be applicable to those descriptions.

3.5.1 Homogeneous vs. antihomogeneous

We start with the opposition between homogeneous and antihomogeneous. For this pair of notions there exist explicit definitions (going back to (Krifka 1987); see also (Krifka 1989), (Krifka 1998)) which can be expressed with the formal tools our formalism makes available. A pair of such definitions are given in (3.15).

- (3.15)a. An eventuality description EV is *homogeneous* iff for every instance *ev* of EV and every time *t* such that $t \subset ev$ there is an instance *ev'* of EV such that $dur(ev') = t$.⁵

⁵In practice, some limitations often have to be imposed on the size of *t*: *t* shouldn't be

- b. An eventuality description *EV* is *antihomogeneous* iff whenever *ev* is an instance of *EV* then there is no instance *ev'* of *EV* such that $ev' \subset ev$.

Does this opposition match either of those given in (3.13)? We take it as self-evident that it does not match the one in (3.13.b). But could it match up with distinction (3.13.a)? Given the principles to which we have committed ourselves so far, we are not in a position to answer this question either positively or negatively, but a positive answer is at least partially supported by some of the assumptions we have made. That state descriptions are homogeneous is adumbrated in (2.27), which we can now see as a kind of homogeneity principle for result states. But the scope of (2.27) is limited to result states: what we need is a principle that applies to state descriptions in general.

Should we adopt such a principle? We think the case for it is a strong one. If a stative condition holds over some interval of time *t*, then surely that must mean that it also holds over any subinterval *t'* of *t*. It is only one step from here – a stipulative one no doubt, but a plausible and harmless one – to assuming that there then also exists a token state that is characterised by this condition and whose duration is exactly *t'*. Putting these assumptions together leads to the principle that all state descriptions are homogeneous:

- (3.16) If an eventuality description is a state description, then it is homogeneous.

To establish a full correspondence between the oppositions in (3.13.a) and (3.14.b) we need a similar principle for event descriptions:

- (3.17) If an eventuality description *EV* is an event description, then it is antihomogeneous.

But this is by no means obvious. One obstacle are activity verbs, such as the verb *walk*. We already considered the phrase *walk to the station*, which, we argued, is instantiated by events that consist of a walk by someone which ends at the station. But surely, if an event counts as instance of *walk to the*

too small, as some minimal stretch of time is needed to determine whether *EV* is satisfied there; when the intervals become too short, the question whether *EV* holds throughout them cannot be settled on the strength of what is going within the interval itself. At best it could be stipulated in such cases that *EV* does hold throughout the interval because the interval is included within a larger interval that is large enough to allow direct verification that *EV* holds throughout it.

station, it must also count as an instance of the verb *walk*. And if that is so, then counterexamples to (3.17) seem unavoidable. Suppose that *x* leaves her house by the front door and walks to the corner of the street. There she turns left and walks to the next intersection. From what we have been saying about *walk* it seems to follow that *x*'s walk from her front door to the first street corner is an event *e* that instantiates *walk*. By the same token there is an event *e'* which consists in *x* walking from her front door to the second corner and that should also count as an instance of *walk*. But $e \subset e'$. Ergo.

Is there a way to escape the conclusion that *walk* and other activity verbs are verbs whose lexical semantics is in disagreement with (3.17)? Various strategies may come to mind. One would be to assume that the instances of the lexical semantics of activity verbs are not events, but belong to some ontological category distinct from both events and states. But it is unclear what the characteristic features of this category might be and how it could be demarcated from events on the one hand and states on the other. Neither this option nor any other that we have contemplated seems viable. So we conclude that (3.17) does not hold and thus that the homogeneous-antihomogeneous opposition does not lign up with the difference between state descriptions and event descriptions.

We may as well add at this point that the exclusion of kinds of eventualities other than events and states is one of the fundamental ontological assumptions we are making. It has been an assumption in all our earlier work on temporal reference and the account we are developing in this paper conforms to it. In fact, our assumptions go further than this: Not only do we assume that every eventuality is either an event or a state; we also assume that all eventuality *descriptions* that arise as semantic representations of natural language sentences and their constituents (or as parts of such representations) are either event descriptions – descriptions all instances of which are necessarily events – or else are state descriptions, all of whose instances are necessarily states.

We also continue our earlier practice of indicating whether an eventuality description is an event description or a state description by the choice of symbol we use to represent the description's referential argument: the symbols used for event discourse referents always begin with an 'e' and the symbols used for state discourse referents always begin with an 's'.⁶ Note well that the use

⁶ This is of course just a notational device, which could be replaced by the use of a single ('neutral') type of symbol for all eventuality representing discourse referents in

of special discourse referent symbols for states and events creates the possibility of introducing content ‘through the back door’, and with that the danger of introducing hidden contradictions. For instance, by using ‘s’ as symbol for the referential argument of an eventuality description we thereby declare this description to be a state description, and thus, in view of principle (3.16), to be one that is homogeneous. But that amounts to a claim about the satisfaction conditions of the description, which may or may not be true.

3.5.2 Perfective vs. imperfective

In the tense-and-aspect literature the terms ‘perfective’ and ‘imperfective’ are used in what appear to be quite different contexts. On the one hand we find uses in which the terms are applied to ‘high’ verb projections. The perhaps most explicit example of this kind of use is the distinction between *imperfective* viewpoint aspect (also called *internal* viewpoint aspect) and *perfective* (or *external*) viewpoint aspect found in (Smith 1991). This use of the terms ‘perfective’ and ‘imperfective’ is closely connected with ways of classifying tense forms that go back to a much earlier date, most notably in descriptions of the tense-and-aspect system of the Romance languages. For instance, French has two past tense forms, known as the ‘Imparfait’ (‘Imperfect’) and the ‘Passé Simple’ (‘Simple Past’) and the same is true of other Romance languages. Imparfait and Passé Simple differ in that the Passé Simple conveys perfective and the Imparfait imperfective aspect. Both are simple past tenses in the sense that they situate the eventualities described in clauses in the past of *n*. (Though they do so in somewhat different ways; see Section 6.)

The distinction between internal and external viewpoint aspect is (as the terms suggest) that between viewing the eventuality that is being described from a temporal position that is ‘internal’ to that eventuality – i.e. from a time at which that eventuality is *going on* – as opposed to viewing it from a time that is ‘external’ to the described eventuality, either in that the eventuality is wholly in the past of that time or wholly in its future. In our approach this distinction is captured by (i) identifying ongoing events with states (including the ‘progressive states’ that are expressed by progressive forms of event verbs in English (Vlach 1992)) and formalising temporal lo-

conjunction with two sortal predicates, ‘Event’ and ‘State’, where, for any such ‘neutral’ discourse referent *ev*, ‘Event(*ev*)’ says that *ev* is an event and ‘State(*ev*)’ that *ev* is a state – see e.g. (Kamp and Reyle 1993), Ch. 4 where the distinction between discourse referents for atomic individuals and discourse referents for non-atomic individuals is handled in a similar fashion.

cation of ongoing eventualities s at internal viewpoint times t as inclusion of t within s ($t \subseteq s$) and (ii) identifying externally viewed eventualities with ‘events’ which are located as lying either entirely before or as lying entirely after the given external viewpoint time t .⁷ In other words, we are using the distinction between states and events to capture the distinction between internal and external viewpoint, and thus between imperfective and perfective aspect in the ‘high application’ sense of the terms ‘perfective’ and ‘imperfective’: when the perfective-imperfective distinction is understood in the sense of that between external and internal viewpoint, then there is a correspondence between the opposition in (3.13.a) and (3.14.b); but it is, one might say, a ‘correspondence by design’.

In a theory of tense and aspect for French the most direct way to deal with the combination of temporal and aspectual information that is conveyed by *Passé Simple* and *Imparfait* is to assume that both types of information are located at a single node of the syntactic structures for French sentences and to make this node responsible for incorporating both kinds of information into the semantic representations of its mother node. But German and English differ from French and the other Romance languages in that the distinction between imperfective and perfective aspect is not expressed as part of tense morphology in the narrow sense of the term). In English viewpoint aspect is often indicated by the presence or absence of progressive morphology. (It always is, when the main verb of the sentence is an event verb). In German verb morphology does not indicate the distinction, and other devices, such as the adverb *gerade*, or some periphrastic like *dabei sein, zu ...* (‘to be at ...-ing’) or *damit beschäftigt sein, zu ...* (‘to be occupied with ...-ing’) must come to the rescue in cases where the speaker intends an imperfective interpretation for what may look *prima facie* like an event description and wants to make sure that the interpreter will get an imperfective reading to the description.

For both English and German it seems reasonable to assume that the information which distinguishes between perfective and imperfective viewpoint aspect interpretations should be handled in some other way than by treating it as part of the information contributed by tense. The treatment we adopted in Section 2 for both languages was to assume that the information is associated with a separate Aspect projection. We will stick to this decision in

⁷In the formalism we are using these latter relations are captured by a conjunction of two relations, (a) inclusion of e in some time t' and (b) a relation between t' and t which can take on of two forms: t' lies entirely before t or t' lies entirely after t . (Put more formally: either $e \subseteq t' < t$ or $t < t' \supseteq e$).

what follows. It should not be forgotten, however, that since the means that English and German offer for expressing perfective or imperfective viewpoint aspect, it isn't obvious without further argument that the Asp projections should be assumed to play the same semantic role in the two languages. We will return to this point in Section 3.6.

The use of the terms 'perfective' and 'imperfective' as types of viewpoint aspect is not the only one. There is another, older and if anything even more wide-spread, use that can be found in the tense-and-aspect literature as well. This use was first established in discussions of 'Aktionsart' in Slavic languages. The verbs of Slavic languages can be divided into three categories: basic verbs, prefix verbs and secondary imperfectives. Roughly speaking, prefix verbs are obtained from basic verbs by attaching prefixes to them, and secondary imperfectives are obtained from prefix verbs by suffixal morphology. There is a systematic connection between the aspectual behaviour of a Slavic verb and the category to which it belongs – secondary imperfectives show 'imperfective' behaviour (as indicated by the name of the category) and so do, by and large, the basic verbs. The behaviour of unmodified prefix verbs, on the other hand, (i.e. prefix verbs unmodified by Secondary Imperfectivisation), is 'perfective'.

Exactly what the 'perfectivity' and 'imperfectivity' of lexical verbs come to is not so easy to say. The reason is that the aspectual behaviour of a verb is ultimately something that can be recognized only at the level of complete clauses that contain the verb as their main verb. But the way in which the aspectual properties of the verb manifest themselves at the level of the full clause is often indirect – mediated by various transformations of the eventuality description the verb initiates along the path of compositional clause meaning through which the aspectual properties of the description may be modified. As we have implied more than once, how these transformations shape the final outcome is a complex problem, and it is one of which we want to discuss only those parts that are indispensable to the presentation of our proposals about the semantics of perfects. In this paper we are only considering sentences in which the path connecting the insertion of the lexical semantics of the main verb with the final step in the construction of the semantic representation of AspP is quite simple. So only transformations that are involved in such simple paths are directly relevant. But the basic problem remains: whether the paths we include in our considerations are simple or more complex, the true meaning of an Aktionsart classification can be appreciated only in the light of what happens along those paths.

Without a systematic account of the compositional computation of AspP representations a detailed exploration of the implications of aspectual distinctions at the level of lexical verb meaning isn't possible. But even in the absence of such an account there is a definite statement we can make about the correspondence between on the one hand (i) the distinction between 'perfective' and 'imperfective' as these terms are used in relation to the verbal systems of Slavic and, on the other, (ii) the distinction between lexical event descriptions and lexical state descriptions that is a special case of the general distinction between event descriptions and state descriptions to which we are already committed. At this level of lexical semantics the correspondence fails. The central problem are activity verbs. According to the classical tests – e.g. simple clauses involving these verbs can be felicitously combined with *for*-phrases like *for an hour* but not with *in*-phrases like *in an hour*; simple infinitival clauses can be modified by 'progressive periphrastics' like *be in the process of* – the basic verbs of Slavic languages are for the most part activity verbs. But the received view within the tense-and-aspect literature is that activity verbs are event verbs, i.e. that their lexical semantic representations are descriptions of events. (Recall in this connection the lexical entry in (3.9) in Section 3.4 for the activity verb *walk*. Thus according to the present 'low application' use of the perfective-imperfective distinction, an activity verb is an expression whose semantics takes the form of an event description but which nonetheless falls into the category of imperfective verbs.)

Summing up: We have distinguished two uses of the terms 'perfective' and 'imperfective', one applicable to high verb projections and the other to lexical verbs. The higher level distinction ties up with our distinction between descriptions of events and descriptions of states. The lexical distinction does not, since activity verbs are treated on the one hand as event verbs (by many, including us), while on the other they are categorised as imperfective according to the familiar tests for the perfective-imperfective distinction as it applies to lexical items.

One benefit of the decision to treat activity verbs as event verbs will become visible in the treatment we will propose for the perfects of such verbs in Section 4. But reaping that benefit will require certain assumptions about how the semantics of such verbs is transformed into the semantic representations of PerfP nodes. That story will not only be an essential part of our account of English and German perfects, but also an illustration of the complex relation that may obtain between the applications of aspectual distinctions at the lexical and at higher levels. Some discussion of this issue follows in Section 3.6.

3.5.3 Telic vs. atelic

Of the different notions mentioned in (3.14) telicity and atelicity are the most difficult to pin down. There exists, we take it, a general agreement that the telic-atelic distinction is a distinction between events – or rather, as we have been arguing, between event descriptions – and not one that applies to states, or state descriptions. Alternatively, one could hold that all state descriptions are, trivially and obviously, atelic. Either way there is no need to dwell on the question what state descriptions play in the distinction between telic and atelic. So we can begin our discussion of the ‘telic-atelic’ opposition by putting such descriptions aside.

But within the domain for which the telic-atelic distinction is of interest – that of events and event descriptions – the way in which the distinction should be drawn, and its relation to the oppositions in (3.13) are by no means straightforward. One reason for this is that different uses of the terms ‘telic’ and ‘atelic’ often presuppose, explicitly or implicitly, different representation formalisms in which their meanings can be defined, or in which it is possible to express the logical properties and relations by which they are governed. Some of these formalisms are more expressive than the one we are using, and allow for characterisations of telicity that our formalism can’t emulate (at least not in a direct and straightforward manner); and when this extra expressive power is used in the explication of telicity, comparison with distinctions that can be expressed in our own formalism will obviously be difficult.

One widely shared assumption about telicity is that telic eventuality descriptions are event descriptions whose instantiations have a ‘culmination’, or ‘culmination point’ (Moens and Steedman 1988a). It is this characterisation of telicity that we will focus on in this section. So the question we will have to address is: Does the distinction between telicity and atelicity as presence or absence of culmination correspond to one of the distinctions in (3.13.a) and (3.13.b)?

What are ‘culminations’? An intuitive explanation is easiest for events that are intentional actions by some agent: The agent has a certain purpose, plan or intention, a conception of what it is she means to accomplish; and it is part of that conception that when she goes about realising her goal she will be in a position to recognise when the realisation is complete. This recognition pertains to the final phase of the realising activity, the one which ‘puts

the final dot on it' as a realisation of the conception in question. This final phase, which brings the realisation process to a successful conclusion, is the culmination of such an intentional action.

Two things are clear from this characterisation: (i) A culmination of an action isn't a culmination of the action as token event, but as the action qua execution of a certain intention or plan, and thus as an instance of the corresponding event type 'realisation of intention or plan P'; (ii) A culmination point can be recognised by comparing the current state with the goal state that is part of P, and thus can be recognised independently of the event of which it is the culmination. In both respects culminations of actions resemble target states.

Action verbs are event verbs that present their instances as events which are performed by an agent with the intention to bring about a certain goal. Thus the events that instantiate an action verb have culminations, in virtue of being instances of that verb. As the term 'culmination' is used in the literature, however, it is not limited to intentional actions. One example of a culminating event description is *fall to the bottom of the well*. The instantiations of this description are typically not intentional actions. (Arguably they never are.) But they are nevertheless taken to have culminations, which consist of the final part of the falling, when the falling object makes contact with the bottom of the well. The two characteristics of telic event types in the present sense of 'telic' – (i) events instantiating the given event type have culminations qua instances of this type, and (ii) the culminations of these events can be defined independently – also hold for such non-intentional cases. So they are included within the class of 'telic' descriptions as well.⁸

Informal and approximate as this characterisation of culminations may be, it gives us enough for a comparison between (3.14.c) and (3.13.b). Let us suppose that certain event descriptions E come with an associated *culmination point description* CULM(E) and define *telic* event descriptions to be those whose instances come with culmination points; so the telic event descriptions

⁸This informal characterisation leaves certain questions unanswered. For instance, is the culmination of an event e really part of e itself or can it also be an event that immediately follows e – the transition from a 'prestate' of e, which lasts until the very end of e, to a 'poststate' of e (i.e. a result state), which starts when e has reached its end? As far as we can tell there is no general agreement on this point. And some authors do not even address the question. We ourselves are neutral on this. (For all we know the answer to the question may well vary from one case to the next.) Either position is compatible with everything that really matters in this essay.

are those descriptions E for which CULM is defined, and the atelic descriptions are those for which it is not. The question we then have to answer is:

What is the relation between telic event descriptions on the one hand and event descriptions with target states on the other?

As before, we split the question into two halves:

- (3.18)a. If an event description E includes a target state, then E is telic (ie. CULM(E) is defined).
- b. If an event description E is telic (ie. CULM(E) is defined), then E includes a target state.

There are strong grounds for adopting (3.18.a): If an event description E comes with a target state, then it will determine a target state description TAST(E) (see Section 3.2). That means that if e is an instance of E , then there will be a transition from some ‘pre-state’ s_0 of e to an instance s of TAST(E). Let us make the plausible assumption that every transition from one state to another state with incompatible characterisation is an event (characterised by the fact that a state of the first kind makes way to a state of the second kind). Then the transition to the target state s will be an event e' and since s right-abuts e , e' must occur at the right edge of e . This seems to speak in favour of taking e' to be the culmination of the instance e of E . (Again, we need not decide whether e' is part of e or is punctual event that coincides with the very beginning of s .) Making this assumption is thus tantamount to accepting (3.18.a).

More problematic is (3.18.b). Here is one of countless (potential) counterexamples: consider the event description *count to one hundred*. Counting to one hundred is a type of intentional action and it is normally clear to the agent who performs an action of this type when the goal of the action has been reached – that is when the agent utters (out loud or in the privacy of her own mind) the expression *one hundred* (or some other expression denoting the number 100 in the language in which she is doing her counting). This final part of the counting activity – when a term denoting 100 is at last publicly or tacitly produced – seems to qualify intuitively as the event culmination: it is the point that the agent has been working towards, that marks the completion of her action and that she will recognise as its completion. But on the other hand, it may seem doubtful that actions of counting to one hundred can be described as having target states. For what could the target state of such an action be? There is no obvious sense in which the world

has in any significant way changed when the agent has reached the end of her counting. It therefore looks like *count to one hundred* is a description of events that come with culminations but without target states; and thus that *count to one hundred* is a conterexample to the implication in (3.18.b).⁹

But how conclusive is this assessment of the description *count to one hundred*? Is it really all that clear that instances of *count to one hundred* don't give rise to target states of any sort? True, the world at large may not be affected by x's counting to one hundred. But there is nevertheless a good sense in which x herself is affected by it. When she recognises that her counting is done and over with that will put her into a mental state to the effect that the action she undertook is completed, so that now she is free to turn to other things. Couldn't *this* kind of state qualify as a 'target state' of events of counting to 100?

Our own inclination is to say 'no' to this question. When the activity verb *count* is combined with the phrase *to one hundred* the result state is a telic verb phrase in the sense that the instances are events with culminations, but the VP is not a target state VP as we understand that notion: its semantics is an event description that does not specify a target state. So for us *count to one hundred* remains a conterexample to (3.18.b). We will see in the next section, however, that 'pseudo target states' like that of an agent being aware that an action of hers has been accomplished can be invoked in interpretations of present perfect uses of such VPs. Fastening onto such mental states of the agent of an action described by a present perfect sentence is just one of a range of strategies that English speakers can resort to when they are trying to justify present perfects of event descriptions that do not come with result states ready-made.

So the upshot of our discussion of the telic-atelic distinction so far is this. There is a one-way implication between event descriptions with target states and telic event descriptions (that given in (3.18.a)). But the converse implication (3.18.b) does not hold in general. One reason why this implication fails is that there are countless phrases which describe well-defined actions,

⁹Some authors seem to see a very close conceptual relationship between culminations and target states. Consider for instance the following quotation from (Moens and Steedman 1988a): 'Thus an utterance of "Harry reached the top" is usually typical of what we will call a *culmination* – informally, an event which the speaker views as punctual or instantaneous, and as accompanied by a transition to a new state of the world.' As will become clear in the next paragraph, for us the relation between culminations and result states is not one of such conceptual intimacy.

but actions which leave no predictable mark on the world in which they are performed. (Whether there are yet other types of event descriptions that constitute counterexamples to (3.18.b) is a question that we do not explore.)

At the start of our discussion of telicity we set aside state descriptions because they seem devoid of interest in this context – either the telic-atelic distinction doesn't apply to them or else they are trivially atelic. The intuitive reason why state descriptions could not possibly be telic is closely connected with their intrinsic homogeneity: when a state *s* that instantiates a state description *S* comes to an end that may be for no identifiable reason or because something has come on to the scene that prevents it from continuing. But in either case the fact that *s* has come to an end – a point from which on, for a little while at least, *S* is not satisfied – is not something that could be predicted from the content of *S* as such; but for the contingencies of the world, *s* could have gone on longer; there could have been an instance *s'* of *S* of which *s* would then have been a proper subpart.

In this way we can argue that state descriptions are always atelic. But a very similar argument can also be applied to certain event descriptions. Examples are the semantic representations of VPs consisting of single activity verbs, like *sleep*, *walk* or *work*. Events of walking, working or sleeping may come to an end because something intervenes or because that is what the subject decides, or perhaps for no recognisable reason at all. But just as in the case of state descriptions there is nothing in the semantic representation of the verb (or of the VP of which it is the only constituent) which entails that the described event must come to an end.¹⁰ So we conclude that there are atelic as well as telic event descriptions.¹¹

¹⁰ Note that the semantic representation of a VP consisting just of a single verb *V* is essentially the semantic representation from the lexical entry of *V*. We take it to be a general feature of the lexical entries of activity verbs that their semantic representations are event descriptions without target states. This means that the semantic representations of VPs consisting of single activity verbs are also without target state specifications. But in addition they do not qualify as telic event descriptions of any other sort for the informal reasons just given.

¹¹ It might be thought that the argument we have given for the existence of atelic event descriptions is open to the objection that the use of VPs consisting of a single activity verb is in practice quite restricted. For instance both a simple past tense sentence like *I/John worked* and a present perfect sentence *I have/John has worked* require quite special contexts to be felicitous. (The matter is different for progressive forms like *I/John was working* or *I have/John has been working*, but by our lights these involve state descriptions and therefore are of no use to the present argument.) Usually a natural use of the non-progressive past and perfect forms of such VPs are helped by some kind of addition, such as *a little while* or *a little bit*. This isn't an objection to the point the argument is meant

We conclude Section 3.5 with a summary of its results.

We started out with two salient distinctions between eventuality descriptions that arise as semantic representations in the formal framework we are using and which, in particular, are found among the semantic representations that serve as inputs to perfect operators. These were stated in (3.13). The aim of the section was then to see whether either of these distinctions pairs up with one of three prominent oppositions from the tense and aspect literature – homogeneous-antihomogeneous, perfect-imperfect and telic-atelic (see (3.14)). The conclusions we have reached are as follows:

(i) The pair ‘homogeneous-antihomogeneous’ does not match up with either that in (3.13.a) or that in (3.13.b).

(ii) The notions ‘perfective’ and ‘imperfective’ appear to have been used in what appear to be different senses. According to one of their uses (that in the sense of viewpoint aspect) the opposition in (3.14.b) corresponds to our own distinction between event and state descriptions (3.13.a); but according to the second use we considered (as a distinction at the level of lexical verbs and perhaps VPs) this correspondence does not hold.

(iii) There are some systematic connections between the telic-atelic distinction and the two distinctions in (3.14): Trivially all state descriptions are atelic (if we insist in applying the distinction to them at all). But among event descriptions we find telicity as well as atelicity. And the telic event descriptions can be further divided into those that specify target states and those that do not. So the logical relationship between the telic-atelic opposition and the distinctions in is only a partial one:

(a) event descriptions that specify target states are always telic;

(b) state descriptions are never telic.

to establish. For on the one hand the semantic representations of phrases like *work for a little while* as we find them in sentences like *I worked/ have worked for a little while* are like the semantic representations for single verb VPs like *work* in that they do not qualify as telic descriptions on the same intuitive grounds that apply to the single verb VP representations. And on the other there are at least some activity verbs, such as *sleep*, which are quite happy in non-progressive single verb VPs (*I have slept, You slept* and so forth).

3.6 The role of Asp projections in English and German

3.6.1 Prog and the Asp projection in English

The use that was made of English Asp nodes in Section 2 involved two kinds of information, which were labelled ‘+prog’ and ‘Default’. ‘+prog’ triggers applications of the operator PROG. PROG selects for event descriptions as input representations and transforms these into output representations that are descriptions of progressive states. ‘Default’ indicates that the syntactically represented input string lacks progressive morphology, and it is an instruction to the representation construction algorithm to pass up the semantic representation of Asp’s complement node (ie. VP) unaltered to the next node up (i.e. to AspP).

This way of handling the different kinds of information that can be associated with Asp has a plausible intuitive justification: What semantic information is attached to Asp is determined by the presence or absence of progressive morphology, and either information is interpreted as an instruction for how to construct the output representation from the input representation. But does this way of using the Asp nodes agree with established views of how such syntactic nodes function?

This question carries a presupposition – that there is an established view about the role of Asp nodes. We are not quite certain that there is an established view. But whether that be so or not, we will assume that the role of the Asp node is as stated in (3.19).

(3.19) Asp nodes are ‘functional heads’; and that means that the contributions they make to the morphology and/or the semantics of the sentences whose syntactic structures contain them as parts are determined by the values of a *feature function* that is associated with the node.

Feature functions are functions whose range consists of two or more (‘feature’) values. Feature functions with exactly two values are often referred to as ‘binary features’.¹² Each value of the feature function associated with

¹² Many of the feature functions that play a part in linguistics are binary. And among the feature functions that are not binary – i.e. those that have more than two values – it is common for the range of values to be still quite small.

There is a tendency in the literature to refer to both feature functions and feature values simply as ‘features’. Sometimes this can be confusing, but normally it is quite clear which use an author has in mind. We will also make use of this shorthand.

a functional head has its impact either on morphological-phonological realisation or on interpretation or on both. Here we restrict attention to the impact on interpretation, and for us this impact always takes the form of an input-output constraint on representations. Formally we assume that with each functional head category 'Xyz..' is associated a feature function 'XYZ..', which maps each node of category Xyz.. onto one of 'XYZ..'s feature values. In some cases the feature value is determined by properties of the syntax or morphology of the represented sentence. (This for instance is the case for the feature values +prog and Default we have so far assumed for English Asp nodes: +prog is triggered by the presence of progressive morphology, Default by its absence. But it is also possible in principle that the choice of feature value – i.e the result of applying XYZ.. to some particular Xyz.. node – is not determined by any syntactic or morphological properties of the sentence. In such cases the choice of feature value is a source of ambiguity, which may be resolved by construction requirements higher up in the tree or by contextual information of other sorts, e.g. information stemming from the surrounding discourse.)

The input-output constraints imposed by feature values have two sides to them. On the one hand they determine constraints on 'admissible' input representations. For instance, the information we have been labelling as '+prog' imposes the constraint that admissible input representations must be event descriptions (and not state descriptions). On the other hand the constraints have to do with the way in which input representations are related to output representations. In all uses we make of semantic features in this paper this relation is *deterministic* in that the output representation is uniquely determined by the input representation. For instance, the relation between input and output representations that is contributed by +prog is deterministic in that the output representation corresponding to an input representation K is the result of applying the representation-transforming operator PROG to K. Evidently it is always possible to represent a constraint that is deterministic in this sense in the form of a representation transforming operator. And when deterministic output constraints are represented in this way, then the corresponding constraints on input representations can be captured as limitations on the domains of the representing operators. More explicitly, suppose that a semantic feature imposes a constraint C on admissible input representations and determines a representation transforming operation R defined on input representations that satisfy C. We can think of the pair <C,R> as the 'operator' determined by the given feature value and it is in this way – as pairs consisting of a constraint on input representations and a representation transformation that is applicable to all potential input rep-

representations that satisfy the constraint – that we will identify the operators determined by feature functions.

It is not uncommon for a semantic feature to determine an operator that is defined for all possible input representations. We call such feature values *total*. *Partial* feature values are those feature values which specify operators that are not defined for all possible input representations. An example of a total feature value is the ASP value ‘Default’. The operator it determines is the unrestricted identity transformation, i.e. the pair $\langle V, Id \rangle$ consisting of the vacuous (= tautologous) constraint V and the identity operation Id on representations. But there are also many partial feature values. One is the ASP value $+prog$, which determines the operator $\langle E, PROG \rangle$. Here E is the constraint that the input representation must be an event description, and $PROG$ is the operator which was introduced in Section 3.4.

Often the operators determined by partial feature values can be extended via *coercion*. $+prog$ is an example of this as well. It comes, we just said, with an input constraint that restricts admissible input representations to event descriptions. But even when the input representation is a state description, then it is sometimes possible to first ‘coerce’ this representation into an event description and then apply the operator to that event description. This is the classical explanation of why a progressive like that in *He is being a nuisance* is acceptable, whereas *He is knowing the answer* is odd (and many speakers even consider it ungrammatical): the state description *be a nuisance* can be coerced into an event description (roughly equivalent to *make a nuisance of oneself*), but the state description *know the answer* does not allow for such a coercion. This means that for *He is knowing the answer* the interpretation process grinds to a halt at this point and no well-defined sentence interpretation can be reached. Formally we can think of a coercion strategy as involving an operator in its own right, which transforms representations outside the domain of some other operator into representations which belong to that domain. In this way the coercion operator extends the domain of the feature operator for which it can be used as ‘back up’, by adding its own domain to it.

Some partial feature operators come with two or more coercion operators as back-ups. The domains of those back-up operators can be related to each other in different ways. When the domains of all back-ups of an operator $\langle C, R \rangle$ are disjoint, then coercion will be unequivocal: an input representation that does not satisfy C can belong to the domain of only one back-up operator, so that operator is the one to be applied to the input. But if $\langle C, R \rangle$ has two back-up operators with overlapping domains, then it is pos-

sible for an input representation to belong to the domains of both of those. Coercion will then involve a choice between these operators. An ill-matched input representation to $\langle C, R \rangle$ (one which does not satisfy C) can thus give rise to ambiguities that do not arise for inputs which do satisfy C and therefore do not need adjustment. An important instance of coercion ambiguity are English perfects of state descriptions, which will be discussed in Section 4.

Many of the features that play a part in linguistic theory are binary, we said. And the use we have been making of two feature functions that have played a part in our considerations – the functions ASP and PERF associated with the category labels Asp and Perf – seem to illustrate this tendency: for each of these two functions only two function values have played a part in the representation computations that we have so far presented. But there is no need why all feature functions should be binary and indeed not all of them are. In fact, the question ‘Binary or more-than-binary?’ can be raised for both ASP and PERF. Here we just consider the case of ASP. One reason why it might be doubted that +prog and Default are the only values of ASP has to do with sentences with generic, habitual or dispositional interpretations, like those in (3.20).

- (3.20)a. Dolphins suckle their young.
 b. In the early 20th century professors wore suits.

What is responsible for the generic interpretations of such sentences? At what point in the computation of their semantics is their genericity determined? One possibility is that this decision is made at the Asp level: that ASP has besides the values +prog and Default one or more values which turn the input representation into one that expresses generic quantification.

There is no immediate need for an answer to this question, or to the question whether or not ASP is binary. But the issue will come up again in Section 10, where we deal with quantificational perfects. Whether PERF should be treated as a binary or non-binary feature, on the other hand, is a different matter. This is one of the questions to which the present theory should provide an answer. The question will come up repeatedly in Section 4 and thereafter.

We conclude this section with a minor point of nomenclature. There is a wide-spread practice in linguistics to label the two values of a binary feature function XYZ as ‘+XYZ’ and ‘-XYZ’ (or simply as ‘+’ and ‘-’, when it is clear from context that XYZ is the feature at issue). The names we have

been using for values of ASP do not conform to this convention, but if ASP isn't binary anyway, then there is no convention to conform to. On the other hand we have been using the labels '+perf' and '-perf' for the two values of PERF to which we have been referring up to this point. Those labels suggest that PERF *is* a binary feature. But as hinted in the last paragraph, it is far from obvious that PERF is binary. Later on we will find good reasons for treating it as non-binary.

Summary of Section 6.3.1. In (3.19) we stated our assumption about the semantic role of functional heads in syntactic trees: With each functional head *XYZ* is associated a feature function *XYZ*. This function assigns one of its values to each node *n* of category *XYZ*. This value *XYZ(n)* determines an operator which transforms input representations into output representations. For some feature values the associated operator will be total – it is defined on all possible input representations – while for other values the operators may be partial. Such a partial operator $\langle C, R \rangle$ will be defined only for input representations that satisfy *C*. In such cases the given feature value may specify in conjunction with $\langle C, R \rangle$ a set of coercion operators $\{O_1, \dots, O_k\}$ which extend the application domain of *R* beyond the set of 'directly licensed' input representation that satisfy *C*. The domain D_i of each coercion operator O_i extends beyond the domain *D* of *R* (the set of input representations satisfying *C*) and O_i maps D_i to a representation set that is included within *D*. There may sometimes be overlaps between the domains of different coercion operators in the set, in which case coercion preparatory to application of *R* creates ambiguity.

The discussion in this section has focussed primarily on the functional head category *Asp* and its feature function ASP. But the main importance of the issues brought up in this section concerns the feature function PERF. Much of what we will have to say in Section 4 and beyond has repercussions for the value structure of this function.

3.6.2 Interlude: German alternatives to the progressive and German *Asp* projections

The motivation we have given for making the *Asp* node of English clauses the locus of the information that distinguishes between the operations determined by +prog and Default is the overt difference between presence and absence of progressive morphology. For German, which lacks overt progres-

sive morphology, such a motive is lacking.¹³

3.6.3 *gerade*

The temporal adverb *gerade* is like the English Progressive in that when it occurs in conjunction with an event description like *einen Brief schreiben* ('write a letter') the result is an output representation to the effect that the corresponding progressive state description 'be writing a letter' holds at the time that *gerade* denotes.¹⁴ But *gerade* is unlike the Progressive in that

¹³ The reasons for situating the English progressive at this level are partly syntactic and partly semantic. That this level should be below the level of Perf follows from the fact that perfects can be formed out of progressives, but not conversely. ('Fritz has been walking.' is grammatical; 'Fritz is having walked.' is not.)

That the Asp level should be above that of VP is less straightforward. Here the arguments of which we are aware are primarily semantic. One is this. The progressives of certain accomplishment VPs with indefinite direct object phrases do not require existence of an entity instantiating the direct object phrase. (For instance, the VP 'be writing a poem' can be true of a subject α even though there neither exists nor ever will exist a poem that α is writing. If we were to assume that the progressive has narrow scope relative to the direct object DP *a poem*, then we could not account for the fact that the existence of a poem that is being written by α is not part of the satisfaction condition of 'be writing a poem'.)

Another reason for why the level of PROG should be assumed to dominate that of VP has to do with the fact that activity verbs can lead to telic VPs through combination with goal PPs (and other expressions with a similar effect), such as *walk to the station* or *cross the street*. The PP adjunct of the first of these examples and the direct object of the second are clearly part of what the progressive operates on in these cases. What makes it true to say that α satisfies the phrase *be walking to the station* is that α is engaged in the goal-directed activity of walking to the station – not that α is engaged in the mere activity of walking, but that as it happens, the bit of walking in question is in the direction of the station; likewise for *be crossing the street*. To get the meanings of these progressive phrases right we must assume that PROG applies after the verb has combined with its direct object or goal PP. For German such a motive is lacking. Here transitions to state descriptions that in English are brought about by the progressive must be enforced in other ways, for instance by means of an adverb like *gerade* or by clausal embedding under matrix predicates like *dabei sein, (zu ...)* ('to be at ...-ing') and *damit beschäftigt sein, (zu ...)* ('to be occupied with ...-ing'). In this second part of Section 3.6 we reflect on the consequences these differences have for the role of Asp in German. We split the discussion into two parts. The first is about *gerade*, the second about the clausal embedding constructions.

¹⁴ The time that is denoted by *gerade* when it is used in the way we are discussing here has to be recovered from the context. (Later, when in Section 7 we will have introduced the notion of 'Temporal Perspective Point', we will be in a position to be more precise on the forms this recovery can take.) When *gerade* is used in the way considered here, its best translation into English is as 'just now', or 'just then' (depending on where the denoted

3.6. THE ROLE OF ASP PROJECTIONS IN ENGLISH AND GERMAN⁹³

it does not select for event descriptions, but rather for state descriptions. Thus *Sie war gerade weg* ('She happened to be away') is perfect, whereas the corresponding progressive sentence in English – *She was being away just then* – is arguably ungrammatical. In fact, it is when *gerade* combines with an *event* description that the result seems to involve coercion, from event to state descriptions. For instance, in sentence (3.21) the effect of *gerade* is that the sentence as a whole means the same as the English progressive sentence 'Maria was writing a letter just then'. (It is because of this apparent power to coerce event descriptions into state descriptions that *gerade* can play a part comparable to the English Progressive.)

(3.21) Maria schrieb gerade einen Brief.

(Lit.: 'Maria just wrote a letter.')

Natural English translation: 'Maria was writing a letter just then.'

So far what we have said suggests that *gerade* shares with the English Progressive the power of triggering adjustment coercions, but with this difference that the coercions triggered by the Progressive are from state descriptions to event descriptions, whereas the coercions triggered by *gerade* are from event descriptions to state descriptions. In fact, the coercions triggered by *gerade* are the very transformations that are executed by the operator PROG. In other words, PROG is a back-up operator for the semantics of *gerade*, which is activated when *gerade* is confronted with an event description.

But can we be sure that this is the right story? Whether it is the right story depends on the role we attribute to German Asp nodes.¹⁵ And what role we should attribute to German Asp nodes – assuming that German has an Asp projection level – is less clear than it is for English, since German has no obligatory morphological marking of the distinction between progressive and non-progressive aspect. But let us suppose that Asp in German sentence structures has the same semantics as it has in English: The associated feature function is ASP, with (at least) the feature values +prog and Default, and these values trigger the same operators. The difference between the two

time is located in relation to the utterance time). ” There is also another temporal use of *gerade*, in which its English translation can be a simple 'just'. When used in this second way *gerade* refers to a time just before some other time. (This other time is the Temporal Perspective Point, see Section 7.). This use of *gerade* does not select for state descriptions but accepts both state and event descriptions.

¹⁵ Assuming that German clauses have an Asp projection level at all: Even that assumption could be questioned. For the implications of there being no Asp level in German see below.

languages is then just that the choice between +prog and Default is not expressed by overt morphology.

But the absence of overt progressive marking has further implications. To see what these are we need to think about the predicaments of a parser which has to assign the right ASP value to the Asp node of a German sentence; and for simplicity let us assume that this means choosing between the two values +prog and Default. What clues can the parser rely in making this choice? In the absence of any direct clues that the parser can exploit, it would seem that there are just two options.: either the parser makes an arbitrary choice, and hope is for the best; or the parser leaves the choice open, delivering an ambiguous (or ‘underspecified’) parse, leaving the disambiguating choice to the semantics. We consider both options, beginning with the first, according to which the parser does make an arbitrary choice.

To see what consequences this option has for the representation construction for a sentence like (3.21), one further issue must be decided, viz. the syntactic position of *gerade*. Since on the use of *gerade* we are considering its grammatical category is that of an adverb, we assume that it is integrated into syntactic structures via adjunction. Moreover, not much reflection on the semantics of the intended use of *gerade* as temporal adverb is needed to show that it functions much like other temporal locating adverbs like, for instance, *gestern* or *heute*: each individual use denotes some time t and locates the referential argument ev of the semantic representation of its adjunction site by relating it to t in the familiar way (via ‘ $e \subseteq t$ ’ in case ev is an event discourse referent e and via ‘ $t \subseteq s$ ’ in case ev is a state discourse referent s). Let us assume therefore that the syntactic position of *gerade* is the same as that which we have been assuming for other temporal locating adverbs: that of an adjunct to TP.¹⁶

Suppose, then, that *gerade* adjoins to TP. This entails among other things that *gerade* adjoins above AspP. On the assumption that German Asp makes the same kinds of contributions as English Asp this leads to the following story about (3.21): The parser delivers one of two syntactic structures for (3.21), which differ from each other in that in the first APS maps the Aps node to +prog, whereas in the second the APS value is Default. The semantic representation construction will assign to the ApsP node of the second

¹⁶ In Section 9 we will look into the possibility of other adjunction sites for locating adverbs. What we say about *gerade* here, may need some refinement in the light of what will come to light at that point.

parse the event description it inherits from the VP, whereas the semantic representation of the AspP node of the first parse will be the result of applying PROG to that event description and these alternative semantic representations of AspP will be passed on (with minor modifications) to the lower TP. At that point the construction procedure for the second parse crashes because of incompatibility between the lower TP representation and the selection restrictions of *gerade*, which requires a state description from its adjunction site. The construction procedure for the first parse, on the other hand, can be continued and leads to the intended reading, (viz. that Maria was writing a letter at the time denoted by *gerade*).¹⁷

According to the second option – the parser refuses to choose an ADSP value and leaves the decision to the semantics – the story has a more consistently happy end. Once the semantic construction procedure has reached the Asp node, the construction bifurcates into two branches, one the result of following the possible choice of +prog and the other following the possible choice of Default. When the representation construction is continued for each of the AspP representations that result in this way, we obtain two possible representations for the sister node to *gerade* (which by assumption is the lower TP node). In the case at hand one of these is a state description and the other an event description. Because of the selection restriction imposed on *gerade* the second branch aborts at this point, and only the first one survives. So we end up with a single representation, which we would also have obtained, if the parser had chosen to assign the ASP value +prog to the Asp node.

It is also possible to obtain this same final representation on the assumption that German has no Asp projection level, but that *gerade* allows for event to state description coercion, via application of PROG. And there are further implementation variants as well. The general moral of this discussion is that some cases of selection restriction can be implemented along a number of formally distinct (if conceptually closely similar) lines. We will find other examples of this as we go along and encounter other instances of aspectual selection restriction, especial those that are directed connected with perfects. In all such cases the question arises to what extent the choice between different implementation options is arbitrary or whether linguistically substantive considerations narrow it down or determine it.

¹⁷ The story isn't much different when we assume that the parser postpones the choice between +prog and Default beyond the level of Asp, rather than taking its chances by plunging one way or the other. Postponing the choice until the adjunction of *gerade* has been reached also involves evaluating at that later point the consequences of the two options and discarding the one that can be seen not to be viable.

Among the issues that confronted us in the course of this discussion about aspect is whether the syntactic structures of German sentences should be assumed to have an Asp projection level at all. Most of the discussion was based on the assumption that they do. So far a case for that assumption was hardly made, but one can be made for it, and against the alternative assumption that *gerade* allows for event-to-state coercion. Simple past sentences like (3.22.a) are generally ambiguous between an eventive and a progressive interpretation and often this ambiguity is resolved only at the discourse level. Illustrations of how the discourse context can resolve it are given in (3.22.b), where resolution favours the progressive reading, and (3.22.c), where the resolution is the eventive interpretation.

- (3.22)a. Sie schrieb einen Brief an ihren Vater.
(‘She wrote a letter to her father.’)
- b. Als Fritz hereinkam, war Maria beschäftigt. Sie schrieb einen Brief an ihren Vater.
(‘When Fritz entered, Maria was busy. She wrote a letter to her father.’)
- c. Den Sonntag verbrachte Maria wie üblich. Sie schrieb einen Brief an ihren Vater. Dann machte sie einen kleinen Spaziergang und anschließend las sie die Wochenzeitungen.
(‘Sunday morning Maria spent in the usual way. She wrote a letter to her father, Then she had a short walk and following that she read the weekly newspapers.’)

The fact that the interpretation of (3.22.a) must be able to adjust itself to the requirements of contexts like those in (3.22.b) and (3.22.c) introduces a new element into the considerations for and against the assumption that the eventive-progressive ambiguity is resolved at the level of Asp. Suppose that German doesn’t have an Asp level, or that it does, but that conversion of event descriptions into progressive state descriptions does not take place there. Then only the eventive representation will be assigned to sentences like (3.22.a). Integration of this sentence representation into the discourse (3.22.c) will be unproblematic, since that is the interpretation this discourse wants. But integration into (3.22.b) will now require – at the point of discourse integration – the coercion into a progressive state representation. We have no conclusive argument that this could not be done, and doubt that such an argument could be given. Nevertheless, formulating the rules for discourse integration in such a way that the kind of event-to-state coercion

3.6. THE ROLE OF ASP PROJECTIONS IN ENGLISH AND GERMAN⁹⁷

which would be required in the case of (3.22.b) strikes us as awkward and as contrary to natural assumptions about modularity.

For this discourse-related reason we tend towards an architecture in which the choice between eventive and progressive interpretations of sentences is made in the course of constructing the semantic representations of sentences from their syntactic structures. And given the assumptions we have already made that leads us back to Asp as the place where the choice is put into effect. (This also has the additional practical advantage for us that it allows us to assume closely similar syntactic structures for sentences of German and English.)

But of course the crucial difference between English and German remains: In English the choice between +prog and Default is determined by syntactic-morphological form, but in German there is usually nothing in the form as such that determines this choice. So the parser of a German sentence has to make a guess at this point or return an ambiguous parse.¹⁸

Before we leave the topic of *gerade* there is one more point to be mentioned. It indicates that there is some difference between English +prog and German +prog after all. Consider the sentences in (3.23).

- (3.23)a. He was modest.
b. He was being modest.
c. Er war bescheiden.
(‘He was modest.’)
d. Er war gerade bescheiden.
(Lit.: ‘He was then modest.’)
e. Er war (gerade) mal wieder bescheiden.
(Lit.: ‘He was (just then) once again modest.’)
f. Er gab sich (gerade) bescheiden.
(Lit.: ‘He gave himself (just then) modest.’)

¹⁸ The need for resolution of eventive-progressive ambiguities that is illustrated by (3.22.b) and (3.22.c) may be seen as pointing towards an extension of the architecture adopted in this paper to one which admits *underspecified* representations. Specifically, such an architecture should allow feature functions such as ASP to assign sets of values to syntactic nodes (rather than just single values), with the attached requirement that one of the values in the set be selected eventually. For a syntax-semantics architecture that allows for underspecification of temporal and aspectual properties and relations see (Reyle et al. 2007). (However, the particular form of underspecification suggested here, viz. of feature functions that may assign sets of values, is not accounted for in that paper.)

- g. Er machte (*gerade*) den Bescheidenen.
(Lit.: ‘He made (just then) the modest one.’)

(3.23.b) is a prototypical example of a progressive use of the predicate *be modest* - a copular construction composed of the copula *be* and the adjectival Complement *modest*. (3.23.b) is a perfectly well-formed sentence, but its meaning is clearly different from that of the non-progressive (3.23.a). (3.23.b) describes the subject as behaving as if he was modest, or of playing at being modest. The German equivalent (3.23.c) of (3.23.a) is like (3.23.a) a plain past tense copular sentence, involving the past tense *war* of the copula *sein* (‘be’) and the German equivalent *bescheiden* of the English adjective *modest*. But adding *gerade*, as in (3.23.d), (with the intended reading ‘at that point in time’) does not create the possibility of reinterpreting (3.23.c) in the way that (3.23.b) is a reinterpretation of (3.23.a). In fact, (3.23.d) is a rather odd sentence. This is because *gerade* suggests that the predication expressed by the phrase with which it combines is comparatively ‘short term’ – it should be natural for a subject to satisfy it over short periods of time. Dispositional predicates like ‘modest’ do not fall into this class. Dispositions of this sort are inborn or else they take quite a bit of time to acquire; and once you have them, you do not typically lose it over night, or over a cup of tea. Such predicates do not go well with the temporal adverb *gerade*. We can observe a similar effect when we try to integrate a sentence like (3.23.c) into a discourse of the type of (3.22.b), which imposes an imperfective interpretation on the sentence in question. An example is (3.24).

- (3.24) Am 6-en Oktober, sobald bekannt gegeben worden war, dass HM den Nobelpreis für Literatur gewonnen hatte, rief ich sie an. (?) Sie war bescheiden. (‘On the 6-th of October, as soon as it had been announced that HM had won the Nobel Prize for literature, I called her. She was modest.’)

In (3.24) the predication ‘Sie war bescheiden’, is also odd, (just as the ‘She was modest’ in the English translation).

(3.23.d) differs from the versions of (3.23.e-g) that include *gerade*. Here the addition of *mal wieder* in (3.23.e) and the locutions *gab sich bescheiden* in (3.23.f) and *machte den Bescheidenen* in (3.23.g) enable the same kind of reinterpretation that is made available by the English Progressive in (3.23.b). Moreover, as expected, replacing the versions of (3.23.e-g) without *gerade* for (3.23.c) in (3.24) removes the oddity there as well.

These observations show that if in both English and German the choice between eventive and progressive interpretations of event VPs is made at the

level of Asp, then English +prog and German +prog differ as follows. Both these feature values trigger application of the partial operator PROG, which selects for event descriptions as inputs. But the English operator comes in the company of a coercion operator which is able to convert certain state descriptions into event descriptions, so that the operator is applicable even in these cases. The German operator does not come with such a coercion back-up; when the operator determined by German +prog gets a state description as input, the construction aborts. When the semantic representation of a German VP is a state description, then the only way in which the construction of a semantic representation for the sentence can succeed is for ASP to assign the value Default, so that PROG is not activated. For simple sentences like (3.23.c) this will lead to a semantic representation that is a state description, but only to a state description of the same sort that was initially obtained for the VP, and not the kind of representation that reflects the state-to-event coercion that is part of constructing the interpretation of an English sentence like (3.23.b).

The assumptions to which the discussion of this subject have led about the role of German Asp and the semantics of the adverb *gerade* are summarised in the points (1) - (5) below. (We have included our assumptions about the role of English Asp so as to highlight both the samenesses and the differences.)

1. Both the ASP function of English and the ASP function of German have at least two values, to which we refer as '+prog' and 'Default'.
2. The operator determined by Default is the same in both languages. It is the identity operator on input representations.
3. The semantics of +prog in German differs from the semantics of +prog in English. Both determine the same partial operator PROG from event descriptions to (progressive) state descriptions. But they differ in that English +prog provides a coercion operator, whereas German does not.
4. The temporal adverb *gerade* is a temporal locating adverb that locates the relevant component of its input representation (the eventuality discourse referent that bears the subscript *att*) at the time that *gerade* denotes. (There is a non-trivial story to be told about how the denotations of occurrences of this adverb are determined in context, but this matter has no direct bearing on the issues that matter right now.)

5. *gerade* selects for state descriptions. This selection restriction is not complemented by the possibility of event-to-state coercion: adjunctions of *gerade* at adjunction sites whose semantic representations are event descriptions invariably crash.

This section has taken us about as far from our central theme as we will stray. The motivation for including it was two-fold. The discussion of *gerade* has brought to light certain subtle questions about the semantics of feature values. Two such values, such as English +prog and German +prog, can be very close in that they determine the same partial representation transforming operators and yet differ in the coercion back-ups that come with these operators. Precisely this kind of difference will become important when we turn to a closer comparison of the English and German present perfect in Section 4.

The second motive was to demonstrate how languages can differ in that what can be conveyed in one language through the exploitation of coercion must be expressed overtly in the other. The state-to-event coercions that are permitted by the English Progressive can be obtained in German only through the use of overt expressions like *mal wieder*, *gibt sich bescheiden*, *macht den Bescheidenen*. On the other hand, German *gerade* can trigger the kind of event-to-state coercions that English can enforce only through the explicit use of progressive forms.

3.6.4 *dabei sein, zu ... and damit beschäftigt sein, zu*

...

The adverb *gerade* provides German with one device to force upon event describing VPs the reinterpretations that English imposes through the use of the Progressive. But as we noted earlier it is not the only device that German has for this purpose. Others are the clause-embedding constructions *dabei sein* and *damit beschäftigt sein*. These take infinitival clauses with *zu* as complements. They select for event descriptions as inputs. And their semantic effect is to turn these event descriptions into the descriptions of states. Thus in (3.26) the effect of *war dabei* is to turn the event description provided by the complement clause *einen Brief zu schreiben* into the state description that is expressed in English by the phrase *was writing a letter*. In the construction of the semantic representation of (3.26) this will be the

semantic representation of the outer VP *war dabei, einen Brief zu schreiben*. Much the same applies to the phrase *damit beschäftigt sein, zu ...*¹⁹

- (3.26)a. Maria war dabei, einen Brief zu schreiben.
(‘Maria was in the process of writing a letter.’)
- b. Maria war damit beschäftigt, einen Brief zu schreiben.
(‘Maria was busy writing a letter.’)
- c. Maria war dabei, bescheiden zu sein.
(‘Maria was in the process of being modest.’)
- d. Maria war damit beschäftigt, bescheiden zu sein.
(‘Maria was busy being modest.’)

Sentences with *dabei sein, zu ...*, such as (3.26.a), resemble sentences with *gerade*, such as (3.21), not only in having closely similar meanings. Given the assumptions about the syntax-semantics interface to which we are now committed, the respective interpretations of sentences with *gerade* and sentences with *dabei sein, zu ..* also have in common that they depend crucially on the feature value at at Asp. However, since the selection restrictions of *dabei sein* are the opposite of those of *gerade*, these feature will usually have to be different as well. When the VP of the *zu*-complement of *dabei sein* is an event description as in (3.26.a), then the Asp projection should pass this description on as is; so the ASP value should be Default; when the embedded VP describes a state, as in (3.26.c), then neither ASP value will lead to a well-formed interpretation: the PROG operator cannot be applied because German +prog does not allow for state-to-event coercion; and Default passes the state description unchanged, but then the interpretation process

¹⁹ *damit beschäftigt sein, zu ...* and *dabei sein, zu ...* do not have quite the same meaning. *damit beschäftigt sein* is more restrictive. It selects for subjects that can be understood as agents and for *zu*-complements that are descriptions of actions. *dabei sein* is not subject to these restrictions. Thus the German sentence (3.25.a) is well-formed, just as the English sentence in (3.25.c), and at least for us the two are indistinguishable in meaning. In contrast, (3.25.b) is unacceptable – a pencil cannot be ‘busy doing something’ (except of course in worlds of the likes of Hans Christian Andersen).

- (3.25) a. Der Bleistift war dabei, vom Tisch zu rollen.
(English in (3.25.c))
- b. Der Bleistift war damit beschäftigt, vom Tisch zu rollen.
(The pencil was busy with rolling off the table.)
- c. The pencil was rolling of the table.

In the remainder of this section we will only talk about *dabei sein, zu ...*. But the issues that will be raised apply to *damit beschäftigt sein, zu ...* as well.

fails when a version of this state description is offered as semantic complement to *dabei sein*. (This, by the way, also shows that *dabei sein* lacks the power to trigger the state-to-event coërcions that are a distinctive property of the Progressive in English. In this respect it differs from the circumlocutions in (3.23.e-g).²⁰)

The point of this brief discussion of *dabei sein* was to show the differences in Aspect management to which our architectural assumptions commit us for in the interpretation of sentences with *dabei sein* like (3.26.a) on the one hand and sentences with *gerade* like (3.21) on the other: even if these sentences end up with equivalent interpretations, the ways in which their aspectual properties are computed are as different from each other as they are from the corresponding English sentences in the Progressive.

But there is also a more general moral that can be extracted from the discussion of this and earlier parts of Section 3. The aspectual properties of the semantic representations that get computed along the path from insertion of the semantics of the main verb of a clause to the semantic representation of the full clause can change at several points along that path. And that, moreover, is true in particular for that part of the path which extends from lexical insertion to AspP. The properties of the semantic representation of AspP, and thus of the input representation to perfect operators, depends not only on the aspectual properties of the verb itself, but also on the transformations to which semantic representations are subjected higher up. In what has been discussed here we have drawn attention only to some such aspect-affecting transformations: the determination of viewpoint aspect at Asp and the telicity-creating transformations that take place when an activity verb like *walk* is combined with a goal PP like *to the station*. But these cases of aspectual modification are just two from a larger spectrum.

Ideally this essay should have included a more probing investigation of this spectrum of aspect-modifying factors. But that would have detracted too much from our central topic – the perfects of English and German –, which will require us to address a range of other issues. The length of this monograph is bad enough as it is – a lame excuse, no doubt, from a substantive point of view, but, alas, a compelling one for practical reasons. We hope to address the role that aspect modification plays in semantic composition on

²⁰ Such a coercion seems marginally possible for *damit beschäftigt sein*, as in (3.26.d); but this sentence is still not very good, even if it seems somewhat more acceptable than (3.26.c).

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another occasion, in a setting that also pays attention to the ways in which the internal structure of verbs contributes to their aspectual properties and which also takes into account a somewhat wider range of languages.

3.7 What, really, is a feature?

Section 3.6 has been mostly about ‘features’; more precisely, it has been about features – about feature functions and feature values – in the sense we defined in Section 3.6.1. But what does all this have to do with the term ‘feature’ as it appears in the title of this essay, that has been used throughout Sections 1 and 2 and that figures crucially in the representation constructions of Section 2 in the form of the subscripts $_{tt}$ and $_{alt}$? Or better: What does that use of the term ‘feature’ have to do with the feature-related notions that have been the focus of discussion in the present section?

The definitions of Section 3.6.1 on which all else in Section 3.6 has been based are designed to fit the standards that have been set in the literature on Feature Logic and its applications within linguistics. (See e.g. (Rounds 1997), (Johnson 1988), (?)). But what if this is the established definition of the notion of a ‘feature’ in linguistics, then, to repeat the question one more time, what if anything does the term ‘feature’ of the title and the $_{tt,alt}$ regime we adopted in Section 2 have to do with this well-established formally precise notion?

In what follows we will focus primarily on $_{tt}$. But the issues we will raise apply to both $_{tt}$ and $_{alt}$ and in much the same way and for the most part they will be mentioned together.

We begin by looking at the role that $_{tt}$ plays in determining the effect of temporal location by T. In the light of what has been said in Section 3.6.1 we should think of T as determining a feature function TEN which has at least two values, viz. pres and past. Each of these two values determines an operator that transforms input representations into output representations. We have already seen what these operators do. For instance, the operator PAST that is determined by the feature value past transforms an input representation whose store contains the unique $_{tt}$ -bearing eventuality discourse referent ev^{21} into one in which ev is located in the past of n . (We recall: location by PAST involves the introduction of a new discourse referent t for the temporal location time which (in the simplified version of PAST we have considered so far) is itself located in the past of n via the condition ‘ $t < n$ ’.

²¹ (That is, the store contains the expression ‘ ev_{tt} ’). Uniqueness of a $_{tt}$ -bearing element in the store is guaranteed by the way in which the construction algorithm is set up. (This requirement is fulfilled in all the sample constructions presented in this book. Explicit formulations of construction algorithms for fragments of English, German and possibly other languages must be designed in such a way that it is fulfilled.)

Location of ev is in relation to t and takes a form that depends on the type of ev : When ev is an event discourse referent, then location takes the form of the condition ' $ev \subseteq t$ '; if ev is state discourse referent, then it takes the form ' $t \subseteq ev$ '.²²

We have included this brief refresher of the semantics of the feature values past and pres to make plain that, at least as far as the T projection level is concerned, $_{tlt}$ is neither a feature in the sense of 'feature function' nor a feature in the sense of 'feature value'. Rather, $_{tlt}$ serves to make the input representations to the operators determined by the values of TEN suitable for application of those operators. Formally we can describe $_{tlt}$ (and, likewise, $_{alt}$) as a device for enriching representations. There exists – here as in all other cases where annotations are used to enrich representations – an obvious many-one relation between representations with and representations without $_{tlt}$ and/or $_{alt}$ annotations: start from an annotated representation K , eliminate all annotations from it, thereby obtaining an annotation-free representation K' . Then there will in general be a number of ways of turning K' back into an annotated representation K'' . K'' could be the same as the original K , but it may also be different. In the case of $_{tlt}$ and/or $_{alt}$ annotation the difference between an annotated representation K and its annotation-free reduction K' has no consequences at the level of truth conditions.²³ The difference between K and K' manifests itself solely at the level of representation construction, viz. when a representation comes to serve as input to a TEN operator or to the semantics of a temporal adverb.

The roles that $_{tlt}$ and $_{alt}$ annotations play in representations which serve as inputs to such operations can be described in purely formal terms and the little refresher above reminded us of what these descriptions are like. But these roles can also be captured in less formal and more intuitive terms. For instance, by carrying the subscript $_{tlt}$ a discourse referent ev presents the eventuality that it represents as the one that is to be located by Tense – as if

²² We do not think there is any need to also repeat the definition of the operator PRES determined by the value pres. But it is worth noting one difference between PAST and PRES. PAST is a total operator, but PRES is a partial one, which selects for state descriptions. See e.g. (Reyle et al. 2007), Section 6.

²³ This of course is trivial, since K and K' have the same DRS and stores with the same elements, except that some of these may carry annotations in K whereas they don't in K' . Since truth conditional equivalence between K and K' means that any set of entities corresponding to the discourse referents in the store of K that satisfies the DRS of K also satisfies the DRS of K' and, conversely, every set of entities corresponding to the discourse referents in the store of K' that satisfies the DRS of K' also satisfies the DRS of K , their truth-conditional equivalence is self-evident.

it was carrying a placard saying ‘T, I am the one you should locate!’. It is in this sense – as interpretation-relevant markings of certain entity-representing constituents of our representations – that *tl* and *alt* qualify as ‘features’ – as distinguishing ‘features’ of certain elements represented in the formal structures that we use to encode and manipulate information.

We repeat: It is in this sense that *tl* and *alt* can lay claim to the term ‘feature’; and it is in this sense only. But we think that is good enough: this is a way in which the term ‘feature’ is often used informally. Any reader who has not felt discomfort at our referring to *tl* and *alt* as features during the earlier parts of this essay ought to agree.

Suppose then that we see *tl* and *alt* as ‘role features’ for the discourse referents that carry them. As we said, these roles come into their own when representations serve as inputs to TEN operations or locating adverbs. But of course it is not only in the execution of those operations that *tl* and *alt* play an active role. The very reason why we introduced them in the first place is the annotation *changes* that can take place before *tl* and *alt* serve their ultimate purpose of guiding temporal location. It is the *dynamics* of *tl* and *alt* annotation that carries the burden of the account of perfects we are developing.

As we have seen, there are two aspects to the dynamics of *tl* and *alt*. They can be shifted, and in some cases they can be ‘split’. Splitting – *tl* and *alt*, which thus far appeared on the same eventuality discourse referent, now end up on two different ones – is the unique prerogative of perfect operators. (Not all perfect operators involve splitting, by the way. We will argue in Section 5 that the German Zustandsperfekt does not.) The more common fate of *tl* and *alt* is for them to be shifted in tandem. In our set-up such joint shifting always occurs when an operator changes the aspect descriptions from event to state or from state to event. In such cases the features appearing on the referential argument of the input description always move to the output description. Among the operators that produce this effect are in particular the non-default operators triggered by feature values of ASP, such as the value +prog, which triggers the aspect modifying operator PROG. Application of PROG to an event description as input involves shift of both *tl* and *alt* from the event discourse referent that is the referential argument of the input representation to the state discourse referent that is the referential argument of the output representation. But it is equally true of the various aspectual coercion operation our suggestion in connection with PROG that when it gets a state description as input and its selection restriction to input that are event descriptions is thus not satisfied, then sometimes state-to-event

coercion is possible as a preparatory measure. In this case the coercion will involve a shift of *tl*t and *alt* from the referential argument of the input to the coercion (a state discourse referent) to the referential argument of the output representation (an event discourse referent), before the application of PROG that follows shifts *tl*t and *alt* from this event discourse referent to another state discourse referent.²⁴

The dynamics of *tl*t and *alt* annotation brings out an important aspect of the compositionality of meaning. The semantic representations of certain sentence constituents, viz. the projection of the verb, play the part of ‘potential sentence representations’. (It is in this sense that verbs are the lexical heads of clauses.) Such representations can be turned into propositional representations – for us: DRSs without unfilled argument positions and without stores – by temporal location of their annotated discourse referents, followed by transfer of the remaining discourse referents from the store into the universe of the DRS.²⁵ But they can also be transformed into other representations with a similar status (they too can be turned into proposition-representing DRSs) and in these output representations the roles marked by *tl*t and *alt* are often taken over by other discourse referents.

Some of these transformations are effected by the feature shifting operators of the syntax-semantics interface architecture proposed here. And it is because this is what our feature shifting operators do that it is legitimate to call them ‘operators’: they transform representations into others with the same status.

²⁴ We take it that the conception of annotation shifting is implicit in the treatment of aspect shifting operators in the work of Moens and Steedman ((Moens and Steedman 1988b), (Moens and Steedman 1988a)). Moens and Steedman describe such operators as transitions from one element of a complex eventuality structure (some kind of ‘nucleus’, in their terminology) to another. PROG is one of several operators they characterise along these lines. Moens and Steedman did not discuss the questions of tense-based and adverbial location that have led us to allow for annotation splitting as part of the semantics of the perfect. So attributing to them a ‘shift-without-split’ perspective is to some extent a matter of speculation. And in any case, the central insight behind their treatment of aspectual operators can, it seems to us, be perfectly well combined with the splitting principles central to the line we are pursuing.

²⁵ This is a considerable oversimplification. The operations that may be involved in turning representations of the highest TP node into DRSs may include resolution of pre-suppositions (with discourse anchoring of discourse referents in the store as a special case), discourse integration of the kind touched upon in Section 3.6.2 and more besides. But this does not compromise the general point that we want to make in this and the next paragraphs. On the contrary, the point is reinforced.

The idea that operators in this sense play a central role in semantic composition is of course anything but new. It is, one could say, just a new edition of the age-old conception of propositional operators which goes back to the early days of formal semantics and beyond - of operators that take propositions as arguments and return propositions as values.²⁶ But even if the feature shifting operators we are using here can be seen as recastings of the propositional operators of old, the recasting involves an important new twist. Our feature shifting operators operate at a *subsential* level. The representations they transform do not represent complete propositions as they stand, but must be subjected to further processing before they can do that.²⁷

Over the past decades semanticists have become increasingly aware of the complexity of semantic composition in human languages. Much of this has to do with our understanding of the role of recursion. On the one hand recursion is much more restricted than we once assumed - iteration of recursive operations is not only curtailed at the level of performance because of limits in human processing capacity; it is also restricted by the fact that many operators change their input representations into output representations with properties that would prevent the operator from applying again, in spite of the fact that input representation and output representation have the same status (in the sense that further processing steps of the same sort would turn them into propositional representations). The feature shifting operators of our proposal are examples of such operators at the sub-sential level, and as such they bear witness to the fundamental changes in our understanding of the ways in which semantic composition works.

²⁶ Much of the logic-driven semantics of the sixties and seventies was devoted explicitly and exclusively to the investigation of such operators - modal operators, tense operators, conditional operators, attitudinal operators etc. The literature is immense and we make no serious effort to provide references. Useful information can be found in (Benthem and ter Meulen 1997).

²⁷ As indicated in footnote 25, how much processing is still needed may vary. But, obviously the more, the more 'subsential' the levels at which the feature shifting operators do their work.

Chapter 4

The result states of perfects.

In Section 3.5 we drew attention to two salient distinctions between semantic representations of verbs and their projections: (i) that between event descriptions and state descriptions; (ii) that between event descriptions with and event descriptions without result state specifications (see (3.13)). Representations of each of the three kinds involved in these two oppositions can arise as inputs to perfect operators; and the kind of the input representation is decisive for what a perfect operator can and must do with it. This section is devoted to the question what happens in each of these three cases.

(4.1) lists the three types of input representations to perfect operators once more explicitly.

- (4.1) a. the store of the representation contains both an event as carrier of the *tt*-feature and a result state of that event.
- b. the store of the representation contains a *tt*-carrying event but no result state of it.
- c. the store of the representation contains a *tt*-carrying state (but no result state).

What a perfect operator does with each of these three kinds of input representations also depends on which operator it is. As has been clear since Section 2, the English Present Perfect and the German Perfekt differ in this regard. Part of this difference is that the two perfects do different things with the feature *alt*. But we will see momentarily that there are other differences as well. We discuss the effects of the two perfects on each of the three types of inputs one at the time – on inputs of type (4.1.i) in Section 4.1, on

those of type (4.1.ii) in Section 4.2 and on those of type (4.1.iii) in Section 4.3.

4.1 Perfects of result state specifying phrases.

It is a familiar observation that the English Present Perfect has a strong tendency to convey ‘current relevance’: The use of the perfect, as opposed to that of the simple past, suggests that certain causal effects of the event described by the VP still obtain at the time of utterance. What these effects are depends on the kind of event and thus on the verb that is used to describe it. This implication is especially notable when the verb is a target state verb. (4.2) and (4.3) illustrate the point for our paradigm target state verb *leave*.

(4.2) a. ?? Fred has left. But he came back/has come back in the meantime.

b. ✓ Fred left. But he came back/has come back in the meantime.

(4.3) a. A: Has John left?

?? B: Yes, he has. And he is back already.

b. A: Has John left?

✓ B: He did. But he has already come back.

Both in the first sentence of (4.2.a) and in the reply of B in (4.3.a) the perfect sounds awkward, and barely grammatical. Clearly preferred in these cases is a simple past, as in (4.2.b) and (4.3.b). The reason for this is not hard to find. The second sentence in (4.2) and the second sentence of B’s replies in (4.3) make explicit that the target state of the ‘leave’-event described in the first sentences of (4.2) and (4.3) no longer obtains at the utterance time: John has come back and thus the state of his being away from the place from which he left obtains no longer. Such examples can be multiplied at will, but we leave it at this and conclude that English Present Perfects of target state verbs require that the target state of the described event (modulo the description of it that is provided by the clause in question) holds at the time of utterance.

We conjecture that this is a general property of present perfect sentences in which the representation of AspP specifies a result state: An utterance of such a sentence is true only if a state of the specified kind holds at the utterance time. Given the formal assumptions we have already made, this means that the result state component *s* of the AspP representation is the

one to which the perf operator shifts $_{tt}$.

The facts about German are different. Consider the German counterparts in (4.4) and (4.5) to the English examples in (4.2) and (4.3).

- (4.4) a. ✓ Fritz hat das Haus verlassen. Aber er ist schon wieder zurück.
(Fritz has left the House. But he is back already.)
- b. ? Fritz verließ das Haus. Aber er ist schon wieder zurück.
(Fritz left the House. But he is back already.)
- (4.5) a. A: Hat Fritz das Haus verlassen?
(Has Fritz left the house?)
✓ B: Ja, hat er. Und er ist schon wieder zurück.
(Yes, he has. And he is back already.)
- b. Verließ Fritz das Haus?
(Did Fritz leave the house?)
?? B: Ja, das tat er. Und er ist schon wieder zurück.
(Yes, he did. And he is back already.)

In our judgement (4.4.a) and the reply of B in (4.5.a) are perfectly acceptable. (If anything, it is (4.4.b) and the reply in (4.5.b) that seem awkward, but that is due, we take it, to the fact that German has no good equivalent of English *do*-support) This suggests that the German present perfect operates differently on inputs with specified result states than the English present perfect. The German perfect is able to shift $_{tt}$ to a formal result state event even when the input makes a target state available as potential recipient for this feature. It is unclear from the examples in (4.4) and (4.5) whether this is the only option available to the German perfect, or whether it is one of two, with shift to the result state specified by the input representation as a second alternative. It is hard to find tests that decide between these two possibilities, and lack of evidence forces us to leave the issue unresolved.¹ We would not be surprised if with regard to the interpretation option of perfects there are subtle differences between German dialects that our treatment is not able to capture. But this is a matter that needs further investigation and

¹ Trying to decide between the two possibilities runs into the familiar methodological difficulty that according to one of them the sentences in question allow for one interpretation In1 (that in which $_{tt}$ is moved to a formal result state), whereas according to the other the sentences are ambiguous between In1 and another interpretation In2 (in which $_{tt}$ is moved to a target state), and where In2 entails In1. What could convince us that such sentences allow In2 as one of their possible readings, if this reading entails the one that is assumed to be possible for them in any case?

methods of inquiry that are out of our reach.

It might be thought that this problem can be circumvented by looking at the negations of such sentences. If a present perfect sentence like the first sentence of (4.4.a) is ambiguous between the interpretations In1 and In2, then one would expect its negation to be ambiguous between \neg In1 and \neg In2, and where now \neg In1 entails \neg In2. On the other hand, if the unnegated sentence is not ambiguous and only has reading In1, then its negation should be unambiguous as well and only have the reading \neg In1. So if the ambiguity hypothesis is correct, then the negated sentence should be true in a situation in which \neg In1 fails but \neg In2 does not. If the non-ambiguity hypothesis is true, then we would expect the negated sentence to be false in such a situation.

Let us apply this test. Consider the sentence (4.6.a) and suppose that at the utterance time n Fritz has left the house (so that \neg In1 fails) but has returned in the meantime (so that In2 fails, which should entail that \neg In2 is true). What is our judgement about the truth value of (4.6.a) in such a situation?

- (4.6) a. Fritz hat das Haus nicht verlassen.
(translation: see (4.6.b))
- b. Fritz hasn't left the house.

The answer is obvious and unequivocal: (4.6.a) is clearly not true in this situation. But does this dispose of the ambiguity hypothesis? It would be rash to draw such an inference. For exactly the same judgement applies to (4.6.b), and there can be no doubt that English present perfects do allow for interpretations in which *tt* shifts to a target state. (In fact we have argued that that is the only option for English.) So the fact that the sentences in (4.6) are judged false cannot show what one might have thought it should be able to show for German.

The fact that both (4.6.a) and (4.6.b) are judged false in the given scenario is an interesting fact in its own right, which cries out for an explanation independently of whether it helps us to decide on the right semantics for German present perfects of event descriptions with built-in target states. This is a topic to which we will return in Section 10. But let us give a hint of what we believe is a crucial ingredient in this explanation. Event descriptions that specify target states are *eo ipso* descriptions of events that can only take place in a situation in which the target state type is not yet instantiated. (For if it were, then the event could not bring about an instance of the target state type; but then it could not be an instance of the given event description.) In other words, the instances of such event descriptions come with a *pre-state presupposition* – a presupposition to the effect that at any time when an event of the given description is claimed or considered to take place a state obtains that does not satisfy the corresponding target state type. It is this pre-state presupposition that is preserved when a sentence asserting the occurrence of an event of the given description is negated. That is, the sentences in (4.6) presuppose that the target state of Fritz not being in the house holds during some time t – in other words it presupposes that Fritz is in the house – and denies that an event occurs which puts an end to the state. So presumably the pre-state persists during t : Fritz remains in the house until some time later than t . There is neither an event of his leaving the house nor the result state of his being not in the house that his leaving would have brought about.

4.2 Perfects of event specifying phrases without result state specifications.

This time we start with the German present perfect.

When the perfect does not get a result state from its input, then a result state has to be manufactured then and there. Since there is no linguistically determined result state in such cases, it might be expected that one possibility for what gets accommodated as recipient of *tt* is a formal result state. For German this expectation seems especially natural in the light of our finding in the last section that formal result states are available as *tt*-recipients even when the input representation has an explicitly presented target state on offer. As far as we can tell, this is indeed the general tendency for German present perfects whose inputs are event descriptions without result states. But for present perfects of English the matter is notoriously different.

Discussions of the English Present Perfect typically classify its uses and/or meanings into a number of distinct types. For instance, in (Comrie 1976), still a yardstick in the literature on aspect, we find the distinction between the *experiential perfect*, as in ‘Bill has been to Boston’, and the *result perfect*, as in ‘Bill has gone to America’. Others have spoken of a ‘recency use’ of the Perfect, drawing attention to the implication carried by certain English present perfect sentences that the events they describe happened not too long ago. What is arguably a special form of this, but which nevertheless seems to be subject to even more special constraints, is McCawley’s so-called ‘hot news’ use of the perfect (McCawley 1971). An example is the sentence ‘Nixon has died.’, as used in a news bulletin the day after Nixon’s death. Other detailed analyses of different uses of the English perfect can be found in (McCoard 1978), (Michaelis 1994), (Portner 2003) and (Mittwoch 2008); but an exhaustive list would be much longer. The most recent of these papers, (Mittwoch 2008), distinguishes between (i) the *perfect of result*, (ii) the *experiential perfect* and (iii) the *universal perfect*. This is a broad distinction, which covers perfects that we haven’t so far even mentioned. That is true most notably of the universal perfect. One type of universal perfect will be reviewed in Section 4.3. But universal perfects can take different forms, and all of these belong to an even wider category of ‘quantificational perfects’. In fact, if we read Mittwoch correctly, then her ‘experiential perfect’ is a kind of quantificational perfect as well, but one that involves existential rather than universal quantification. Quantificational perfects have certain distinctive properties that set them apart from the perfects discussed in this section, all

of which, we believe, could be seen as instances of her category of perfects of result. In this essay they will be the topic of a separate section that will come much later, viz, Section 10.²

One clear point of convergence that we discern within the literature on the English perfect is that English present perfects want more than purely formal result states. They want result states that stand not just in a temporal but in some kind of causal relation to the events described by their input representations. We will proceed on the assumption that this is right. For the perfect sentences that are the topic of this subsection, in which the input representations to the perfect operator do not specify a target state, this assumption raises the question where the ‘target-like’ result states come from that are needed to justify the use of such sentences.

As amply witnessed in the literature, there are different strategies that English speakers use to infer or reconstruct such states from the contents of the individual perfect sentences and the contexts in which they are used. We find it hard to synthesise all the cases that are discussed in that part of the literature that we have sighted, let alone to come with an overview that does justice to the literature as a whole. So we will make no attempt to present such an overview. We will limit ourselves to discussing a small number of cases, of which we hope that between them they give a fairly good over-all impression of the various types of target-like result states that English speakers construe as justifications of perfect sentences and of the causal relations that tie them to the events described in those sentences.

We start with two instances of what Comrie calls the ‘experiential perfect’. Comrie’s example we already mentioned is repeated below as (4.7.a). A second example is given in (4.7.b).

(4.7) a. Mary has been to Boston.

²((Rathert 2004)) – this book and (Musan 2002) are the most extensive discussions of the German perfect that we have taken into account – makes a two-way distinction, between existential and universal perfects. We see this simple binary division as misleading in two ways. On the one hand, it doesn’t make room for the distinction between existential perfects as a species of quantificational perfect and those perfects which correspond to Mittwoch’s ‘perfects of result’. (German perfects of this second kind, which we will refer to as ‘episodic perfects’, are covered in the current section.) On the other hand, quantificational perfects can (as we already noted above) take many more forms besides the universal and the existential ones. In this respect, quantificational perfects are like generalised quantifiers of natural languages in other domains.

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- b. Mary has met the Dalai Lama.

The event reported in (4.7.b) is of a type that doesn't come with a lexically determined target state: The world isn't necessarily a different one just because A has met B. But nevertheless, meeting someone can make a big difference to the one who actually met this person – as a personal memory, as something to tell about to friend or foe, or perhaps as something that will affect you in an even deeper sense. The effect may be a strong one when the one you meet is an icon like the Dalai Lama; the fact of having met him will be perceived by many as endowing you with a lasting aura of distinction. The property of having been to Boston is perhaps *prima facie* somewhat less spectacular, but it too can be seen as significantly distinguishing those who have it from those who do not.

This then is our suggestion for the semantics of this kind of experiential perfect: Sentences like those in (4.7) are acceptable because the events they describe can be seen as a memorable and remembered experience for the subject, or as conferring upon it a distinction that it did not possess before. To the interpreter the perfect form of such sentences is acceptable because he can compensate for the absence of a linguistically determined target state in the input representation to perf by construing an 'ad hoc target state' which consists in the sentence subject having, as a result of the input event, the distinctive property of having been part of an event like that.

A remarkable feature of this way of justifying the use of present perfects is its close connection with the grammatical subject of the sentence. One of the oldest and most notorious puzzles about the English Present Perfect is the one illustrated by the pair in (4.8)³.

- (4.8) a. * Einstein has visited Princeton.
b. ✓ Princeton has been visited by Einstein.

There are various aspects to the difference between (4.8.a) and (4.8.b), of which the special character of the English present perfect is only one. We will leave this puzzle for now, but will return to it in Section 4.2.2.

A second example of how event descriptions without explicit target states can nevertheless provide the basis for the construal of a target-like result

³The example goes back to ((Chomsky 1970))

state is the exchange between A and B in (4.10).⁴

- (4.10)a. A to B: A shower wouldn't be a bad idea.
- b. B to A: I have been working in the garden.
- c. B to A: I have worked in the garden.

In the context provided by A's implicit suggestion, both of B's replies seem fine. Intuitively it isn't hard to see why this is so. B's reply is meant to give an explanation of his current bodily condition, which he can guess must have been the reason why A said to him what she did say: B is the way he is right now because of the garden work in which he has been engaged.

It is worth noting that in the given context the progressive form in (4.10.b) and the non-progressive form (4.10.c) work equally well, although generally speaking they are not equivalent, as shown in (4.11).

- (4.11)a. A to B: A shower wouldn't be a bad idea.
- b. B to A: I have been working in the garden. In fact I am still doing so right now.
- c. B to A: I have worked in the garden. (?) In fact I am still doing so right now.

Also interesting in this connection is the comparison between B's replies in (4.10) and their respective counterparts in the simple past, as in (4.12):

- (4.12)a. A to B: A shower wouldn't be a bad idea.
- b. B to A: I was working in the garden.
- c. B to A: I worked in the garden.

Between the two replies in (4.12) we can observe a noticeable difference. (4.12.b) is a felicitous response, (4.12.c) is not. The oddity of (4.12.c) can, we believe, be accounted for as follows. The simple past of this sentences conveys that the event described by the VP is not in any relevant way connected

⁴ (4.10) and its variations below are inspired by a similar German example discussed in (Klein 2000):

- (4.9) Ich habe im Garten gearbeitet und muss mich duschen.
I have in the garden worked and must me shower.

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with the state of affairs at the utterance time that A has just addressed. (The opposition with the present perfect version in (4.10.c) probably contributes to this effect: Had B wanted to highlight the relationship between event and current situation, then he would have used the present perfect. The choice of the simple past is therefore naturally understood as implying the opposite.⁵) Since the point of B's reply is precisely to establish a causal connection between his past activity and his current state, the choice of the simple past comes across as the wrong one.

However, *if* this is the right explanation of the oddity of (4.12.c), then why is the past progressive sentence (4.12.b) not infelicitous as a reaction to A's remark? The explanation here is, we conjecture, that the past progressive does not come with the same implication of termination that is carried by its non-progressive counterpart in (4.12.c). (4.12.b) is imperfective; it presents the activity of working in the garden from an internal perspective which is neutral with regard to how long it would be going on or how it might come to an end. Hence there is no comparable implication in this case that the mentioned activity is disconnected from the situation at speech time.

More would have to be said to make this account of the difference between (4.12.b) and (4.12.c) conclusive. But for our present purposes the details do not really matter. What does matter is the contrast between the impropriety of (4.12.c) and the propriety of (4.10.c): It is because the present perfect *wants* a causal connection between described event and the situation at utterance time, but the simple past does not, that the former fits the context set by A's remark, which focusses attention on the present, while the latter doesn't. The need to interpret (4.10.c) as involving a causal relation between the described activity and the current situation goes hand in glove with the pressure to understand (4.10.c) as giving a causal explanation for the current state at which A has hinted and the effect is one of rhetorical coherence. The tense form of (4.12.c) carries the opposite implication, which conflicts with the role that the sentence is meant to play in this context, and this results in an impression of incoherence.

Our next example of result state accommodation is the exchange in (4.13). The setting: A is sitting behind her desk in her office. B has just opened the door and is standing in the door opening, poised to enter the room.

(4.13)a. A: You know you are not supposed to walk in like that.

⁵ We conjecture that the often observed 'remoteness effect' of the simple past in English and other languages is also due to this contrast.

- b. B: I am sorry. But I knocked.
- c. B: I am sorry. But I did knock.
- d. B: ? I am sorry. But I have knocked.

Here we can observe an acceptability difference pointing in the opposite direction: While the simple past sentences in (4.13.b) and (4.13.c) are perfectly felicitous in the given context, (4.13.d) seems somewhat peculiar. (4.13.b) and (4.13.c) come across as simple attempts to make clear to A that B knocked – something that, his utterance seems to imply, B thinks A may not have noticed. But (4.13.d) is subtly different in this respect. It seems to be saying something to the effect that since B has knocked, a situation has been established in which he is entitled to come in. We take it that this difference between (4.13.b,c) on the one hand and (4.13.d) on the other arises because the present perfect of (4.13.d) carries the implication of a causally grounded result state and that this state is absent from (4.13.b) and (4.13.c): By knocking, B has created a state of affairs that licences his entering A's room without need to wait for further confirmation.⁶

4.3 Hot News

A quite different kind of causal relation between described event and current result state is involved in the so-called 'hot news' perfect, exemplified by the news bulletin item (4.14), published or broadcast shortly after the actual event (e.g. the day after Nixon's passing away).

(4.14) Nixon has died.

The rationale behind this use of the perfect is quite different from the cases considered so far in this section. The intuitive reason why such perfects are acceptable is, we take it, this. In our culture news tends to get updated

⁶ (Michaelis 1994) also discusses the sentence 'I have knocked.'. but in a different setting. In her scenario the speaker B and her interlocutor C are both standing in the hallway, in front of the door to A's room. In this setting B's saying 'I have knocked.' to C (at a voice level that won't be audible inside the room) can serve more than one purpose. It can be meant to convey to C that it is fine to enter; or perhaps that one should not knock again, but leave the next move to A, or as a way of saying that there is apparently no one inside, since there has been no reaction to B's knocking. Any of these grounds for B to say what he said makes sense on the assumption that the knocking of which he speaks in the present perfect has created a state of affairs in which a certain reaction may be expected and in which the absence of such a reaction may suggest further conclusions.

at roughly regular intervals. This is so in particular for official news media, such as newspapers, press agencies, radio and TV, but the notion is applicable more widely. The practice of updating with worthwhile new facts provides the setting for this use of the Present Perfect. A present perfect sentence whose VP describes a certain event *e* is acceptable when *e* falls within the last interval between two successive update occasions upd_1 and upd_2 . (i.e. when upd_1 is past and upd_2 coincides with the utterance time). When that is so, then the state of *e* being ‘news’ – of being an item of information that still needs updating – still holds at the utterance time. But after upd_2 this result state of *e* no longer holds, so that utterances of the sentence after this point would be felicitous no longer.

Of course, this description is overstating the case. In general our conception of when a certain communication still counts as ‘hot news’, and when it ceases to be that is not sharply defined, and with that fuzziness comes a fuzziness in the acceptability conditions of such sentences (unless they can be justified by the current validity of some other target-like result state).

The clear cases of hot news perfects’ are a subset of a broader category of perfects that are justified because the events they describe are ‘recent enough’. We do not go into the question here what other forms recency can take. But it should be clear that there is a close connection between recency and the requirement for target-like result states that obtain at utterance time: such states typically can come to an end, by some intervening event that terminates them or because they fizzle out of their own accord. In fact, we doubt that mere recency can ever be a sufficient justification for an English present perfect by itself – it should always be possible to construe the recency of the described event *e* as warranting the current validity of a causally related result state.

The acceptability of hot news and other recency-based perfects consists in their being a certain temporal interval *XN* reaching from some time before the utterance time *n* up to *n* itself, such that the described event *e* lies within *XN*. This is one step in the direction of what is perhaps the most widely accepted approach towards accounting for the English perfect, known as the ‘eXtended Now’ approach, and also as the ‘Perfect Time Span’ approach.⁷ This approach assumes that the interpretation of a present perfect always

⁷ The two notions do not fully coincide, or at least not as they are used by some authors. But we will not distinguish between them. We will be mostly use the term ‘Perfect Time Span’.

involves the choice of an XN interval within which the eventuality complex described by the sentence must be included; moreover, many such proposals extend this analysis of the English Present Perfect also to other perfects of English and perfects of other languages: the interpretation of any perfect involves a Perfect Time Span interval within which the described event must be temporally included. For non-present perfects, however, the upper bound of the PTS will not be the utterance time, but some other ‘temporal perspective time’. (For details about perspective times see ((Kamp and Reyle 1993)), ((?)) or Section 6 below. For a comparison between the PTS approach and the proposals of this paper see Sections 8 and 10.)

There are two things we have been trying to accomplish in this section: (i) to give an impression of the different forms that target-like result states may take and of the strategies that interpreters use to infer or accommodate them; (ii) to provide further evidence for the claim that the result states of present perfects in English must be target-like, in the sense of being identifiable independently from the described event and standing to that event in a relation of effect to cause. For non-quantificational English present perfects a pure formal result state is, it seems, never enough.

4.4 Einstein against Princeton

Before we conclude Section 4.2 we return to a matter that we postponed for discussion at this point. viz. the notorious infelicity of (4.8.a), which we repeat here, jointly with its felicitous counterpart, in (4.15).

- (4.15)a. * Einstein has visited Princeton.
 b. √ Princeton has been visited by Einstein.

That (4.15) is an acceptable is just what one would expect: There is a past event of Einstein visiting Princeton and in virtue of that event Princeton still is in the state of having been visited by Einstein, a state which continues to convey distinction upon it.⁸ What is not expected is the unacceptability of (4.15.a).

⁸ The example is a little odd insofar as Einstein spent the entire last part of his life in Princeton. But it just is the example that is cited and discussed by pretty much everybody who has addressed the phenomenon it is meant to illustrate. We conform to the practice.

There are two factors that conspire to produce this effect. The first is a convention according to which certain properties can no longer be attributed as currently possessed properties to people after they are dead (and, more generally to entities of certain ontological categories after they have ceased to exist), even if they are as much alive in public memory as Einstein is for us today. (Note that it is because we are trying to interpret (4.15.a) as involving a property that Einstein *currently* has that the interpretation gets into trouble. The sentence ‘Einstein visited Princeton.’ is fine.⁹) But there is also a second factor: Apparently it is the *subject* in (4.8.a) and (4.8.b) whose current property is at stake. In (4.8.b) the subject is Princeton, a town that exists today and to which we can therefore ascribe properties based on things that happened to it at earlier times (such as being visited by Einstein). But that is apparently no help in saving (4.8.a), for there *Princeton* doesn’t occupy the right grammatical position.

But is it really to the grammatical subject of a present perfect sentence that the interpreter must attribute a current property which can be seen as a causal consequence of the described event? Or is it attribution to a constituent with some other kind of linguistic status that is at issue, a status that is often but not invariably realised by the grammatical subject? What seems to speak in favour of this second possibility is that sentences like (4.15.a) improve when they are used in contexts which imply that the subject is not the topic. Suppose for instance that we are talking about the many distinctions that Princeton has as a centre of academic excellence, and that someone utters (4.15.a), perhaps with a focal stress on *Einstein* to indicate that this is the focus, while *Princeton* functions as a (continued) topic. For some speakers (4.15.a) is more acceptable when it is used in such a setting and with this kind of prosody. The explanation is presumably that for sentences like those in (4.15) it is the topic that should be interpretable as the current bearer of a property brought about by the described event, and that in the special

⁹ There is a range of present tense predications that are possible for historical figures. For instance, it is perfectly natural to say that ‘Einstein is the most famous physicist of the 20-th century’ or that he ‘is the father of the Theory of Relativity’, or that he ‘is better known than any other scientist’ or that he ‘is the author of the paper “On a Heuristic Viewpoint Concerning the Production and Transformation of Light”’. But present perfect predications seem to be unacceptable quite generally of entities that do no longer exist at predication time. Even the present perfect equivalent of the last predication, viz. ‘Einstein has written “On a Heuristic Viewpoint Concerning the Production and Transformation of Light”’, is not felicitous, whereas, once again, the corresponding simple past sentence is unexceptionable. This seems to indicate that what the interpreter of such sentences is trying to attribute to the subject is something like awareness or memory of the described event, something of which people are incapable once they are dead.

setting we are considering discourse context and intonation determine Princeton as the topic (in spite of the fact that in (4.15.a) it figures as direct object).

However, even in this special setting (4.15.a) does not seem optimal, and there are speakers who still prefer an alternative like ‘EINSTEIN was in Princeton.’. But hard facts bearing on this question are not easy to come by. Judgements are neither stable between speakers nor even for individual speakers across successive consultations. Apparently speakers differ in that some prefer to construe the sentence subject as its main predication bearer, whereas others prefer what they perceive as the topic, while for a third category the choice between these two options isn’t firmly anchored in the grammar they have internalised. And perhaps speakers’ intuitions also vary with regard to the predicates that can be applied to bearers at times at which they do no longer exist.

These various aspects of the linguistic expression of predications fall outside the scope of this paper. The problem(s) illustrated by (4.15) are relevant to our topic only insofar as they interact with the Present Perfect’s need for a target-like result state that holds at utterance time. The very fact that (4.15.a) is infelicitous is yet another indication that the result states which English present perfects want must be more than merely formal result states.

As we said at the outset of this brief exploration of conditions under which the English Present Perfect can be used with event descriptions, this has been anything like an exhaustive survey. In fact, an exhaustive survey is probably not even possible; it may well be that the range of possible strategies which could be used to justify instances of the Present Perfect is open-ended: Speakers can come up with new uses, which do not quite fit any established justification pattern and thus achieve novel effects by inducing their audiences to catch on to the new strategy and to a new kind of result state and its causal connection to the mentioned event; if that is the case, then it would be foolhardy to try and predict the full range of potential strategies in advance, something we would have to do if we wanted to give the complete list once and for all.

Nevertheless, there exist a number of established strategies for construing target states from the available information in content and context, among them the strategies we have made an effort to describe in this section.

How English speakers acquire this repertoire of Present Perfect uses is an interesting and difficult question. But we are inclined to agree with (Michaelis 1994) that all or most of this repertoire is what an English speaker

has to learn as part of mastering the semantics and pragmatics of the Present Perfect. The Present Perfect *could* have been different from what it is in current standard English; for instance, for all we know it could have been like the present perfect in German (as we have defined it), or perhaps somewhere halfway between that and the way the English Present Perfect is. The methodological issues that are involved in these considerations are quite general and, we believe, still not very well understood. But this much seems to be true: the different strategies for the construal of target-like result states all fit an identifiable general pattern; they are all ways of doing what the term ‘finding a target-like result state’ implies, viz. finding a causal relation of some kind between the described event and some condition that obtains at the utterance time. But what this general characterisation does not tell us is which particular strategies that fit it are actually available to English speakers as ways of justifying present perfects. Exactly what the range of those strategies is may well, as Michaelis suggests, be wholly or largely a matter of linguistic convention, which has to be somehow learned as part of the meaning of the Present Perfect. That any strategy belonging to this repertoire must fit the general characterisation is presumably an important aid in acquisition. But exactly how it can be that has to do with aspects of human cognition of which we are ignorant.

In German the Einstein-Princeton problem doesn’t arise. (4.16.a) is just as good as (4.16.b). (In fact it seems better; (4.16.b) is rather awkward, though for reasons that are orthogonal to the issues we are discussing.)

- (4.16)a. ✓ Einstein hat Princeton besucht.
 b. ? Princeton ist von Einstein besucht worden.

Given the assumptions we have made about the differences between the English and German present perfect there is a ready explanation for this. The interpretation of a German sentence in the present perfect involves shifting *tt* to a formal result state. Such a state does not require an independent characterisation of which it should be possible to verify that it holds at the utterance time, let alone characterisation that attributes some property to an individual that is explicitly mentioned in the sentence itself. In particular, the semantics of (4.16.a) does not involve the truth at utterance time of a predication of the form ‘P(Einstein)’ for some suitably chosen predicate P. Restrictions on the applicability of predicates to people after they are dead do therefore not play any part in the interpretation of German present perfect sentences, even if we make the plausible assumption that these restrictions

are the same whether we consider German or English.

4.5 Perfects of state descriptions

More than once so far we have been speaking of the inputs to perf operators as descriptions of events. That may have seemed a case of sloppy phrasing, for we have given no reasons why the input could not have been a state description. As a matter of fact, quite often the input to a perfect operator is a state description. Nevertheless, our speaking of the inputs to perf operators as (invariably) event descriptions was not an oversight. For we take it that the representations perf operators want *are* event descriptions; perfect operators come with a selection restriction to the effect that their inputs should be descriptions of events. But this does not mean that when the input representation is a state description, the interpretation process will crash. Rather, this conflict between selection constraint and input representation can always be resolved; but it will provoke some form of ‘coercion’, which converts the input description into an event description. The coercion result can then serve as legitimate input to the operator and be transformed by it in the same way as if it had been the input to begin with.

One form of coercion of state descriptions to permissible inputs of perf operators is coercion via *closure*. *closure* of a state s instantiating a state description $\lambda s.S(s)$ is the operation which transforms $\lambda s.S(s)$ into the description of an event. It is necessary to distinguish here between (i) a state s' that is maximal relative to a given state description $\lambda s.S(s)$ and (ii) the event e corresponding to this maximal state, which we will refer to as its ‘closure’. A *maximal satisfier* of the state description S which includes s is a state s' that satisfies the conditions in (4.17).

- (4.17)(i) $S(s')$
 (ii) $(\forall s'')(S(s'') \ \& \ s' \subseteq s'' \rightarrow s'' = s')$
 (iii) $s \subseteq s'$

However, in the ontology adopted in this paper we distinguish states that are maximal relative to a given state description S from the closure events corresponding to those states – events that could be described as ‘bouts of S ’. We distinguish such events from the corresponding maximal states by building their maximality into the event types they instantiate. Thus to the state s' characterised in (4.17) corresponds a unique event e that temporally includes s and instantiates the event description in (4.18).

$$(4.18) \lambda e'. (\exists s')(S(s') \ \& \ s \subseteq s' \ \& \ (\neg \exists s'')(S(s'') \ \& \ s' \subset s'')) \ \& \ \text{dur}(s') = \text{dur}(e')$$

Is the distinction between s' and e' a distinction without a difference? In one sense it is: by just looking at the world we can detect no difference between the maximal state s' and the event e' that is coextensive with it and characterised by the same condition that must obtain throughout the duration they share. But there is another sense in which the distinction *is* meaningful and real; and it is one to which we have already committed ourselves by the way we have chosen to express the difference between perfective and imperfective aspect. As we saw in Section 3, the same eventuality – say that of John doing the dishes – can be described from a perfective (or external) and from an imperfective (or internal) point of view; in our formalism this difference amounts to describing it as an event or as a state. The transition from the maximal satisfier s' including s to the event e' is just one instance of the switch from an imperfective to a perfective viewpoint, targeted on the same real world eventuality.

The definitions in (4.17) and (4.18) put us in a position to define what we mean by *state-to-event coercion via closure*. Suppose that S is a state description; then the *state-to-event coercion via closure* of the state description S is its replacement by an event description of the form (4.18)¹⁰

Both the English and the German Perfect accept state-to event coercion via closure. Thus the sentences in (4.18) both have an interpretation according to which Mary was ill for some time preceding the utterance time n but that illness came to an end at some time before n .

(4.19)a. Mary has been ill.

¹⁰ The semantic representations we are using in this paper consist in general of a store and a following representation, which is either a simple DRS K or a DRS K preceded by a set consisting of one or more presuppositions (which again take the form of a DRS, with or without its presuppositions). The stores of the input representations to perf operators always contain an eventuality argument that plays the part of referential argument of the representation. In the definitions just given the referential argument is a state discourse referent s and the state description is given by the DRS K . The result of state-to-event coercion via closure is then a representation in which s is replaced in the store by a new event discourse referent e , K is transformed into a DRS K' in the way that it is transformed into the scope of the quantifier ' $(\exists s')$ ' in (4.18) and s is then transferred from the store into the universe of K' . We could have described state-to-event coercion via closure directly in these terms, but feel that the presentation of this operation that we have given in the text may be more perspicuous. Moreover, our presentation aims to make clear that the operation does not depend on the particular representation formalism we are using.

- b. Mary ist krank gewesen.

In the next section we will give an explicit presentation of the representation construction for such sentences. But – running ahead slightly – we may note already at this point that interpretation of the sentences in (4.19) via closure of the state description in (4.20) imposes the requirement that the maximal satisfier of the input description that is co-temporal with the closure event e ended before n . For only in this way will it be possible for a result state of e to hold at n .

$$(4.20) \left\langle s \mid \boxed{\text{ill}'(\underline{x})} \right\rangle$$

The difference between the English and German present perfect that has figured prominently in the last two sections – the English present perfect wants a target-like result state, the German present perfect seems happy with a purely formal result state – appears to be relevant for perfects of state descriptions as well. Thus (4.19.a) seems felicitous only if some kind of current relevance Mary’s past illness can still be detected (which suggests among other things that the illness should not have been too long ago, and also that Mary hasn’t suffered from the same or some comparable illness since the one in question). The German sentence (4.19.b) does not seem to carry such an implication, or at any rate not to a comparable extent.

We conclude this description of state-to-event coercion via closure with an observation that applies to both English and German. In order that such coercions lead to coherent interpretations of sentences like those in (4.19), there must be a maximal state s which satisfies the input representation to the perf operator and ends before n . Thus interpretations of present perfects of state descriptions via closure entail that there was a closure event which fully precedes n (in the sense of ending before n).¹¹

For the German perfect state-to-event coercion via closure is the only permissible state-to-event coercion. The same is true for the perfects of many other European languages, the Romance languages among them. But the

¹¹ There is the additional question whether the closure event that a present perfect describes on such an interpretation must be the last one before n . There appears to be a difference in this regard between English and German that we touched upon earlier: The English present perfect in (4.19.a) seems to carry a strong implication to this effect, the German present perfect in (4.19.b) does not, or in any case much less so.

English perfect is different. It allows not only for coercion via closure, but also for *inchoative* state-to-event coercion. *inchoative state-to-event coercion* transforms the description S of a state s into the description of the event which is the onset of the maximal state including s that answers description S.

As part of our formal statement of inchoative state-to-event coercion we assume a partial function $\text{ONS}(s,S)$ which maps ‘downward maximal’ instantiations s of state descriptions S onto events that are the onsets of such states. A *downward maximal* instantiation of a state description S is a state s such that $S(s)$ but for which there is no instance s’ of S which overlaps s but extends further into the past than s does. Formally:

(4.21) s is a *downward maximal instantiation* of S iff

- (i) $S(s)$; (ii) there is no s’ such that: $S(s')$, $s'O$ and for some t, tO and $t < s$.

We assume ONS to have the following properties.

(4.22)(i) $\text{ONS}(s,S)$ is defined if and only if s is a maximal satisfier of S.

- (ii) When $\text{ONS}(s,S)$ is defined, $\text{ONS}(s,S)$ is an event e with the properties:

(a) $e \supset \subset s$;

(b) there is a state s’ such that $s': \neg S$ and $s' \supset \subset e$.

The indicative state-to-event coercion of a state-describing representation $\langle s, \dots | K \rangle$ leads to an event description of which $\text{ONS}(s',S)$ is the referential argument (where s’ is a downward maximal satisfier of K that overlaps s). But what kind of event description is this? Is it one with or one without a specified target state? Here it appears that the general need of the English present perfect for result states that are more than purely formal has become conventionalised; and it is a conventionalisation that seems very natural in view of all that we have said. The onset of a state s’ is *by definition* an event which initiates a state s of type K. That makes states of this type the natural

target states for onset events. We take this way of identifying the target states of onset events to be part of the process of inchoative state-to-event coercion: The event descriptions which inchoative coercions yield as output representations specify as target states of their referential arguments states that answer to the state description provided by the input representation. Formally the result of applying inchoative coercion to an input representation of the form $\langle s, .. \mid K \rangle$ is a representation of the form given in (4.23).

$$(4.23) \langle e, s'', .. \mid K \oplus \begin{array}{c} s \quad s'' \\ s \subseteq s' \\ \text{'s' is a downward maximal satisfier of K'} \\ e = \text{ONS}(s', K) \\ \text{res}(s'', e) \\ K(s'') \end{array} \rangle$$

(Here ' $K(s'')$ ' is the result of replacing s by s'' in K and ' s' is a maximal satisfier of K ' can be expanded to its definition, as given in (4.17).)

Note well that it is because $\text{ONS}(s, S)$ comes with a target state which satisfies S that inchoative interpretations of sentences like (4.19.a) get the truth conditions that the relevant readings are assumed to have: a state satisfying the input representation holds from some time preceding n uninterruptedly up to and including n .

Just as it is a consequence of interpreting the sentences in (4.19) via closure that the input representation have an instance that ends before n , interpretation of (4.19.a) via inchoative coercion entails that the input representation have a satisfier that starts somewhere before n and ends after n . When an English present perfect of a stative AspP contains a temporal adverb, this adverb will typically impose additional constraints on the satisfiers of the input representation. This is so in particular for adverbials beginning with *since*, which have played a crucial role in many discussions of the English Present Perfect. (see ((Iatridou et al. 2001)), ((von Stechow 1999)), ((von Stechow 2002)), ((Rothstein 2008))) Examples are the sentences in (4.24).

- (4.24)a. Since 2003 we have been living in Edinburgh. (And we will go on doing so for the foreseeable future.)
- b. Mary has been ill (ever) since she moved to Scotland. (And it is unlikely she will get better soon.)

We will look at such sentences in detail in Section 8. For now we only note that such sentences show a clear preference for interpretations that our account makes available via inchoative state-to-event coercion. But they also raise further questions about the satisfiers of the state descriptions that serve as inputs to the perf operator. To mention just one of these: Does the truth of, for instance, (4.24), when interpreted via inchoative coercion, just require that there be a maximal satisfier which overlaps *n* and starts at or before Mary moved to Scotland; or does it come with the stronger requirement that the state does in fact start *at* that very time? This and other questions will be addressed in Chapter 8.

The transliterations of the sentences in (4.24) into German, shown in (4.25) for (4.24.a), do not seem to be capable of interpretations obtained via inchoative coercion. The standard translation for a sentence like (4.24.a) is the one in (4.25.b), in which the English Present Perfect has been replaced by the German Simple Present. Accounting for this difference is our main motivation for both Chapters 7 and 8.

- (4.25)a. Seit 2003 haben wir in Edinburgh gewohnt. (Und wir werden hier auch in der näheren Zukunft wohnen.)
- b. Seit 2003 wohnen wir in Edinburgh. (Und wir werden hier auch in der näheren Zukunft wohnen.)

Summary: It is in what they can do with stative input representations that the difference between the English and the German present perfect is most dramatic. English allows for two kinds of state-to-event coercion – coercion via closure and inchoative coercion, whereas German (like many other languages) only permits the first of these. However, even when an English perfect is interpreted via inchoative coercion, there is, we believe, a difference with the interpretation of German perfects with stative input representations. English perfects with stative inputs that are interpreted via closure want, just as do all other instances of the English present perfect, some kind of target-like result state; while their German counterparts need – in these as in other cases – only formal result states.

4.6 Coercion operators triggered by +perf

In the last two sections coercion has played a part at what may be thought of as two distinct levels. A clear-cut case (on the account we are presenting) are the coercions that serve as back-ups when the inputs to perfects

are state descriptions. And here we also see a clear difference between the German Perfekt, which only permits coercion via closure, and English, which has inchoative coercion as an alternative. Here we have another instance of the difference that we were led to assume in connection with English and German +prog, viz. that the feature triggers the same partial operator in the two languages, but provide distinct sets of back-up coercions.

The state-to-event coercions mentioned in the *lsat* section come into action when the input representation to a perf operator are state descriptions. But in addition perf operators need back-ups when their inputs are event descriptions without result state specifications - operations that add a result state specification to the input representation to which the perf operator can then transfer the feature *ult*.¹² As regards the options for such ‘result state coercions’, English and German also differ, we have seen. German, it seems, requires only one such operator, which adds a formal result state to the event representations which it accepts as inputs. In contrast, English has a range of different ‘operators’ for expanding event descriptions with target state-like result state specifications. None of these are universally applicable – i.e. applicable to all event descriptions without target state specifications. Rather, they act for the most part in complementary distribution, although there are also occasions when two or more of them are jointly applicable. (In some such cases the application results may be compatible, in the sense that the same state can satisfy all the result state specifications that the different operators add to the input representation. In other cases there may be genuine competition in that the result state specifications are not satisfiable by the same states.) A further complication, for which the framework laid out in Section 3.6 provides no proper place, is that the execution of some of these back-up operations heavily relies on context, so that the question whether they can be applied doesn’t just depend on the form of the input, but also on the context in which the need for result state coercion arises. It is largely for this reason that there are cases where none of the back-up operators can be applied. These are cases where an English present perfect will sound strange because no appropriate causal connection with the speech time presents itself.

As we noted at the end of Section 4.2, there is, as far as we can see, no definitive line-up for the result state-supplying back-up operations for the English Present Perfect that has been generally agreed on, and we surmised

¹² Given what we have said in the last section these event descriptions without result state specification include the outputs of coercion via closure, but not the outputs of inchoative coercion.

that it might be quixotic to look for an exhaustive line-up. If this is so – if the range of state-creating back-ups for the Present Perfect consists of a number of well-established operators together with some open-ended strategy for creating new kinds of result states and causal relations that tie them to the events described by the input representations – then that adds a further dimension to the potential complexity of operator semantics in general: some partial operators come with a fixed, conventionally determined set of back-up operators. But the range of possible back-ups can also be given in a manner that provides a certain scope for on-the-spot creativity on the part of both speaker and hearer.

In fact, that there should be such open-endedness to ranges of possible coercion options is no ground for surprise. Perhaps the oldest and most widely discussed cases of coercion are those involved in metonymy – that is, in the adaptation of predicates to arguments that violate their selection restrictions. Here too, coercion often follows well-defined paths. But notoriously there is also room for ‘creative’ metonymies, in which a novel extension of the predicate draws the interpreter’s attention to unexpected and revealing connections. With the Present Perfect this surprise element – that by using a perfect the speaker spotlights a connection that would have been lost had she used a simple past – would seem to be much less pronounced. But here too, we suspect, the road to novel coercions isn’t foreclosed.

4.7 Back to representation constructions

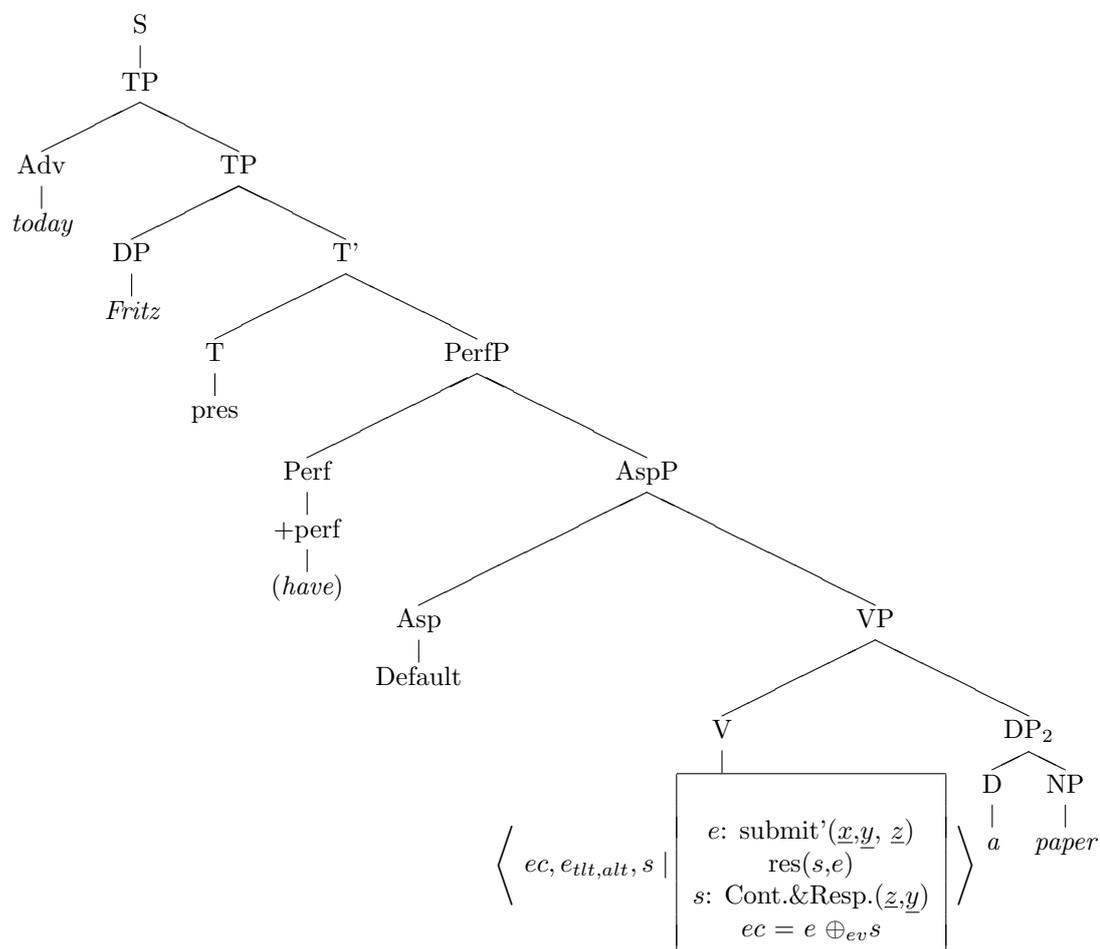
Since our first sample constructions in Section 2, a good deal has been said about the details of English and German perfects. So it is urgent that we reconsider our earlier principles of representation construction in the light of what we have learned. We first review some of our earlier constructions and then add some new ones.

We begin with another look at the representation construction for sentence (2.7), our very first illustration of how representations are built.

(2.7) Today Fritz has submitted a paper.

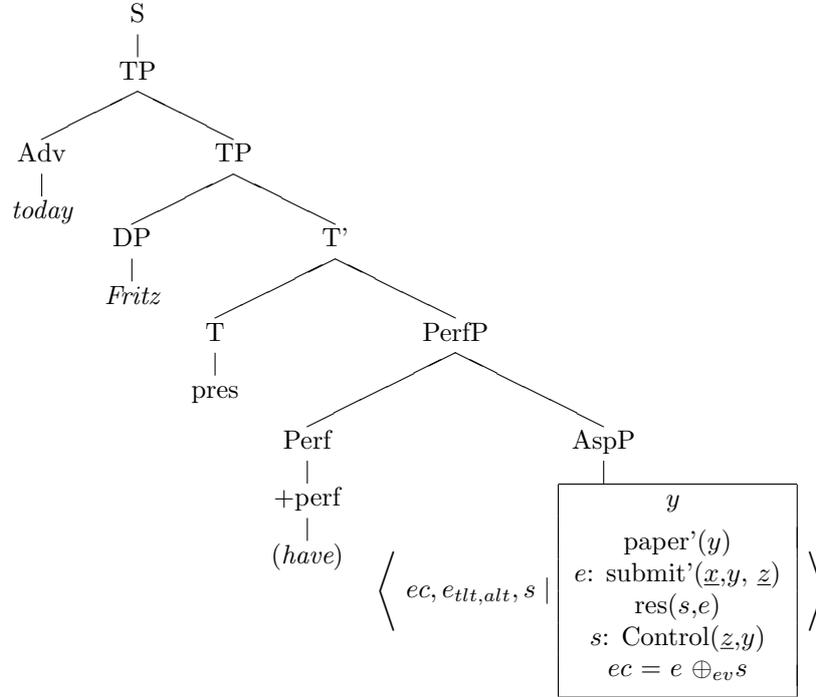
Insertion of the semantic representation of the new lexical entry for *submit*, given in (3.8), for the occurrence of the verb in the syntactic structure (2.8) for this sentence leads to the structure in (4.26).

(4.26)



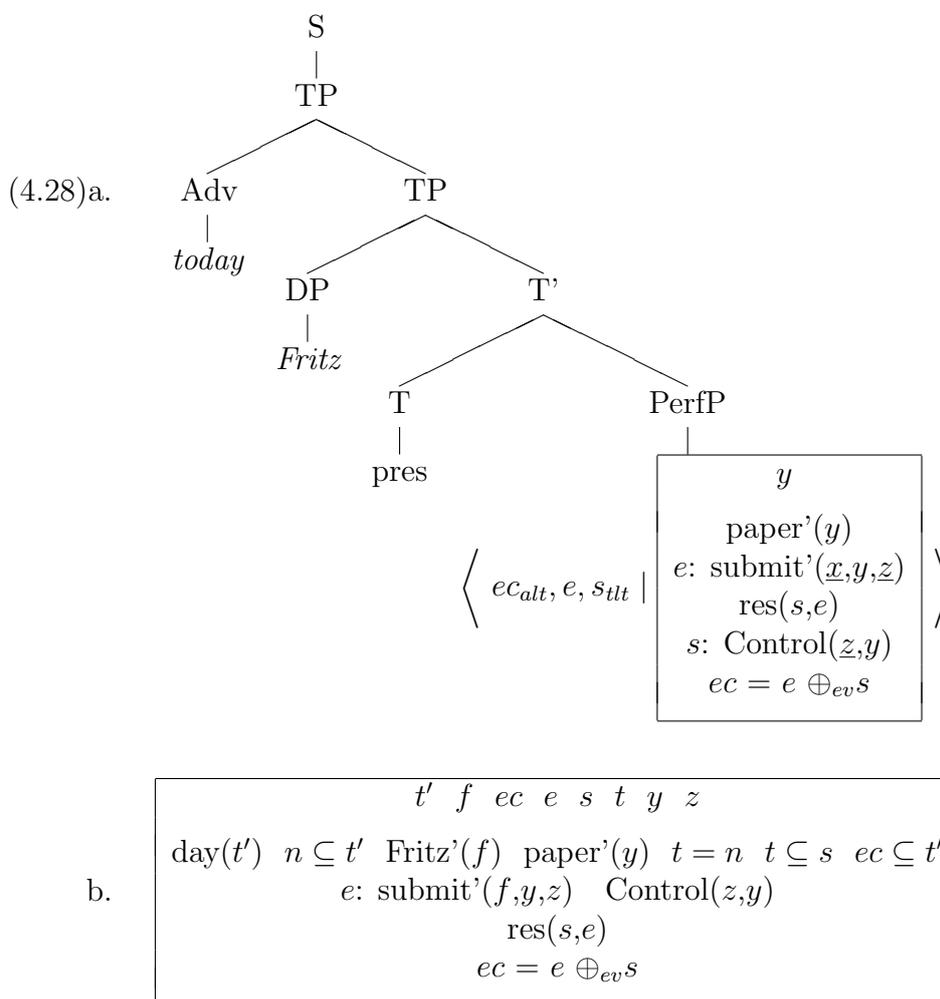
The construction steps that lead from this lexical insertion to the semantic representation of the AspP are the ones we have seen before. (4.27) shows the result.

(4.27)



The English perf operator now shifts *ult* to the result state discourse referent *s* that it finds in its input and *alt* to the input representation's *ec*. The result is given in (4.28.a). The effect of the operation triggered by +perf is just like it was in Section 2 and the final representation is almost identical to the one shown there. The only difference is that the new representation contains the identifying condition '*s*: Control(*z*,*y*)' of the target state. The remaining steps of the construction are as before, and do not need further discussion. The final representation is shown in (4.28.b).¹³

¹³There is one complication with our current treatment of (2.7) that did not arise for our earlier treatment of this sentence. It arises here because we now treat *submit* as a verb with three non-referential arguments instead of two. The third argument position, for the person or institution to whom or which the agent submits the theme, is syntactically optional – it can be realised by an argument phrase (a PP beginning with *to*), but it can also remain unarticulated, or 'implicit'; in fact, (2.7) is one of those sentences in which this argument of *submit* is implicit. But 'implicit arguments', argument positions that are not linked to argument phrases that supply discourse referents to fill them, must nevertheless be filled at some point, and the filling discourse referent must be bound in some way or other. The principles governing the introduction and binding of these discourse referents are a topic in its own right. But since it is orthogonal to the concerns of this essay, it would be counterproductive to pay it the attention that iota would need. Therefore we just assume that the argument slot *z* of *submit* gets instantiated by a discourse referent *z*

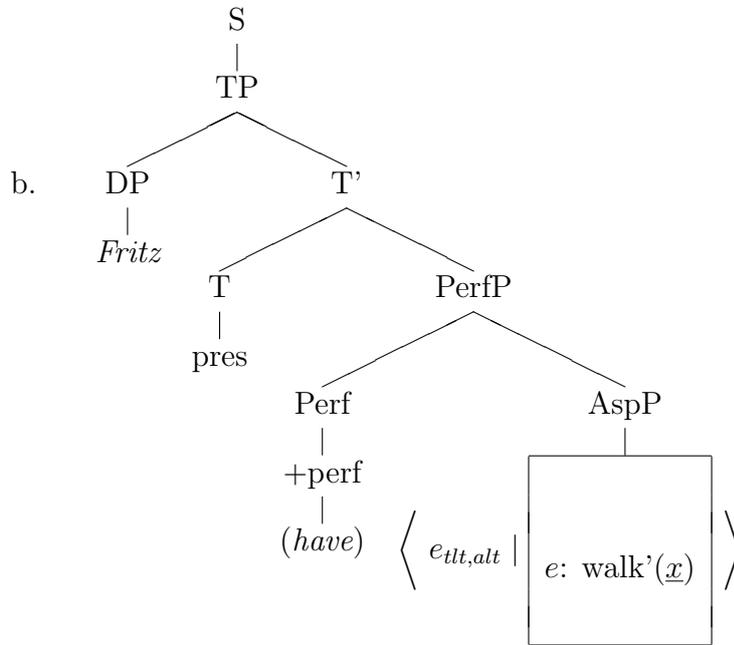


Our next example is a perfect of a non-telic event verb. We have chosen a sentence with the verb *walk*. The sentence we consider, (4.29.a), is among the simplest present perfect sentences that can be built from this verb. It is not a particularly natural sentence, but for present purposes that doesn't speak against it.

Once again we start at the point where the semantics of the verb, given in (3.9), has been inserted for its occurrence in the sentence and then been passed up first to the VP and then to the AspP node; see (4.29.b).

at some point in the transition from the (upper) TP representation to the final sentence DRS and that z gets bound through insertion into the universe of the relevant DRS. (In the case before us there is only one DRS. So it is to the universe of this DRS that z is added.)

(4.29)a. Fritz has walked.

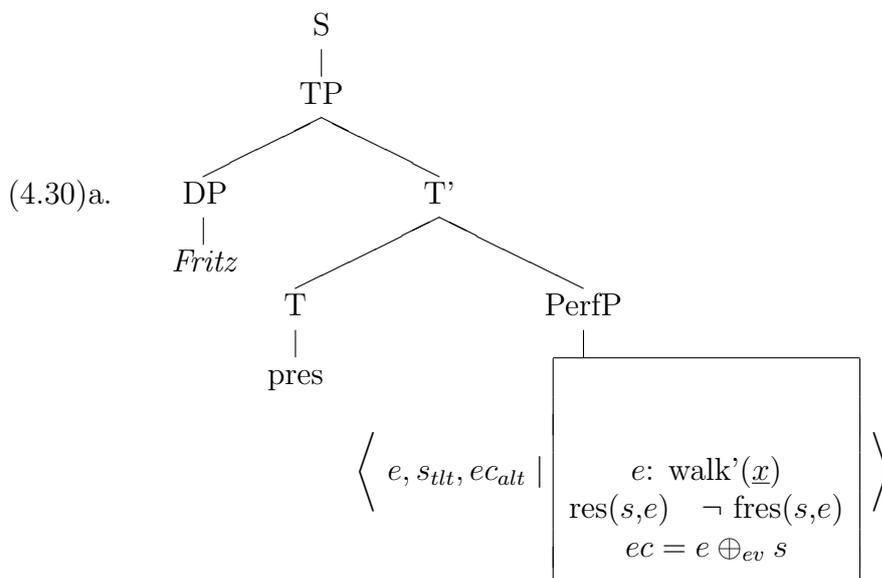


This time the perf operator cannot apply as is. First, the input representation must be expanded with a result state specification through the application of a suitable back-up operator. But which back-up operator is suitable in this case? As we have seen in Section 4.2, this is a question that cannot be answered out of context. We can think of contexts in which (4.29.a) could be used quite naturally. One is that in which the subject Fred is required to do a certain amount of walking every day, perhaps as part of a revalidation program. In that case (4.29.a) could be used to communicate that this part of the day's program has been dealt with. But the sentence itself doesn't tell us that this is the context in which we should think of it as being used. So when we are just concerned, as we are right now, with the construction of a semantic representation for the sentence as linguistic form, then we should refrain from making the assumption that it is in this context in which the sentence is to be interpreted and that should be reflected in the semantic representation we construct. (And the same goes for any other context in which (4.29.a) could be used felicitously, but with a different target state construal.)

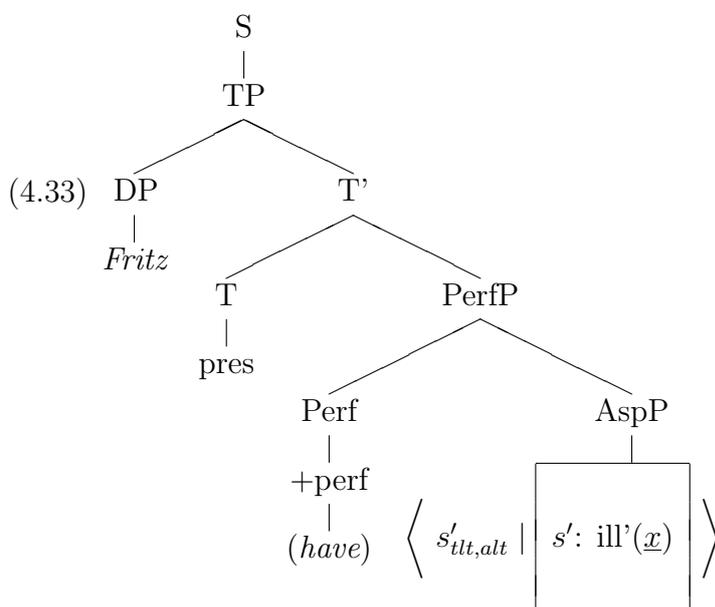
We do justice to this desideratum of refraining from building information about the context of use into the representation we construct for (4.29.a) by adopting a form of underspecification: We expand the AspP representation with the specification of a result state of which we say only that it is a result

state but *not* a formal result state. This leaves open precisely what kind of result state this state is – a question that may then be resolved differently in different contexts of use; and if the context in which (4.29.a) is used does not allow for a satisfactory resolution, then that means that (4.29.a) has not been used felicitously. (Strictly speaking, the representation we will construct should carry a mark that indicates that and how it is underspecified, and that can be removed only by resolving the nature of the result state on the basis of information about the context.¹⁴ We have decided not to build such an explicit mark of underspecification into our representations here, but only in order to avoid notational overload.)

The result of expanding the AspP representation of (4.29.a) in the way described yields the structure in (4.30.a). The remaining steps (including those needed to insert and bind the discourse referent z) lead to the sentence representation in (4.30.b).



¹⁴ $\hat{\text{A}}$ This could be done, for instance, in the form of a pair of ‘query conditions’, ‘S?(s)’ and ‘CAUS?(e,s)’, which say of the new result state s that a suitable characterisation S should be found for it (condition ‘S?(s)’) as well as a suitable causal relation between it and the event e described by the input representation (condition ‘CAUS?(e,s)’).

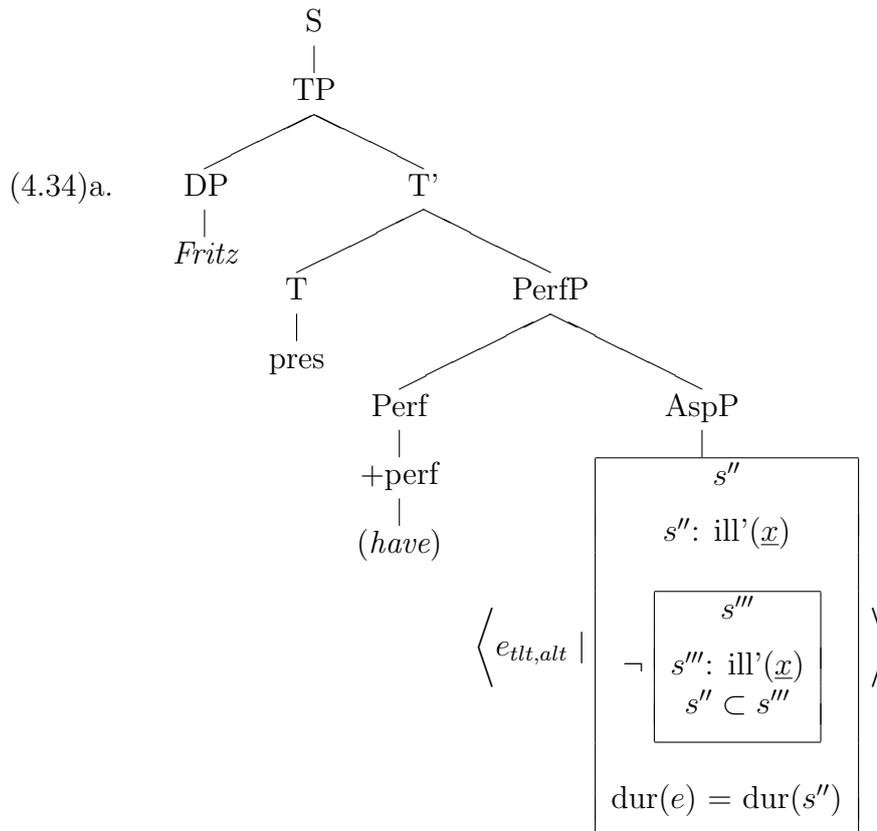


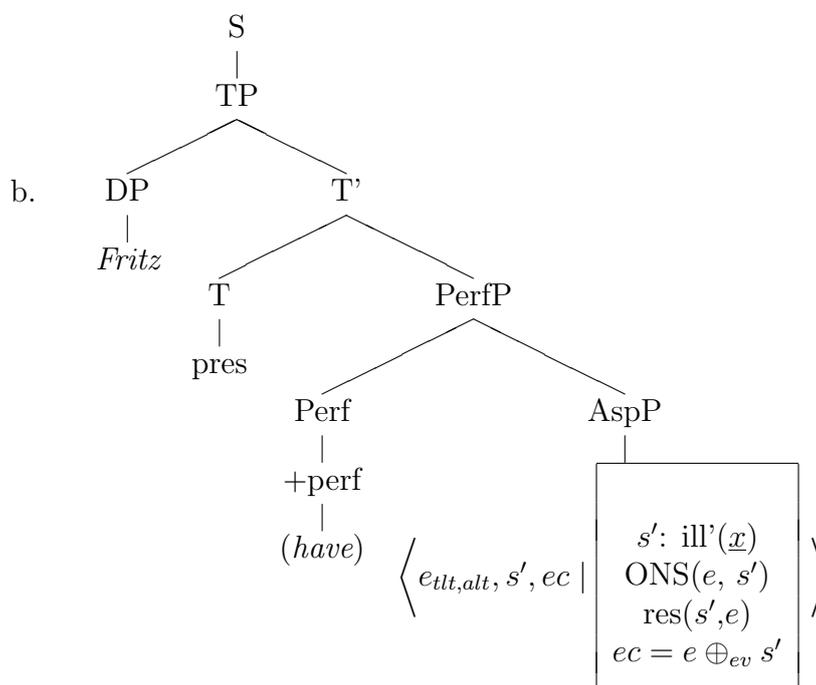
As discussed in Section 4.3, there are two ways for the perf operator to coerce the state description that is attached to the AspP node of (4.33) into an event description: coercion via closure and inchoative coercion. There are, however, some technical details of the implementation of these coercions as preliminaries to the application of a perf operator that we did not touch on there. When a perf operator meets an input representation of the kind it expects, this will be an event representation whose referential argument (the event described) is the bearer of both *tl* and *alt*. Since we want the result of coercion to be a representation to which a perf operator can be applied in the same way that it applies to expected representations, the coercion operations should include the transfer of *tl* and *alt* from the referential argument s' of the input representation to the new event discourse referent e . But once this transfer has taken place, which will guarantee that the right eventualities get located in the right way by T and by (possible) temporal adverbs, there is no longer any need for the original referential argument s' .¹⁵

¹⁵ In the output representation of the state-to-event coercion via closure the closure event e is specified as co-temporal with the maximal satisfier s'' of the input representation that includes s' . But when the result state s of e is located by T as holding at n , and by implication e , the event of which s is the result state, as before n , then that also locates the co-temporal s'' before n . We could then reconstruct s' as some state included in s'' and which therefore also lies before n ; but doing so would not add any substantive contribution. All temporal location information we can get out of the sentence has already been represented at this point, and it has been obtained without reference to s' . So there is no point in keeping s' as part of the output of the coercion operation.

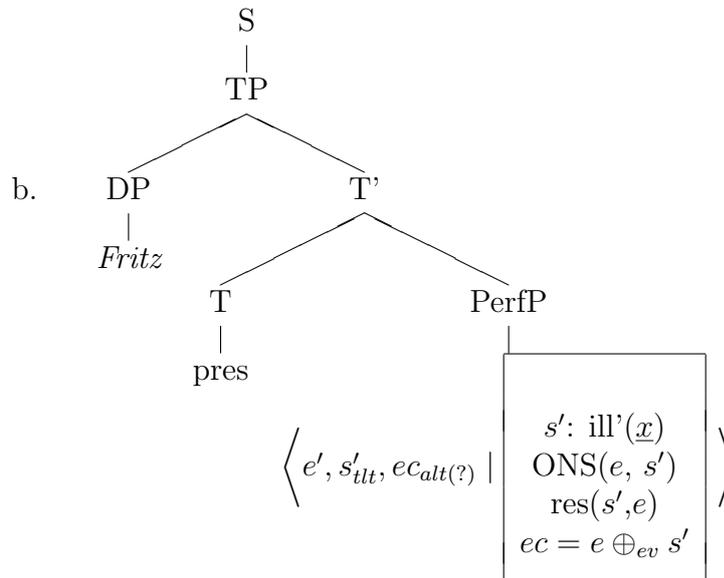
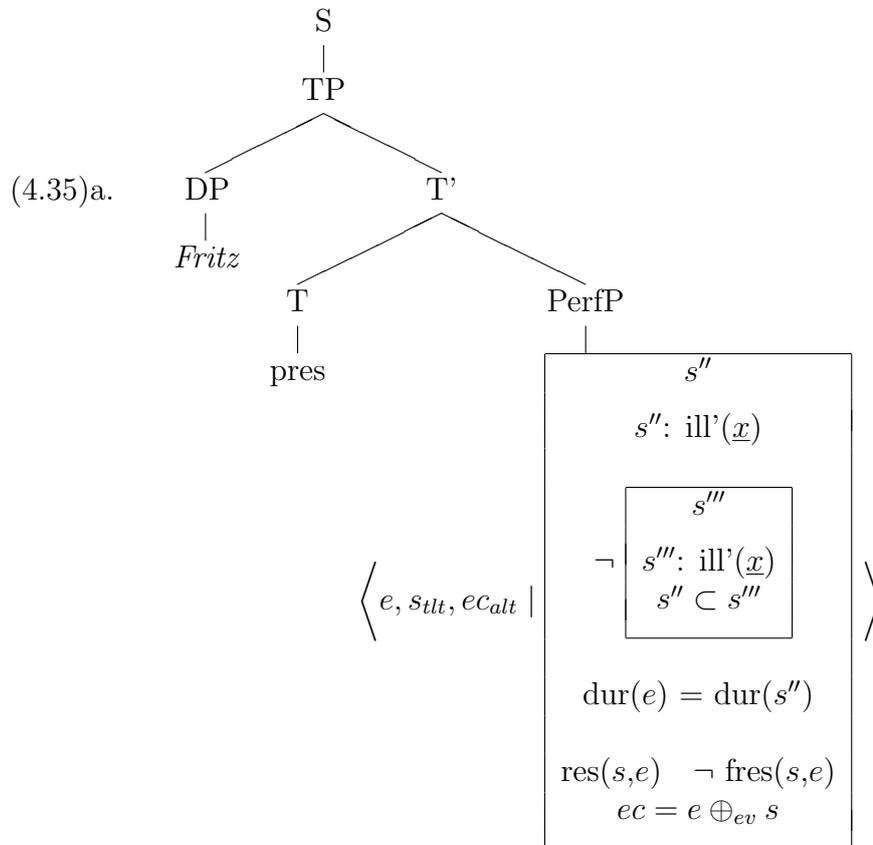
With inchoative state-to-event coercion, the matter is different. On the one hand it is simpler: as in the case of coercion via maximisation, the new referential argument e becomes the carrier of both $_{tlt}$ and $_{alt}$ and that is all that needs to be said about this part of the coercion operation. But as noted in Section 4.3, what is special about this representation transformation is that the referential argument s' of the input representation becomes the target state of the output representation. This makes the coerced input to the perf operator an event description with specified result state. It is convenient to assume that these representations are also like other input representations with specified target states in that they explicitly specify the mereological sum ec of e and s' .

These details of the two forms of state-to-event coercion are built into the coercion results shown in (4.34), (4.34.a) for coercion via closure and (4.34.b) for inchoative coercion.





The next construction steps that are to be performed on (4.34.a) and (4.34.b) are applications of the English present perfect operator to event descriptions. The two applications differ. The input representation of (4.34.b) specifies a result state, which thereby qualifies as the recipient of tlt , like the result state of the AspP representation in (2.7). The input representation of (4.34.a), on the other hand, does not specify a result state. Here a target-like result state and its mereological sum with the event must be accommodated. In this respect the results of coercion via closure are like the AspP representation of ‘Fritz has walked’ (see (4.29), (4.30)). Out of context it is difficult to see which back-up strategy for extending the representation to one that includes a result state specification. Again we limit ourselves to an implicitly underspecified representation in which the result state is merely specified as not purely formal. The results of applying the English present perfect operator to the AspP representations of (4.34.a,b) are given in (4.35.a,b).

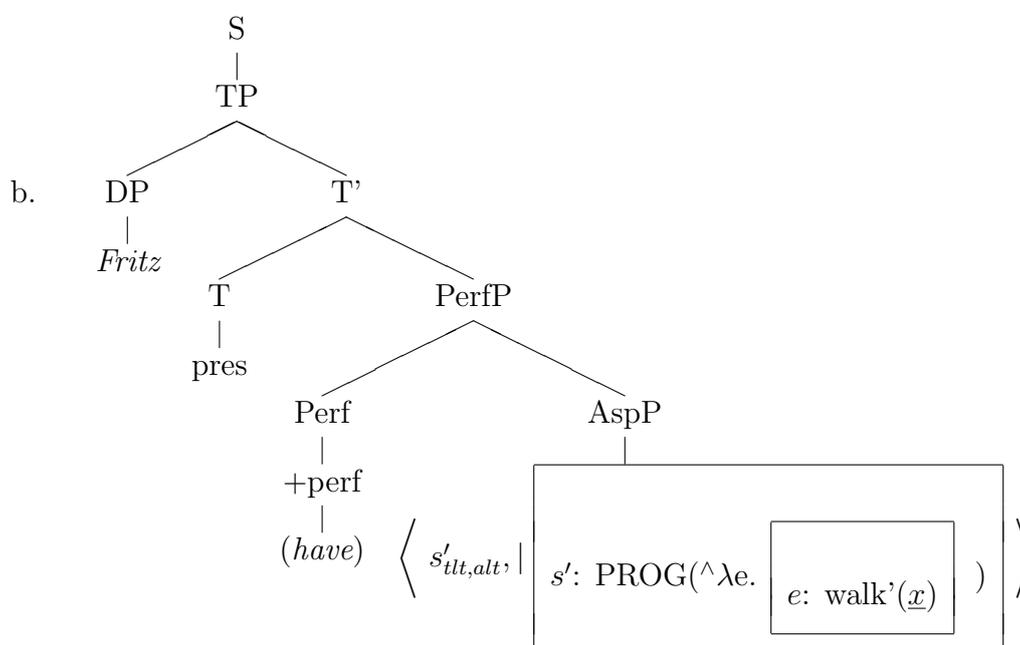


As in the previous two examples we do not dwell on the remaining construction steps.

In (4.35.b) we have placed a question mark behind the *alt* annotation of the discourse referent *ec*. According to the input-output principles for the English perfect, *ec* is the discourse referent to which *alt* should be shifted. But on the other hand the interpretation of perfect sentences via inchoative coercion has some special features in any case, so we should not be surprised if this aspect of perfect formation, which as we have seen is different in English and in German, turned out to be subject to a special regime as well for cases of this kind. We will return to this question in Section 8.9.1, where the answer to it will have tangible implications.

It is useful at this point to compare the case of present perfect sentences involving non-progressive forms of activity verbs, such as ‘Fritz has walked.’ with sentences in which the verb occurs in the progressive form, such as ‘Fritz has been walking.’, repeated below as (4.36.a). The Progressive of (4.36.a) transforms the event description of the VP into a state description, as illustrated earlier by the transition from (3.11.a) to (3.11.b). (4.36.b) gives the stage of the representation construction that is the immediate result of this transition.

(4.36)a. Fritz has been walking.



(4.36.a) is ambiguous in a way that its non-progressive counterpart ‘Fritz has walked.’ is not: since the AspP representation is a state description, it

fails to satisfy the perf operator's input requirements; and as in other cases where the input to an English present perfect is a state description, there is a choice between the two different state-to-event coercions – via closure and inchoative – that can be used to readjust the input representation. It is easy to see that coercion via closure yields an interpretation that is equivalent to that of 'Fritz has walked.'. Inchoative coercion, on the other hand, leads to an interpretation according to which the walking has been going on up to and including the utterance time. This is the interpretation of (4.36.a) that seems to be strongly preferred (and is perhaps the only one possible) in a sentence like 'Fritz has been walking since three o' clock.': there has been walking by Fritz continuously from three o' clock up to and including n. (For more about sentences with *since*-adverbials see Section 8.) Note that the non-progressive *since*-sentence 'Fritz has walked since three o' clock.' does not have this reading; it can only be interpreted as saying that within the period from three o' clock until now there has been some non-coterminial interval during which Fritz has walked. (The interval must be 'non-coterminial' in that it ends before the utterance time.)

The comparison of the English sentences 'Fritz has walked.' and 'Fritz has been walking.' with the German sentence 'Fritz ist gelaufen.' is also of some interest. Since German has no progressive form, 'Fritz ist gelaufen.' can arise as translation of either 'Fritz has walked.' or 'Fritz has been walking.' However, as we have argued in Section 4.3, German perfects of state descriptions only allow for coercion via closure. This means that although the AspP representation of 'Fritz ist gelaufen.' can be both an event description and the corresponding progressive state description, the application of the German perf operator to either of these AspP representations will yield the same interpretation that we get for the English sentence 'Fritz has walked.' As far as we can judge, this prediction is correct.

We conclude this section with a summary of the operations that the English and German present perfect operators must perform depending on what kind of input representation they get. First the case of English.

(4.37)(Operations involved in the English Present Perfect (revised version))

We distinguish 3 possibilities for the input representation (i.e. the semantic representation attached to AspP):

(I) The input representation is an event description which specifies a target state s – identifiable as the first argument of a condition 'res(s,e)', where e

is the referential argument of the input description – as well as a discourse referent ec for the ‘nucleus’ $e \oplus_{ev} s$.¹⁶

(II) The input representation is an event description without target state.

(III) The input representation is a state description (Assume that s' is the discourse referent for the described state.)

We take each of these three cases in turn.

(I) In this case there are two operations:

- Shift $_{lt}$ from e to s .
- Shift $_{alt}$ from e to ec .

(II) In this case the operations of (I) are preceded by the following preparatory transformation of the input representation:

- Add to the store new discourse referents s and ec (for the result state of described event e and for the nucleus $e \oplus_{ev} s$) together with the following conditions: ‘ $res(s,e)$ ’, ‘ $\neg fres(s,e)$ ’, ‘ $ec = e \oplus_{ev} s$ ’.¹⁷
- Continue with the operations under (I).

(III) In this case a state-to-event coercion must take place preparatory to the operations described in (I) and (II). The two kinds of state-to-event coercion that the English Present Perfect admits, coercion via closure and inchoative coercion, are taken one at a time.

(III.a): coercion via closure.

¹⁶ Our discussion of the construction of AspP representations guarantees the presence of a ‘nucleus-representing’ discourse referent ec in input representations that are event descriptions with target states only for the case where the target state comes from the lexical entry of the verb. For target states that get added higher up – as when for instance *walk* is combined with *to the station* – adding ec has not so far been secured. Nothing, however, speaks against stipulating that in these cases too ec and its defining condition ‘ $ec = e \oplus_{ev} s$ ’ be added whenever the target state s is added.

¹⁷ As noted in the last section, the result of this operation should be seen as an underspecified representation, which can be turned into a representation without underspecification only by supplying an independent characterisation for the result state s , as well as a causal relation between s and the event e .

- Remove s' from the store and replace it there by a new event discourse referent e . Attach both features $_{tlt}$ and $_{alt}$ to e .
- Transform K into a DRS K' which says that s' is a maximal satisfier of K .

K' is obtained as the merge of K and the condition C_{max} defined below.

$$(C_{max}) \quad \neg \quad \boxed{\begin{array}{c} s''' \\ K(s''') \\ s' \subset s''' \end{array}}$$

- Add s' to the universe of K' and the condition ' $\text{dur}(e) = \text{dur}(s')$ ' to the condition set of K' .
- Continue with the operations of (II).

(III.b): inchoative coercion.

- Add a new event discourse referent e to the store. Attach the features $_{tlt}$ and $_{alt}$ to e .
- add a new discourse referent ec to the store.
- Add to the condition set of the (non-presuppositional) DRS K the conditions: ' $e = \text{ONS}(s', K)$ ', ' $\text{res}(s', e)$ ' and ' $ec = e \oplus_{ev} s'$ '.
- Continue with the operations under (I).

(4.38) Operations involved in the German Present Perfect (revised version)

In most respects the operations for the German present perfect are the same as those for the English present perfect. We limit ourselves to summarising the differences:

(I)

- $_{alt}$ is not shifted to ec , but left at e .
(Because of this ec is not really needed for the semantics of German perfects; it can therefore be omitted without loss from all relevant representations of German expressions that are found in this essay.)

- The input representation is expanded with the specification of a formal result state s'' and $_{tt}$ is shifted to s'' .

(II)

- As in (I), the input representation is expanded with a formal result state.

(III)

- Coercion via closure is as in English. Inchoative closure is not possible.

(We recall the question about the German perfect that we raised in Section 4.3: Does the German perfect *always* involve shift of $_{tt}$ to a formal result state, as assumed above; or is the German perfect ambiguous between this operation and $_{tt}$ -shift to a target state (in case (I)) or target-like state (in case (ii) and perhaps also in case (III))? This is one of the questions for which we are not in a position to propose an answer.

Chapter 5

The ‘Zustandsperfekt’

The main thrust of our argumentation so far has been that a pure result state analysis of the perfect fails to deliver the correct truth conditions in present perfect sentences with certain temporal adverbs and therefore needs revision. There are some uses of perfect tense morphology, however, for which the result state analysis seems to be just right. German is one of the languages where such a use is not uncommon, and well documented. Two examples of such perfect sentences are given in (5.1).

- (5.1) a. Heute ist Fritz verreist.
(Literally: ‘Today is Fritz departed.’)
- b. Heute ist die Arbeit eingereicht.
(Literally: ‘Today is the paper submitted.’)

Both (5.1.a) and (5.1.b) have interpretations according to which the result state temporally includes the adverb time. Thus the more prominent reading of (5.1.a) is that Fritz went on a trip before the beginning of today. And in the case of (5.1.b) a similar interpretation – that the paper was submitted before today – appears to be the only possible one.

These are the truth conditions we obtain when we assume that the perfect makes the result state into the object of temporal location by both tense and temporal adverb. Within our present framework this amounts to the assumption that the perfects in question shift both *ttt* and *alt* to the result state. Since, as we have been assuming throughout, states temporally include the times that serve to locate them, we get for the sentences in (5.1) the temporal relations: ‘ $n = t_t \subseteq s$ and ‘ $t_{loc} \subseteq s$, where s is the result state and t_t and t_{loc} are the times introduced by the present tense and by the adverb *heute*. Further confirmation that the perfect operation just described is in fact the correct one for (5.1.a,b) is obtained when we replace *heute* by *gestern*. Of the

resulting sentences, given in (5.2.a,b), the first is now unambiguous, with as its only reading that according to which Fritz's departure was situated within yesterday; and the second, (5.2.b), is ungrammatical. We can turn (5.2.b) into a grammatical sentence by turning *ist* (Engl. *is*) into *war* (Engl. *was*), as in (5.2.c). (5.2.c) is the 'past-shifted' counterpart to (5.1.b); it is true iff Fritz submitted the paper before yesterday. (5.2.d), the past shifted version of (5.1.a), is once again ambiguous between one reading which requires the departure to be within yesterday and a second one which requires it to have been before yesterday.

- (5.2) a. Gestern ist Fritz verreist.
(Literally: 'Yesterday is Fritz departed.')
- b. Gestern ist die Arbeit eingereicht.
(Literally: 'Yesterday is the paper submitted.')
- c. Gestern war die Arbeit eingereicht.
(Literally: 'Yesterday was the paper submitted.')
- d. Gestern war Fritz verreist.
(Literally: 'Yesterday was Fritz departed.')

Of the two sentences in (5.1) it is the second that represents the more familiar form of the 'Zustandspferkt'. This form is known as the 'Zustandspassiv' (see in particular (Maienborn 2007), (Maienborn 2009)). In fact, the name 'Zustandspassiv' captures two central aspects of this construction:

- (i) It is a kind of passive construction, involving the past participle of a transitive verb and a grammatical subject that is linked to that argument of the verb which is realised as direct object when the verb is used in the active voice.
- (ii) It is the description of a state, viz. of the result state of the event described by the semantic representation of the verb.

It should be stressed that the Zustandspassiv is a German construction with its own morphology, which is distinct from that of the regular German passive. The regular passive in German is formed with the auxiliary *werden*, which, when used as main verb, translates into English as *become*. German regular passives can occur in the present perfect, in which case the perfect auxiliary is *sein*, while the passive auxiliary *werden* is used in its auxiliary past participle form *worden*¹, just as in present perfects of English

¹ There is a difference here with the uses of *werden* as main verb; main verb *werden* (= *become*) has the past participle *geworden*.

passives the perfect auxiliary is *have* while the passive auxiliary *be* occurs in its participial form *been*. Thus the present perfect of the regular passive corresponding to the Zustandspassiv in (5.1.b) is given in (5.3.a) and its English translation in (5.3.b).

- (5.3) a. Heute ist die Arbeit eingereicht worden.
 (Literally: ‘Today is the paper submitted become.’)
- b. Today the paper has been submitted.

Zustandspferkts involving intransitive verbs are also subject to special morphological constraints. Their verbs always take *sein* (rather than *haben*) as their regular perfect auxiliary. For this reason sentences involving intransitive verbs that can be interpreted as Zustandspferkts, such as (5.1.a), are always ambiguous: besides an interpretation as Zustandspferkts they also permit interpretation as regular present perfects. On the first interpretation the event described by the main verb does not need to lie within the interval denoted by the adverb; on the second interpretation it must.

Note also that the Zustandspassiv can be ‘perfectivised further’ by putting perfect tense morphology on its auxiliary *sein*. Since the verb *sein* in German takes *sein* (and not *haben*) as its perfect auxiliary, this leads to sentences like (5.4.a). Such perfect tense morphology is also found with Zustandspferkts involving intransitive verbs, as in (5.4.b).

- (5.4) a. Die Stadt ist zerstört gewesen.
 (Literally: ‘The city is destroyed been.’)
 (‘There has been a time when the city was in a state of destruction.’)
- b. Fritz ist verreist gewesen.
 (Literally: ‘Fritz is departed been.’)
 (‘There has been a time when Fritz was away on a trip.’)

Morphologically, non-perfect Zustandspassivs are indistinguishable from copula constructions, in which the copular verb *sein* combines with a participial adjective. In fact, the transition from what look like clear-cut Zustandspassives to clear-cut cases of copular constructions with predicative adjectives seems one of gradation rather than involving a sharp cut-off point. This need not trouble us, as long as for cases which seem to elude clear categorisation the analysis that treats them as Zustandspassives and the analysis that treats them as copula constructions yield essentially the same semantic representations and the same truth conditions. For the reason given earlier – we do

not want to go into the details of copula constructions – we do not pursue this connection.

The similarity between Zustandsperfekts and copula constructions points towards a further question. So far, all the examples of Zustandspassivs we have displayed involve event verbs. Does this reflect a general restriction or has our leaving state descriptions out of the picture just been an oversight? That is not so easy to decide. German does allow for sentences like those in (5.5a,b).

- (5.5) a. Maria ist von vielen bewundert.
 (Literally: 'Maria is by many admired.')
- ('Maria is admired by many.')
- b. Diese Leistung ist von keiner anderen übertroffen.
 (Literally: 'This achievement is by no other surpassed.')
- ('This achievement is not surpassed by any other.')
- c. Maria wird von vielen bewundert.
 (Literally: 'Maria becomes by many admired.')
- ('Maria is admired by many.')
- d. Diese Leistung wird von keiner anderen übertroffen.
 (Literally: 'This achievement becomes by no other surpassed.')
- ('This achievement is not surpassed by any other.')

These sentences may be somewhat marginal, but native German speakers find them acceptable. In meaning they appear to be subtly different from their counterparts in (5.5c,d), in which the stative copula *sein* has been replaced by the inchoative copula *werden* (Engl: 'become'). But it is hard to put one's finger on the difference, and in particular there do not seem to be any differences in truth-conditions of these sentence pairs: Either form conveys that the state in question – of Maria being admired by many, or of the achievement being unsurpassed by any other – holds at the time when the sentence is uttered. In both sentence types the participle describes the same eventuality as the active voice of the verb – as in 'Viele bewundern Maria.' ('Many admire Maria.');

the only difference with active sentences is the realisation of the verb's argument slots.

Given that German adjective phrases generally tolerate greater syntactic complexity than English APs – something that is plain with prenominal APs, as in (5.6.a) – the similarity of (5.5a,b) with copula constructions is perhaps even closer than it is for our earlier examples of Zustandsperfekts.

How difficult it is to draw the line between the participles that are presumably part of the *Zustandspferkt*-constructions and the adjectives that are usually assumed to occur as complements of copulas is also illustrated by the use of the word *unübertroffen* in (5.6.b.c), which can occur in syntactic environments that accept adjectives, but not in environments that only accept past participles.

- (5.6) a. Die von vielen bewunderte Maria.
(Literally: ‘The by many admired Maria.’)
(‘Maria is admired by many.’)
- b. Diese Leistung ist unübertroffen.
(Literally: ‘This achievement is unsurpassed.’)
(‘This achievement is unsurpassed.’)
- c. * Diese Leistung wird unübertroffen.
(Literally: ‘This achievement becomes unsurpassed.’)

These considerations suggest that there is no good argument for excluding sentences like (5.5a,b) from the category of ‘*Zustandspferkts*’. However, in the more formal discussion of the semantics of *Zustandspferkts* in the next section we will focus only on constructions that involve event verbs. (5.5a,b) are left to be dealt with by a general theory of copula constructions; but again, that is not for this essay.

One general property of the *Zustandspassiv* is that the result state it describes cannot be a formal result state. This is quite clear when the verb is a target state verb. For instance, it is inappropriate to say (5.1.b) if the paper was withdrawn after it was submitted. But often the use of the *Zustandspassiv* tends to convey even more than that – something like ‘Thank goodness, that has been done!’ or ‘That can be crossed off our list!’. In contexts of this latter sort *Zustandspassives* can be used even with non-target state verbs, as in the following example.

- (5.7) Das Geschirr ist gespöhlt, die Katze ist gestreichelt, der Hund ist gefüttert, die Fenster sind verriegelt. Also gehen wir.
(‘The dishes are done, the cat has been stroked, the dog has been fed, the windows have been bolted. So let’s go.’)

At least one of the verbs in (5.7) – *streicheln* (Engl. *to stroke*) – is not a target state verb. But within the setting suggested by the surrounding clauses – that of people working through a check list before going on a trip – ‘die Katze ist gestreichelt’ is just as acceptable as the other clauses; stroking the cat,

the context implies, is just one of the several things that must be dealt with before leaving the house.²

5.1 Zustandsperfekts and the temporal location of states

Zustandsperfekts, we already observed, look like the saving grace for the otherwise inadequate ‘plain result state’ accounts of the perfect. A plain result state treatment seems justified in particular by the truth conditions of the sentences in (5.1): there is no need for the events described by the verbs of these sentences to have taken place within today. This is just what is predicted by a result state account which assumes that the perfect transfers the role of temporal location target ‘lock, stock and barrel’ from events to their result states (in our current terminology: both *tlt* and *alt* are transferred from *e* to its result state *s*). And as argued in Section 1, that is precisely what makes plain result state accounts incapable of dealing with the sentences in (1.1)).

But even in relation to Zustandsperfekts not all is plain sailing for a plain re-

²The exact conditions under which the Zustandspassiv is acceptable are, at the time we are writing this essay, still a matter of debate. But on the whole the formation of Zustandspassivs is quite productive. (For many relevant observations see (Maienborn 2007) and (Maienborn 2009).) But this is a matter that bears only tangentially on the issues that concern us and we will not pursue it any further. The range of Zustandsperfekts that are not Zustandspassivs, on the other hand, seems severely restricted. As we already noted, the intransitive verbs involved in such Zustandsperfekts must be verbs that take *sein* as perfect auxiliary, and there aren’t all that many such verbs in German to begin with. But the set of intransitive verbs that are found in Zustandsperfekts appears to be even more restricted than that. *verreisen*, we have seen is one of them. Some others are: *schwellen* (to swell up), *zufrieren* (to freeze over), *aussterben* (to die out). Thus ‘Heute ist Marias Fuss geschwollen.’ – literally: Today is Maria’s foot is swollen’ – can either be understood as saying that Maria’s foot has been swelling in the course of today or that today her foot is in a swollen state. Likewise, ‘Heute ist der Teich zugefroren’ – literally: ‘Today is the pond frozen over.’ – can mean either ‘Today the pond is in a state of being frozen over.’ or ‘Today the pond froze.’. And ‘Heute ist der bengalische Tiger ausgestorben.’ can be said on the very day that poachers killed off the last living Bengalese tiger (the non-Zustandsperfekt reading) and also on any day after that (the Zustandsperfekt reading). Note that all these verbs are telic, or, as in the case of *schwellen*, at least allow for a telic reading (in the sense of ‘swell up to such an extent that the swelling counts as a malformation and/or sign of underlying damage’). In fact, telicity seems to be a general feature of intransitive verbs in Zustandsperfekts. Exactly what property or properties single intransitive verbs out as fit for Zustandsperfekts is a question to which we have no clear answer; but this too is one that need not be pursued here.

sult state account. The problem are sentences like (5.2.b). As noted, (5.2.b) is ungrammatical; apparently, the Zustandspassiv is not compatible with an adverb such as *gestern*, which denotes a time that completely precedes *n*. One of the things, therefore, that an account of the Zustandspferkt must accomplish is to show what rules ‘sentences’ like (5.2.b) as ill-formed.

As it turns out, our own earlier result state accounts (((Kamp and Rohrer 1983)), ((Kamp and Reyle 1993)), ((Reyle et al. 2007))) do accomplish this. But they do so for a reason of which we now doubt that it can be the right one. In our earlier result state account it is assumed that the time t_t introduced by tense and the time t_{loc} introduced by temporal locating adverbs (assuming the sentence has one) always stand in the relation ‘ $t_t \subseteq t_{loc}$ ’. This means that the two modes of temporal location, for events e and for states s , take the respective forms ‘ $e \subseteq t_t \subseteq t_{loc}$ ’ and ‘ $t_t \subseteq t_{loc} \subseteq s$ ’. The second of these is relevant for the problem posed by (5.2.b) and it is clear how it succeeds in solving that problem: ‘ $t_t \subseteq t_{loc} \subseteq s$ ’ requires that t_t be included within t_{loc} , but for (5.2.b) that condition is evidently not satisfied: n is not included in the denotation of *gestern*.

The reason why we doubt that this can be the right explanation is that we have already had to abandon the general condition ‘ $t_t \subseteq t_{loc}$ ’ for other reasons. In our present account, present perfect sentences like ‘Gestern hat Fritz seine Arbeit eingereicht.’ (cf. (2.31)) come out as acceptable, and with the truth conditions they actually have, because t_t , which in all our examples so far is identified with n , does *not* have to be included within t_{loc} . If the inclusion relation ‘ $t_t \subseteq t_{loc}$ ’ is to be abandoned for sentences like these, what justification could there be for resuscitating that condition in connection with (5.2.b), just so that we can secure the prediction that this string is ill-formed?

In fact, we should be looking for a solution to the problem that is posed by (5.2.b) in a quite different direction. So far in this essay we have been assuming that an eventuality ev is temporally located by relating it separately to tense and to the temporal locating adverb (in case one is present.) For a state s this means that it must include both t_t and t_{loc} , irrespective of how these are temporally related to each other. As we have just seen, that can lead to trouble when ‘ t_t and t_{loc} ’ do not overlap. But arguably the real problem here is not that of finding an independent justification for a relation between t_t and t_{loc} which rules out sentences like (5.2.b), but rather the more basic question what are the principles according to which eventualities get their temporal locations. The behaviour of state describing sentences in discourse can serve as a clue in this connection. Simple past sentences with

state describing VPs tend to be interpreted anaphorically, by picking up a time from the antecedent discourse at which the state they describe should then be taken to hold. Arguably it is this time – some time t_s at which a described state s is understood to obtain – that is at the heart of temporal state location, and not only when the temporal location of a state is provided by the extra-sentential discourse, but also when location is sentence-internal.

Let us assume that state location involves the introduction of such a 'self-location time' t_s for the state s that is to be located and that it is t_s that directly participates in the location processes triggered by tenses and temporal adverbs, in the sense that it is this time that must be included both in t_t and in t_{loc} . Then the problem with (5.2.b) is solved: the sentence is incoherent: the two conditions ' $t_s \subseteq t_t$ ' and ' $t_s \subseteq t_{loc}$ ' cannot both be satisfied because t_t and t_{loc} are disjoint. On the other hand we do not rule out 'Gestern hat Fritz seine Arbeit eingereicht.' as uninterpretable, for here t_t and t_{loc} serve to locate distinct eventualities: t_t locates e and t_{loc} locates s .³

This treatment would give us all we need except for one thing. The truth conditions of a sentence like (5.1.b) ('Heute ist die Arbeit eingereicht.' - Engl: 'Today the paper is submitted'.) is true only when the submission event took place *before* today. That is, the state of the paper having been submitted must hold throughout today. To secure this aspect of the truth conditions of (5.1.b) we need the interpretation principle for state descriptions that has been in force up to now, viz. that the times t_t and t_{loc} contributed by the locating constituents of the sentence are both included within the state s that is being located. In order that we get all the results we want this principle has to be retained. In other words, state location is now two-pronged: on the one hand t_s has to be included within the locating time or times, on the other s itself must include them.

Once we adopt this way of understanding the location of states, it is natural to envisage a similar revision for the temporal location of events. But here the revision makes little difference. Let us assume that the location of an event e is also mediated by a location time t_e , but that the temporal relation between e and t_e is the reverse of what it is in the case of states: instead

³ Note that the problem illustrated by (5.2.b) arises not just for Zustandspassivs, but more generally for sentences involving present tense state descriptions that are combined with adverbs which refer to past times. For instance 'Gestern ist Fritz krank.' or 'Gestern weiß Fritz die Antwort.' are just as bad as (5.2.b). (The ungrammaticality that (5.2.b) shares with these 'sentences' is one of the many respects in which Zustandspferkts behave like copula constructions.)

of ‘ $t_s \subseteq s$ ’ we have ‘ $e \subseteq t_e$ ’. On this last assumption it makes no difference whether we require that t_e be included within both t_t and t_{loc} (or that we demand this, as we have up to now, of e itself, or that we, redundantly, demand it of both e and t_e). This means that we can, if we want to, revise the location conditions for events in a manner that parallels the revision of our state location conditions: both states and events involve a conjunction of two location principles, one involving the eventuality itself and one involving its location time. But only in the case of states is this conjunction essential; in the case of events we can make do either with the conditions that involve the event’s location time or with those conditions that involve the event directly.

Introducing self-location times for events as well as states would be the most uniform and therefore most elegant revision of the location algorithm. But since the revision has no real impact on the location of events, we propose that as far as they are concerned we stick to our current method. So we adopt there reformulation of the location procedure only for states.

In order to do this we need to make a decision about the point at which the self-location times of states are introduced. We do not know of any ‘higher’ principles that could guide us in this question. The technically simplest, if perhaps not the most elegant, solution is to leave the introduction of t_s to the first temporal locating constituent that contributes to the temporal location of states. In our architecture this is the tense feature associated with T. Thus, when the complement representation of T is the description of a state s with the right annotation (i.e. the store of the representation contains either s_{tlt} or $s_{tlt,alt}$), then that leads to the introduction of a new discourse referent t_s . This discourse referent becomes the recipient of all the temporal location features attached to s , but note well that this time this is not a case of feature transfer, but rather of feature copying; for s itself does not lose but retains these features.

After the introduction and decoration of t_s temporal location proceeds as follows: each temporal locator (T and, if present, the temporal adverb) locates the discourse referent or discourse referents bearing the annotation it selects. If the discourse referent is a state discourse referent, then the time discourse referent t contributed by the locator is encoded as included in that discourse referent; if the discourse referent is a time discourse referent, then that discourse referent is encoded as included within t . We summarise these operations once more in the following (5.8).

(5.8) (Temporal Location of States)

Suppose that α is a sentence constituent that is responsible for temporal location of the referential argument of its complement representation, that this referential argument is a state discourse referent s and that s is annotated with the feature which α selects and that s is so far without a self-location time t_s . Then perform the operations in (i). If s already has a self-location time t_s , then pass directly to (ii).

(i) Introduce a new discourse referent t_s as self-location time for s . That is, add t_s to the store of the input representation, annotate t_s with all the location features of s and add to the condition set of the non-presuppositional DRS K of the complement representation the condition ' $t_s \subseteq s$ '. Then pass to (ii).

(ii) Introduce (as in the earlier version of the location algorithm) a location time discourse referent t to represent the contribution made by α and add to the condition set of K the condition or conditions that determine the temporal location of t . (For instance, when α is T with the feature *pres*, then this condition will be ' $t = n$ '.) Furthermore add to the condition set of K the conditions ' $t_s \subseteq t$ ' and ' $t \subseteq s$ '.

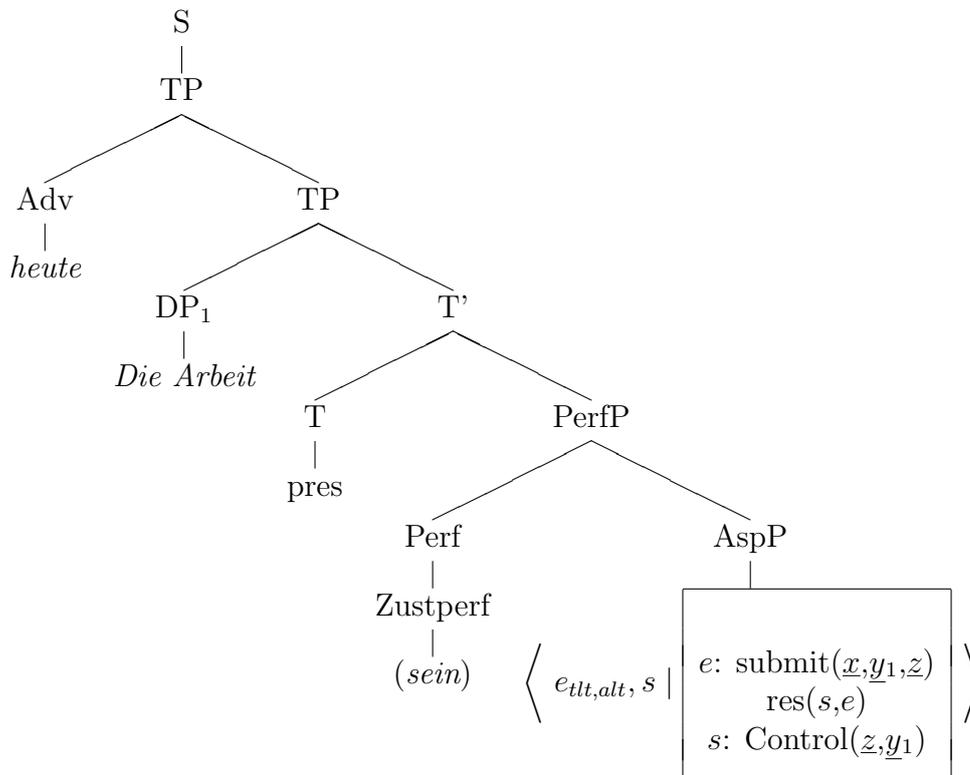
We illustrate this algorithm for interpreting Zustandspferkt-sentences with two sample constructions, one for the well-formed sentence in (5.9.a) and one for the semantically incoherent (5.9.b).

- (5.9) a. Heute ist die Arbeit eingereicht.
 b. Gestern ist die Arbeit eingereicht.

A complication for the representation construction of these sentences is the passive use of the verb. As we have set things up, this is a problem in the domain of linking theory: the \underline{y} slot of *submit* is now linked to the grammatical subject, whereas the \underline{x} slot has become optional, and is realised by a *von*-PP when it is filled at all. In the sentences in (5.9) this argument s is not realised and must therefore be treated as an implicit argument. (As we did earlier for the \underline{z} slot of *submit*, (see fn. 32, we assume that \underline{x} gets instantiated by a real discourse referent x somewhere in the transition from the upper TP representation to the representation of the full sentence.) As before, we assume that the parser will establish the relevant linking relations (by means of co-indexing) and also that it can recognise the well-formedness of sentences in which optionally filled argument slots have not been filled.

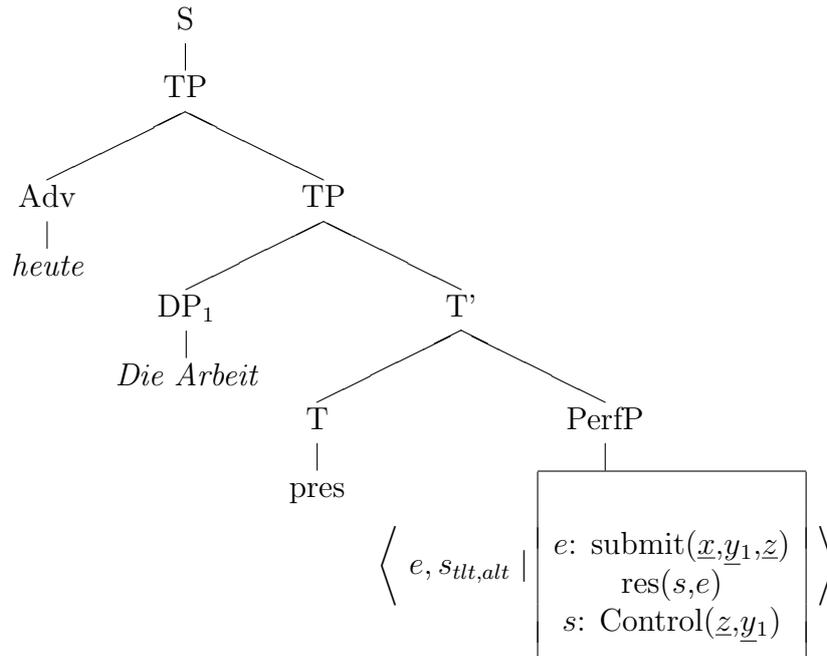
We assume that application of the operations which constitute the semantics of the Zustandspferkt is triggered by a new, additional feature value of the Perf node, which we call ‘Zustperf’. We start our display of the construction of (5.9.a) with a structure in which the semantics of the AspP node has already been established. (In what happens up to AspP there is no difference with earlier constructions.)

(5.10)



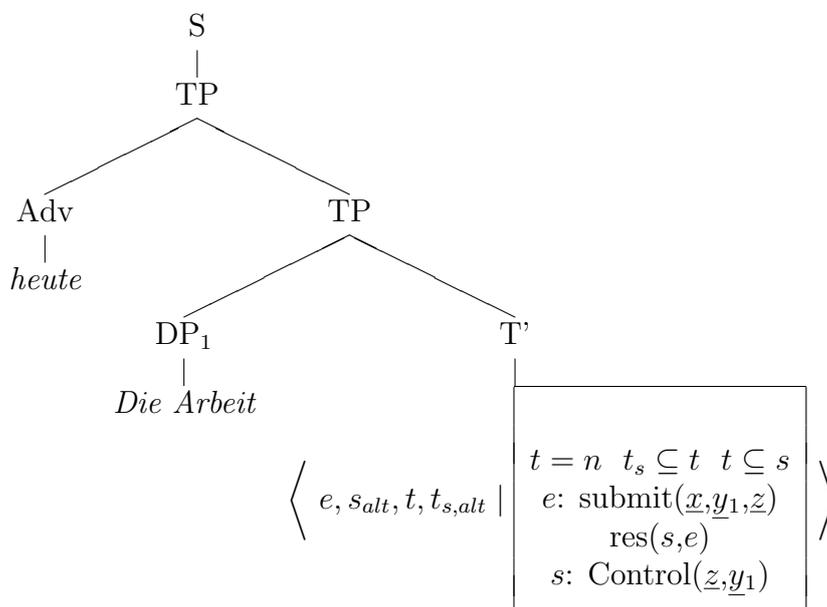
Since the input representation to the Zustandsperfekt is an event description with a specified result state s , all that happens at this point is that both $_{tlt}$ and $_{alt}$ are transferred from the described event e to s . The result is shown in (5.11).

(5.11)



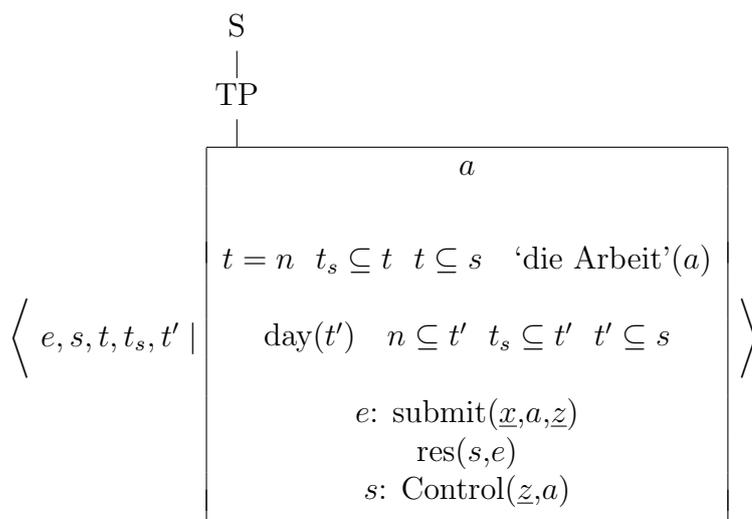
The next step is the T-triggered temporal location of the state description under PerfP. Here the new specifications of (5.8) apply: We introduce not only a time discourse referent t for the time contributed by the present tense but also a discourse referent t_s for the self-location time of s . Furthermore the temporal relation conditions that the DRS is now enriched with are as specified in (5.8). In the resulting representation we discard the occurrences of $_{tlt}$, as these are no longer needed, but retain the occurrences of $_{alt}$ which will be needed for the interpretation of the contribution made by *heute*.

(5.12)



After dealing with the subject DP, which is as in earlier constructions and is of no interest to us here, we come to the adjunction of the adverb *heute*. The discourse referent t' introduced by *heute* must now be temporally related to both elements in the store of the representation of its adjunction site that bear the feature *alt*. For t_s this relation is inclusion within t' , for s it is inclusion of t' within s . The *alt*-annotations can now be removed as well. This gives us the upper TP representation in (5.13).

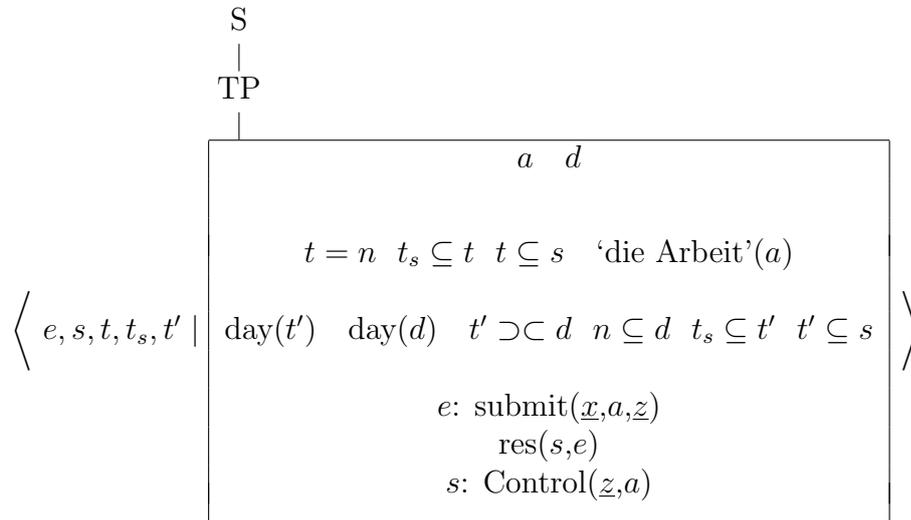
(5.13)



The remaining construction steps can be dispensed with, since all that matters in the current context can be read off the DRS in (5.13). What is to be noted in particular about this DRS is the consistency between the conditions ' $t_s \subseteq t$ ', ' $t = n$ ', ' $t_s \subseteq t'$ ' and ' $n \subseteq t'$ '. Together these say that t_s is included within n , which in its turn is included within t' .

After this discussion of the representation construction for (5.9.a) there is no need to go into much detail about the construction for (5.9.b). It suffices to show the construction stage corresponding to (5.13):

(5.14)



This time the relevant conditions are: ' $t_s \subseteq t$ ', ' $t = n$ ', ' $t_s \subseteq t'$ ', ' $t' \supset \subset d$ ', ' $n \subseteq d$ ' and ' $t_s \subseteq t'$ '. These conditions entail that t_s is included in both t' and t , while t and t' are disjoint (since $t = n$, $n \subseteq d$ and $t' \supset \subset d$). This is impossible, which accounts for why the structure is incoherent.

5.2 No Zustandsperfekt in English?

The perhaps most productive use of the Zustandsperfekt, we saw, is that which we find in contexts in which tasks on some kind of list are ticked off one after the other. One or more present perfect clauses describe events that entail that one of the tasks on the list has been dealt with and thus can be ticked off. We repeat our one illustration of this use in (5.7).

(5.7) Das Geschirr ist gespült, die Katze ist gestreichelt, der Hund ist gefüttert, die Fenster sind verriegelt. Also gehen wir. ('The dishes are done, the cat has been stroked, the dog has been fed, the windows have been bolted. So let's go.')

But isn't such a use of the present perfect just as possible in English? The answer is 'yes': not only is it possible to express in English what (5.7) conveys, but we can do this by using the very same forms, viz. by the English paraphrase that was given for (5.7). This English rendering is related once more in (5.15).

(5.15) The dishes have been done, the cat has been stroked, the dog has been fed, the windows have been bolted. So let's go.

But are the present perfects in these examples really instances of an English 'Zustandspferkt'? Given the account of the English Present Perfect we have adopted, there is nothing that forces us to make this assumption. It seems just as possible to maintain that task list contexts offer the opportunity for yet another strategy of construing target-like result states for event descriptions without built-in result state specifications. And if that is what we assume about cases like (5.15), then there is no need to adopt a second analysis of the English Present Perfect, according to which *alt* is shifted jointly with *tt* to the result state. Note also in this connection that what is perhaps the most tangible property of the German Zustandspferkt, viz. that it cannot be combined with adverbs whose denotations do not overlap *n*, is one that it shares with the analysis of the Present Perfect we have, although there it is secured in a different way, viz. through shifting of *alt* to *ec*.

The answer to this question of this interlude is thus a mildly curious one: Yes, English does admit a use of the perfect that is much like the paradigmatic examples of the German Zustandspferkt. But no, there is nothing special about a 'result state perfect' in English; what look like instances of such a use of the perfect are continuous with its other uses and can be handled correctly by applying the principles of perfect interpretation that we have already adopted. In other words, what manifests itself as two semantically distinct constructions in German – its regular perfect and the Zustandspferkt, which are also morphologically distinct when the operandum of the perfect operator is a passive – appears as a single construction in English. Responsible for this difference between English and German is the difference between the semantics of their 'regular' perfects which in the account proposed in this essay is captured by the different rules of *alt* management: shift of *alt* to *ec* for the English Present Perfect and remaining of *alt* at *e* for the

German Perfekt.

But there remains a difference in coverage of semantic possibilities. There are cases of the German Zustandspferkt, such as (5.16), which, it seems, cannot be expressed by a present perfect sentence in English.

(5.16) Heute ist Fritz verreist.
 ('Today is Fritz gone-on-a-trip')

In particular, the literal translation of (5.16), 'Today Fritz has gone on a trip.', seems to us to entail that Fritz' departure took place today, whereas (5.16) itself seems to deny this, and certainly is compatible with a departure before today. To state in English what is expressed by (5.16) one would have to use a sentence consisting of a copula and an Adjective Phrase, such as, say, *is away on a trip*.

This asymmetry between English and German would go away if we adopt for German Zustandspferkts also a 'copula + AP' analysis, combined with the assumption that phrases headed by German past participles of German transitive verbs, as well as a small contingent of intransitive unaccusatives such as *verreisen*, can be used as APs. We leave the question whether that might be the better analysis after all as an open question. Until this question has been decided we stick – for better or worse – to the analysis proposed here, according to which Zustandspferkts constitute a syntactic category in their own right.

5.3 What is a perfect?

Our motive for dwelling on the Zustandspferkt has been a double one. On the one hand it is an example of a perfect for which a pure result state analysis is right⁴. And on the other it does seem a natural candidate member for the family of perfect operators.

This leads us to a question that should be raised in any case but to which the Zustandspferkt adds extra spice: What is it that the different constructions

⁴ Modulo the modification of our earlier assumptions about the temporal location of states. But as we saw, this modification is needed for other state descriptions as well, once we abandon the principle that the tense location time is always included in the adverb location time.

we have considered so far (and, presumably, a good many others that are found in other languages than English or German and that have also been classified as ‘perfects’) have in common and for which the label ‘perfect’ seems somehow adequate?

The line we have taken in dealing with the different perfects we have thus far considered suggests an answer to this question:

(5.17) What qualifies a linguistic construction as a perfect is that the operation, or one of the operations, that it triggers is the shift of the feature *alt* from the referential argument of an event description to a result state of that referential argument.

Whether this is the right answer to the question ‘What is a perfect?’ can’t of course be proved or disproved conclusively. Answers to such questions can only earn their keep by proving their usefulness in capturing enough of the pre-theoretical intuitions associated with the queried concept to strike us as plausible while at the same time enabling us to think about the concept in more precise and articulate ways, which help us to be clearer about what fall under the concept and what doesn’t and about the role that the concept plays within the conceptual network of which it is part.

In fact, what has been said about the three different perfects considered so far – the English Present Perfect, the regular German present perfect and the German Zustandsperfekt – can be seen as the start of an investigation into ‘perfect typology’ that such a general characterisation of perfects makes possible.

So far our discussions have led to three dimensions along which perfects can vary:

- (I) the nature of the result state;
- (II) the landing site of the feature *alt*;
- (III) the state-to-event coercion options for perfects of state descriptions.

As regards (I), we have drawn one major distinction between result states, viz. between (a) formal result states and (b) target states and target-like states; and as regards (II), we have distinguished between three landing sites for *alt*: (i) the referential argument *e* of the input representation, (ii) a nucleus-like event complex *ec*, which must include both the referential argument *e* of the input representation and a result state of it; and (iii) the

result state itself. And with regard to (III) we have encountered two coercion operations: (α) state-to-event coercion via closure; (β) inchoative state-to-event coercion. This gives in principle four possibilities for the state-to-event coercions that a perfect operator could licence: $\{\alpha, \beta\}$ (i.e. both α and β are allowed), $\{\alpha\}$, $\{\beta\}$ and \emptyset .

These distinctions give us a total of $2 \times 3 \times 4 = 24$ different possibilities. According to the analyses we have offered, three of these possibilities are realised by the perfects we have so far looked at, the English Present Perfect, the regular German present perfect and the German Zustandspferkt. As a basis for further typological consideration that will play a part in the discussions of the next section we recapitulate which of the 24 options each of these three perfect operators selects, given the analyses we have proposed.

1. The English Present Perfect is characterised by:
 - (i) result states must be target states or target-like states;
 - (ii) the landing site for *alt* is ec;
 - (iii) the set of state-to-event coercion back-ups is $\{\alpha, \beta\}$.

2. The regular German present perfect is characterised by:
 - (i) result states are purely formal result states;
 - (ii) the landing site for *alt* is e;
 - (iii) the set of state-to-event coercion back-ups is $\{\alpha\}$.

3. The German Zustandspferkt is characterised by:
 - (i) result states must be target states or target-like states;;
 - (ii) the landing site for *alt* is the result state s;
 - (iii) presumably⁵ the set of state-to-event coercion back-ups is \emptyset .

We have seen that in addition to the distinctions articulated in these characterisations of English and German present perfects there is the question what can be said about the construal of target-like states for perfects that want more than purely formal result states. In Section 4.2 we mentioned Michaelis'

⁵ We say 'presumably' since the analyses we have proposed for Zustandspferks in Sections 5 and 5.1 is moot on this point. If sentences like (5.5.a,b) are rejected as ill-formed, that would amount to assuming that the set of state-to-event coercion back-ups is \emptyset . A similar assessment results if we declare such sentences as acceptable, but only on an analysis that treats them as present tense copular sentences. If the sentences are treated as *bona fide* cases of the Zustandspferkt, the implication is that the set of state-to-event coercions is $\{\beta\}$.

position that the different ways in which English present perfects can be justified through the inference of current result states that stand in some causal relation to the described event. If the range of strategies available for this purpose is a matter of convention, then one might expect that perfects which agree in requiring target or target-like result states may nevertheless differ with regard to the inference strategies they permit. But it might also be that the set of strategies is fixed (by some sort of ‘universal’ principle) once and for all, in which case no further differentiations along such lines are possible. What in this domain can be a matter of conventional properties associated with individual constructions in individual languages and what is determined by universal principles of language, cognition or verbal communication is a question that we do not have the tools to address and must leave to those better equipped to deal with it.

Chapter 6

Perfects other than Present Perfects

So far we have only considered present perfects. But perfects come in various forms – present perfects, past perfects, future perfects, infinitival and gerundive perfects. In this section we look at non-present perfects.

6.1 The two-dimensional analysis of tense and the two analyses of the Simple Past

The principal line we will follow in this section is not new. We adopt, with only minor modifications that are needed because of the different assumptions we have made in the preceding sections of this essay, the Reichenbach-inspired treatment proposed earlier in (Kamp and Reyle 1993), (Kamp and Rohrer 1983) and (Reyle et al. 2007). The central intuition behind that treatment is our reading of Reichenbach's 'two-dimensional' analysis of tense, rooted in his observation that the past perfect should be analysed as locating the described eventuality in the past of a 'Reference time' which itself is situated in the past of the time of speech (Reichenbach 1947). Reichenbach proceeded to analyse all tenses in this 'two-dimensional' way – the semantics of each tense form is given as a pair of temporal relations, one between Eventuality time and Reference time and one between Reference time and Speech time. We have followed him in this too, in spirit if not in every detail. One difference is that, as we argued at length in (Kamp and Reyle 1993), Reichenbach's Reference time is made to do more work than it can and should therefore be split into two notions; for one of these we retained the name 'Reference time' (or also 'Reference point'), whereas for the other one we chose

the name ‘Temporal Perspective time’, or ‘Temporal Perspective point’, or ‘TPpt’ for short. For our immediate purposes only the TPpt matters; it is the times introduced as TPpts that act as intermediaries in relating the Eventuality time to Speech time.

The two-dimensional semantics of the English tense forms of English presented in (Kamp and Reyle 1993) (and likewise the semantics proposed in (Kamp and Rohrer 1983) for the tenses of French) is also like Reichenbach’s in a further respect: tense forms can be divided into ‘simple’ and ‘complex’ in the following sense: the simple forms are those for which TPpt and speech time (or *n*, to return to our way of referring to this time) coincide, the complex ones those for which they differ. Since for the simple tenses TPpt = *n*, they can be analysed without reference to TP points. This is true in particular for the Simple Present, which is characterised by coincidence of all three elements – Eventuality time, TPpt and *n*. Since we analyse present perfects as present tense forms of perfects, they too can be analysed without the use of TPpt – which is what we have thus far been doing. In fact, all analyses of present perfect sentences that we have given can, if that were wanted, be straightforwardly converted into analyses involving TPpts, thereby subsuming them under the more general form of analysis for finitely tensed clauses that we are adopting in this chapter.

It might have been expected from the terminology we have been using that the Simple Past tense also is a simple tense in the sense just defined. But this turns out to be a delicate point. In the cited works we have argued that a distinction is to be drawn between simple pasts of event descriptions, such as (6.1.a), and simple pasts of state descriptions, as in (6.1.b). The past tense of a sentence like (6.1.a) is simple in the sense defined: TPpt coincides with *n* and the event time precedes TPpt. But with sentences like (6.1.b) the matter is less straightforward. Some such sentences – an example is (6.1.c) – can, we argued, only be analysed as involving a complex tense: TPpt precedes *n* while the Eventuality time coincides with the TPpt. The argument here has to do with the quite limited possibilities for ‘shifted’ interpretations of the adverb *now* – such instances of *now* are compatible with state descriptions but not with event descriptions. This is suggested by (6.1.d), which is generally judged as ungrammatical (or very odd, and it is certainly much more marked than (6.1.c), and also than its own progressive version in (6.1.e)).

- (6.1) a. Fritz wrote a letter.
 b. Maria liked Fritz.
 c. Now she liked Fritz.

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- d. ?? Now he wrote a letter.
- e. Now he was writing a letter.

In this regard shifted uses of *now* are like non-shifted ones, and more generally like the normal¹ uses of the simple present in English: They allow only the imperfective (= internal) viewpoint aspect, which, in our set-up, means that they only combine with state descriptions. The restriction to internal viewpoint perspective in simple past sentences with *now* indicates that in such sentences the past time at which they situate the states they describe serves as perspective point, just as in ordinary present tense sentences with or without *now* it is the utterance time that serves as temporal perspective. (Hence our term ‘Temporal Perspective Point (or ‘Temporal Perspective Time’) as replacement for Reichenbach’s ‘Reference time’.) The internal viewpoint restriction of such sentences indicates that the described eventuality is presented as going on *at* the past perspective time, i. e. Eventuality time coincides with TPpt, whereas the TPpt itself precedes *n*.²

¹ By ‘normal’ here we mean to exclude so-called reportive uses of the present, which do admit non-progressive forms of event verbs.

² More recent work has shown that the matter is more compacted than our earlier publications make it out to be. As argued for instance by (Hunter 2012), *now* can occur in past tense even clauses. Even in such cases it can, we believe, be argued that *now* picks up the TPpt and thus that the past tense with which it combines must also locate its TPpt in the past of the utterance time and locate the described event at the TPpt. It is just that in this case the described event is included in the denotation of *now*, something that the earlier argument assumed to be impossible. It has been noted that *now* is typically used in contexts where it refers to a past tense in order to highlight a contrast; in that regard past referring occurrences of *now* resemble its standard uses, in which *no* refers to the utterance time. There are languages – Korean is one; see (Lee and Choi 2009) – that have two distinct words for the ‘past-state-talking now’ and the ‘past-event-talking now’ (in Korean *citum* for the first and *idea* for the second). Our original argument was feared for French *maintenant*. It may well be that the case for *maintenant* is a different one than that for *now*. *Maintenant* can be combined with the French Imparfait, it can definitely not be combined with the Passé Composé (the tense form that has largely supplanted the Passé Simple (‘Simple past’) in modern French), and we assumed at the time that *maintenant* couldn’t be used in combination with the Passé Simple either. In the light of the mentioned findings about *now* a new, more careful search ought to be done to see if there aren’t cases in which *maintenant* is used together with the Passé Simple, but we leave this search to others. In view of these considerations we still believe that the conclusion of the old argument – that the English Simple Past (and, by the same token, the German Präteritum) has a possible analysis in which the TPpt precedes *n* and the described eventuality is located at the TPpt – is right. It is just that this possibility isn’t restricted to descriptions of states. In this essay, we will stick to the (over-)simplifying assumption that simple pasts of event descriptions always locate their TPpts at *n*.

The difference between the kind of simple past found in (6.1.a) and the kind found in (6.1.c) also shows up in the way in which sentences of the two kinds tend to be interpreted when part of a larger discourse. One typical discourse use for a sentence like (6.1.a) is as in (6.2.a).

- (6.2) a. Fritz sat down at his desk. He wrote a letter.
 b. Maria came into the room. Fritz was writing a letter.

In order to assign a coherent interpretation to these sentence pairs, one must, as always³, establish some rhetorical between them. In the case of (6.2.a) the relation that suggests itself is that of ‘narrative succession’, one in which the event described by the second of a pair of successive sentences is seen as a natural follow-up to the event described in the first sentence. This entails that the two events do not temporally coincide – the second one is interpreted as *following* the first – although they are understood as being in fairly close temporal proximity. Other rhetorical relations between successive event sentences entail other temporal relations between the events they describe, and only exceptionally – when the second sentence redescibes the event of the first sentence, or adds to its description – will there be complete temporal coincidence (but in that case only because the events described by the two sentences are the same, and not just temporally coincident).

The case of (6.2.b) is different. Here the natural interpretation is that Fritz’s writing was going on at the time of the event described in the first sentence, that of Mary coming into the room. In such cases, we contend, the exact temporal relation between the eventualities described by the two sentences isn’t inferred, as a kind of secondary effect, from the rhetorical relation that the interpreter is led to assume, but rather is a direct effect of the mechanisms of temporal interpretation themselves. The principles involved in this case are (i) interpreting the past tense of the second sentence as an instance of the second of the two types mentioned (that in which TP_{pt} precedes *n* and the eventuality time coincides with TP_{pt}) and (ii) choosing the time of the event described in the first sentence as TP_{pt}. Locating the state *s* described by the second sentence – that of Fritz being in the process of writing a letter – will then take the form that the TP_{pt} is temporally included within *s* (in the light of our revised procedure for the temporal location of states in (5.8) this amounts to ‘ $t_s \subseteq \text{TP}_{\text{pt}} \subseteq s$ ’); which is just what we want.⁴

³ See (Mann and Thompson 1988), (Asher and Lascarides 2003).

⁴In the literature on discourse relations the rhetorical relation between the state of the second sentence of (6.2.b) and the event of the first is sometimes identified as that of

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So far we have committed ourselves to analysing simple pasts of event descriptions as involving TPpts that coincide with *n* and past tenses of state descriptions with *now* as involving TPpts in the past of *n*. But what about simple pasts of state descriptions without *now*? Here, it seems, further distinctions are needed. Consider the following discourse (6.3).

(6.3) Fritz turned the light switch. The light was blinding him.

(6.3) is ambiguous in that the second sentence can be either understood as the causal effect of the turning of the light switch – it was dark before that event, but blindingly bright after it – or that the blinding effect of the light was the reason for Fritz to turn the switch.⁵ The rhetorical relation involved in the first interpretation would presumably be something like ‘narration’ (much as in (6.2.a)), and in the second it would be ‘causal explanation’ (cf. (Asher and Lascarides 2003)). And, correspondingly, in the first case the state described by the second sentence is understood as following the event of the first sentence, while in the second it is understood as preceding it. It follows that in neither case it is understood as temporally surrounding the event. So neither interpretation can be an instance of the mechanism that we have made responsible for the interpretation of the second sentence of (6.2.b).

This shows that there are some state describing sentences in the simple past that cannot be analysed in the way we have analysed the second sentence of (6.2.b). When such an analysis is impossible, an analysis along the lines of (6.2.a) may be the only viable alternative. But this is not the norm. The

‘background’: the second sentence provides information about the situation within which the ‘foregrounded’ event of the first sentence is occurring. This may be right as far as it goes. But the difference that matters for us here remains: In a discourse like (6.2.b) the temporal relation between event and state arises directly from the interpretation of tense and aspect, together with the ‘anaphorical’ resolution of the TPpt to an event introduced by a preceding sentence.

⁵ Examples like this were discussed in (Hinrichs 1986) and ((Partee 1984)) and treated there as supporting their position that past tense event sentences in a discourse make available reference points which are situated *after* the events they describe. When such a sentence is followed by a past tense state description, then this ‘post-eventual’ reference point can then be used to locate the state described by this second sentence. Note that as it stands, such an account can deal with only one of the two interpretations of (6.3) – that according to which the blinding light is the result of turning the switch, rather than a condition that is terminated by this act. But we do not think that the Hinrichs-Partee treatment of reference points is supported even by this interpretation of (6.3). The event contributed by a sentence can serve as ‘reference point’ for the temporal location of the eventuality introduced by the next sentence. But there are two different ways in which it can do that, and the difference between these is of crucial importance; one of them is driven by rhetorical factors, the other is not.

norm for simple past tense state descriptions are interpretations which locate the TPpt in the past of *n*. The alternative interpretation, in which the TPpt is identified with *n*, becomes available only when this interpretation is blocked.

For present perfect sentences such an alternative doesn't arise. Their analysis always involves identifying TPpt with *n*. The over-all effect of interpreting such sentences will typically resemble that of the interpretation we have proposed for (6.2.a) in that an event is located in the past of *n*. (Even for state descriptions with present perfect morphology we get this effect when their state descriptions are coerced via closure.) We know of no examples of sentences of this form where such an analysis does not produce the intuitively correct result: Sentences in the present perfect always identify, as we are arguing in this section, their TPpts with *n*. And non-present perfects differ from present perfects just in that they locate the TPpt in some other way. In these respects the account of present and non-present perfects endorses the proposals of (Kamp and Reyle 1993) and (Kamp and Rohrer 1983).⁶

Note that since we now have two different versions of the past tense, we will from now on need two different feature values for the feature function that assigns values to nodes of category T. (We will refer henceforth to this feature function as 'TENSE'.) We label these values of TENSE as 'past₁' for the past tense which identifies the TPpt with *n* and 'past₂' for the past tense which situates the TPpt in the past of *n*. As entailed by the commitments we have made, past₂ selects for state descriptions, with no options for event-to-state coercion. past₁ selects for event descriptions, but allows for state-to-event coercion. But these coercions must be triggered by the mechanisms that establish how the given sentence or clause is rhetorically connected to one or more others within the discourse.⁷

⁶ The account of tenses in (Kamp and Reyle 1993) and (Kamp and Rohrer 1983) treats the past perfect form as ambiguous between a true 'past of a perfect' (the analysis adopted in this paper) and an analysis that makes it the past-directed shift of a simple past. Thus the sentence 'Fritz had written a letter.' can be analysed as describing the result state of an event of Fritz writing a letter as holding at some past TPpt (the analysis we adopt in this paper) or as directly locating the event of Fritz writing a letter in the past of this past TPpt. We aren't quite ready to go into the question whether this distinction is still needed in the account presented here. We will return to it in Section 6.2.

⁷ If the rhetorical connections do not licence such a coercion, then the interpretation fails, indicating that past₁ was the wrong feature value to begin with. In such cases the correct analysis must involve assigning the TENSE-value past₂.

6.2 Representation constructions for past perfect sentences

It will be useful to illustrate the various assumptions we have made in the course of this discussion by presenting the representation construction of an actual sentence pair. We start with a past perfect sentence which receives its past TP_{pt} from the preceding sentences in the discourse, as in (6.4).

(6.4) At seven Fritz called Maria. He had submitted a paper to an international journal.

As regards the representation construction for the first sentence of (6.4) there is little that *is* different from what we have seen before. But one thing is different, viz. the details of event location that are triggered by the value past_1 assigned to T. (Note that since the complement representation of T is an event description for this sentence, only past_1 is possible here.) past_1 requires the introduction of a time discourse referent ($t_{tp,1}$) that is to play the role of TP_{pt} in the location of the referential argument e_1 of the complement representation. This discourse referent comes with the requirement that it be resolved in context (to some time or eventuality discourse referent that is made available by the discourse context), and as in other work (in particular (Reyle et al. 2007)) we treat this requirement as a presupposition. Exactly what the resolution options are for the TP points introduced by the different values of T is a question to which we do not claim to have the final answer; all we can do is present certain constraints on TP point resolution as we go along. For past_1 , however, a simple answer, which suffices for all the cases we will consider in this paper, will do, viz. that the TP_{pt} is to be identified with n . But for past_2 the matter is more complicated; we will turn to this question when we get to the semantics construction for the second sentence of (6.4). In general, we will represent the resolution requirement on a TP point in the form of a presuppositional DRS which (i) has the discourse referent for the TP point in its universe, (ii) has an empty condition set, and (iii) bears as subscript the label ‘TP’, followed by the name of the triggering TENSE feature. This label serves as a shorthand for the resolution constraints that apply to the presupposition in question.⁸ As in (Reyle et al. 2007) (and

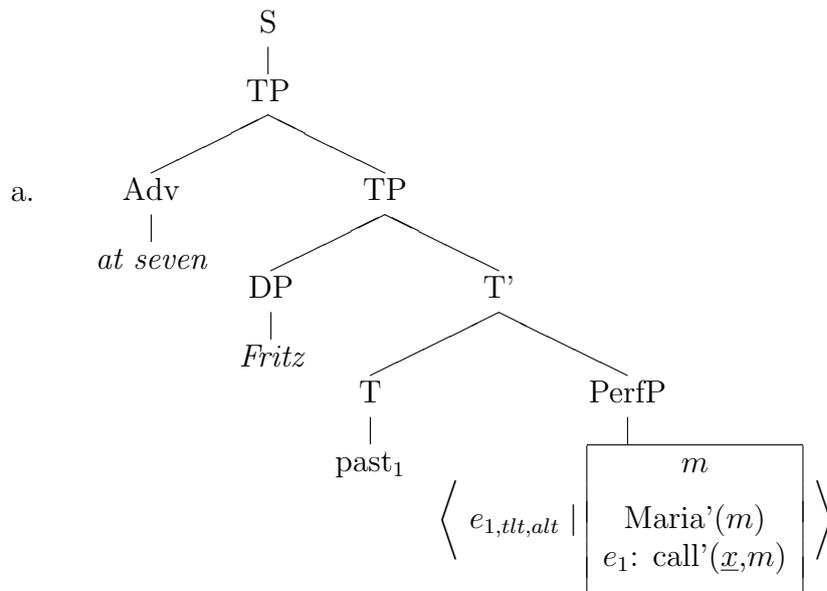
⁸ We already observed that we have only partial knowledge of what these constraints are. So the labels serve just as short-hands for the constraints that would eventually have to be spelled out in full in that component of the grammar which deals with presupposition resolution but also as signals pointing to the work that still has to be done towards finding out what the relevant constraints are.

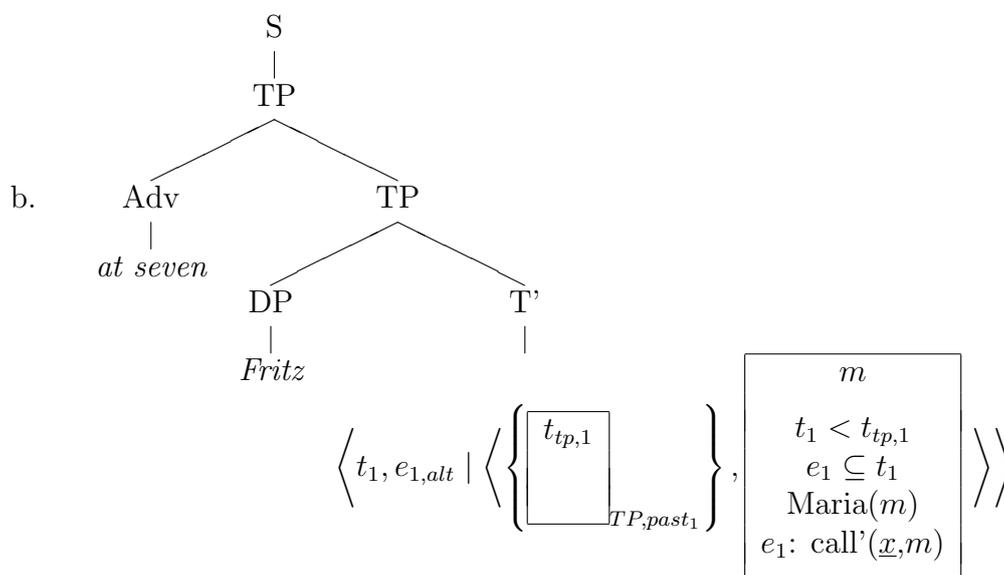
other work, see e.g. (Kamp and Reyle 2011)), we left-adjoin the representations of the presuppositions generated by a sentence or sentence part to the non-presuppositional DRS for that sentence or sentence part. (In the present case, where we are dealing with just one presupposition, this set is a singleton.)

We further assume that *call* is a non-target state event verb, whose lexical entry is like the one we gave for *walk*, except that *call* is a transitive verb.

In order to show the effect of the operations triggered by T we show the construction for the first sentence of (6.4) at the point where the representation for PerfP has been obtained. (Since Perf has the value -perf in this case, and Asp the value Default, this representation is the same as that for the VP.) This construction stage is given in (6.5.a). The result of executing the T operations is given in (6.5.b).

(6.5)





As noted, the presupposition concerning $t_{tp,1}$ is in this case (where the TENSE-value is $past_1$) automatically resolved to n . This resolution has the effect that the presupposition is eliminated. In its stead the discourse referent $t_{tp,1}$ is added to the universe of the non-presuppositional DRS and the condition ‘ $t_{tp,1} = n$ ’ is added to its condition set. The result is shown in (6.10.a).⁹ The semantic representation can then be further simplified by eliminating $t_{tp,1}$ from the DRS universe, eliminating the condition ‘ $t_{tp,1} = n$ ’ from its condition set and replacing the remaining occurrence of $t_{tp,1}$ by n . We do not display the effect of this simplification separately, but it has been adopted in the final DRS for the first sentence, given in (6.10.b). This DRS will be needed as discourse context for the interpretation of the second sentence of (6.4).

We need a brief interlude at this point in which say something about prepositional adverbials such as *at seven*. The interlude is a little awkward insofar as it has nothing to do with the perfect. But we will be making use of temporal adverbs like *at seven*, *on Friday*, *in April* and the like repeatedly in what follows, and expressions of this kind have some special semantic properties which are crucial to the contributions they make to the interpretation of the sentences and bits of discourse in which they occur. So it seems appropriate

⁹ According to the ‘official’ way of handling presuppositions, as described for instance in (Kamp et al. 2011), presuppositions are resolved only after a representation containing them has been constructed for the entire sentence. But often it is convenient and harmless to resolve certain presuppositions earlier – ‘on the fly’, so to speak. The transition from (6.5.b) to (6.10.a) is an illustration of this.

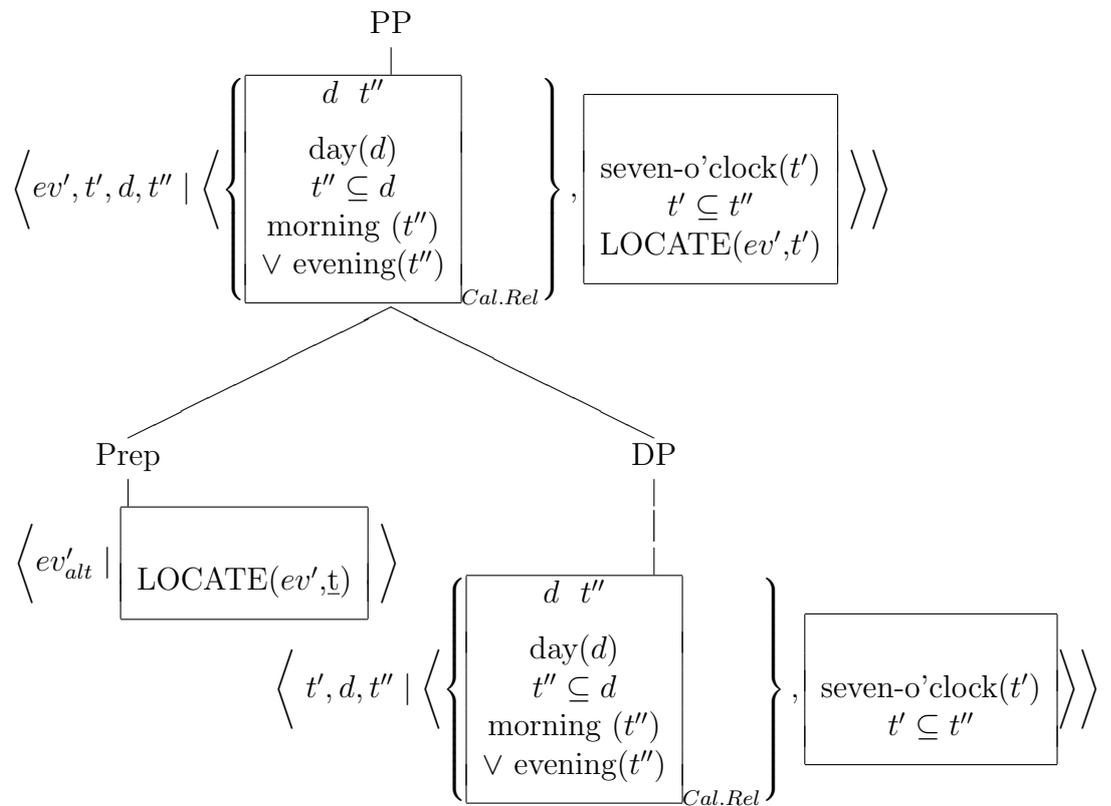
to have a look at then somewhere in this essay, and this is as good a place for doing that as any, even if it isn't a particularly good one, because it will interrupt the flow of the main argument.

Phrases like *seven* in *at seven* or *Friday* in *on Friday* function as names – they are *referential* in the sense that particular occurrences of them always come with the pretense of referring to particular times or days (though like bound pronouns their reference may vary with the values of some quantified phrase in whose scope they are standing). We will make the presumably uncontroversial assumption that *seven*, *Friday* and other such time-denoting expressions occurring in prepositional temporal adverbs of the kind of *at seven* are DPs. The reference of the occurrences of these DPs depends on the one hand on the context in which they are used and on the other on the Calendar adopted in the society in which utterances involving them are made. Our calendar determines the ways in which we determine years, months, days and times of day, making available for this purpose a range of interlocking concepts. These concepts are largely (if not wholly) conventional and form a self-contained system for the identification of temporal instants and intervals. From a linguistic point of view this system isn't particularly interesting, except for the special kind of context dependence that we find in expressions like *at seven* and that is the motivation for this interlude.

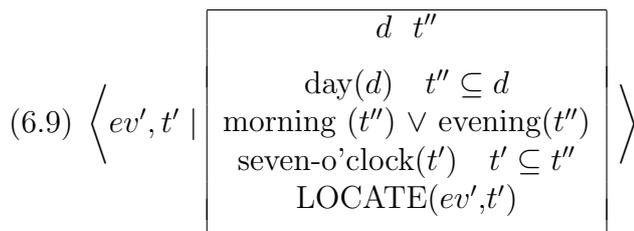
What time is denoted by *seven* in an occurrence of *at seven*? Evidently the denotation must be some time that satisfies the predicate of being a 'seven o'clock time'. Each calendar day, running from midnight to midnight, contains two such times; so in order to determine the referent of a given occurrence of *seven* we need to determine the day within which the referent is situated and furthermore whether the time is that in the morning or the evening of that day. We can represent these two identification tasks in the same way in which we have been dealing with matters of contextually resolvable semantically important but syntactically missing information, viz. as a presupposition, with an associated regime for its justification or resolution. In fact, given our conventions for the representation of presuppositions the most natural representation of the presuppositional information in this case involves a single presupposition with two presupposed elements, one for the day and one for the choice between morning and evening (as a way of distinguishing between '07.00 hours' and '19.00 hours'). When a term like *seven* occurs in a sample sentence as part of a linguistic text such as this one, these presuppositions must be accommodated, by assuming that there is some calendar day and some choice between morning and evening such that *seven* denotes the clock time determined by that day and that choice. But this is

The insertion of the semantics for *at* for its occurrence in *at seven* instantiates the referential argument *ev* by a new eventuality discourse referent and turns the non-referential argument *t* into an argument slot. This slot gets then instantiated by the referential argument of the governed DP *seven* in building the semantics of *at seven* from its two constituents. The semantic representations of *at seven* and its two constituents are shown in (6.8).

(6.8)



Accommodation of the presupposition of the PP representation transforms it into the simpler (6.9).

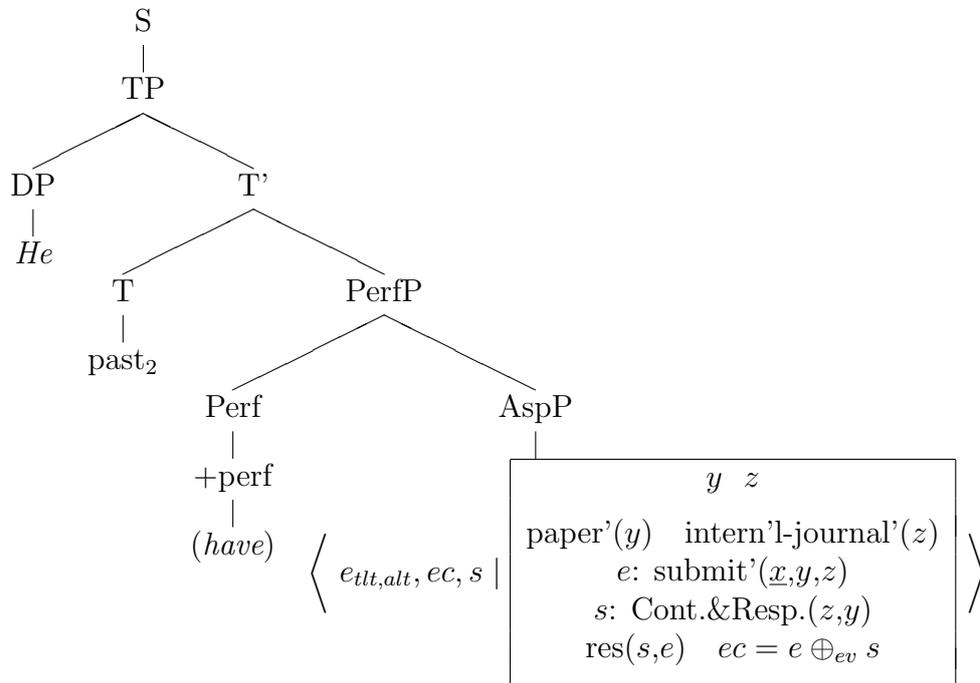


After dealing with the subject DP *Fritz*, which is uninteresting from our present point of view, the resulting representation of the lower TP-node is combined with the representation of the Adverb. This is a case of adjunction: the referential argument of the input to the adverb, here the discourse referent e_1 , gets unified with the referential argument ev' of the Adverb representation, whereupon the two DRSs are merged. In the transition from the upper TP to S the remaking discourse referents in the store are bound through transfer into the Universe of the (main) DRS, with as result the DRS in (6.11).

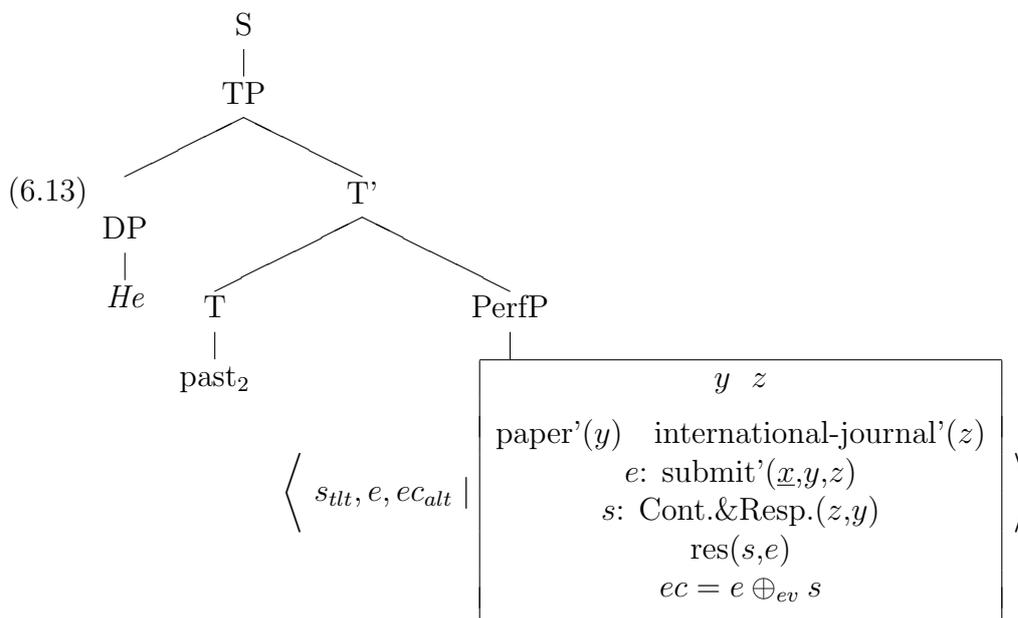
$$(6.11) \quad \boxed{\begin{array}{c} t_1 \ e_1 \ f \ m \ t' \\ t < n \ e_1 \subseteq t_1 \ \text{seven-o'clock}(t') \ \text{Fritz}(f) \ \text{Maria}(m) \\ e_1: \text{call}'(f,m) \end{array}}$$

We start the representation construction for the second sentence of (6.4) once again at the point where the representation of the AspP node is in place.

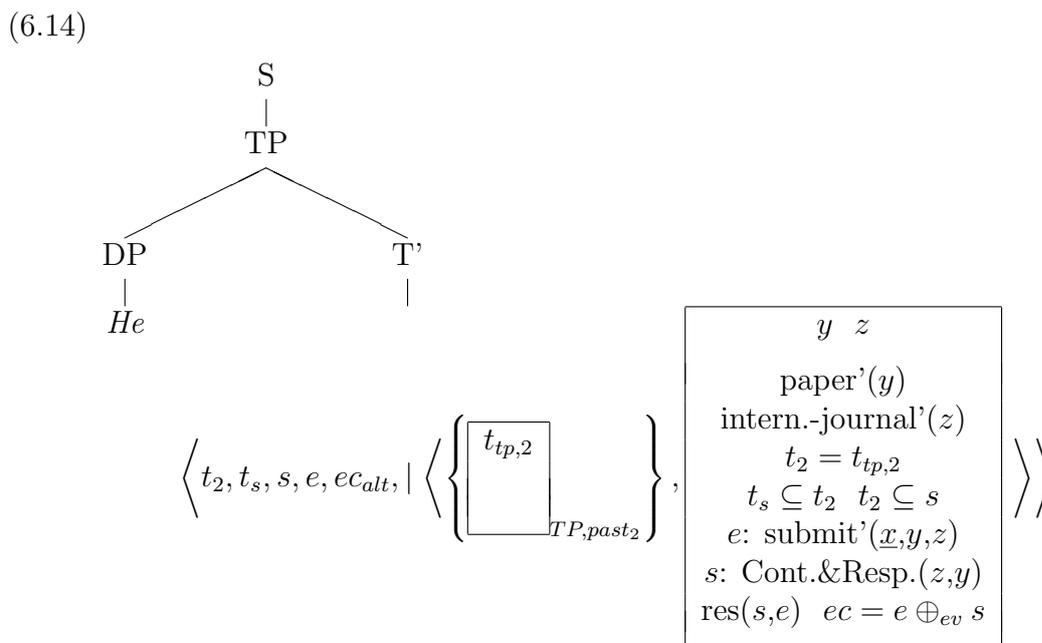
(6.12)



The operator triggered by English +perf has the usual effect, shown in (6.13).



It is in the execution of the next construction step that the new rules for locating the state description under the PerfP node of (6.10) come into action. We present the official procedure in full detail, including the introduction of a self-location time t_s for the state s that is to be located. In addition to this introduction there is the introduction of the TPpt. The results are shown in (6.14).



This time we postpone the resolution of the TPpt presupposition until after we have constructed the preliminary representation for the entire sentence. The steps needed to get there are not quite the same as before, but we skim over one of the differences, by resolving the pronoun *he* on the fly to the subject *Fritz* of the first sentence.¹¹ After this step the remaining discourse referents in the store must be transferred to the universe of the non-presuppositional DRS. In connection with this transfer of discourse referents from store to DRS universe, however, there is a question that needs addressing. (It is one that we could have, and perhaps should have, dealt with before. But at this point the matter can wait no longer.) At issue is the still unused annotation *alt* of *ec*. The situation presented by (6.13) is one that arises quite often, viz. whenever the sentence or clause that is being interpreted lacks a temporal adverbial that could have made use of *alt*. We see such sentences as cases in which the opportunity for adverbial location is left unused: The option was there, but on this occasion it just wasn't exploited by any constituent from within the sentence. Formally, we implement this understanding of sentences and clauses without temporal locating adverbials by stipulating that when the *alt* notation hasn't been used at the point where sentence representation has run its course and the time for transfer of the remaining discourse referents in the store has come, then the *alt* feature is simply removed from the discourse referents in the store that still bear it.¹²

(6.15) shows the result of these operations: the 'preliminary representation' of the second sentence of (6.4), a representation in which one of the presuppositions triggered by the sentence has not yet been resolved but which is otherwise complete.

¹¹ Strictly the pronoun *he* should be treated as another presupposition trigger; and if it were, its presupposition and the TPpt presupposition would together form a two element presupposition set, and the two presuppositions in that set would then be resolved after the preliminary representation of the sentence (the representation of the S node) would have been completed. But this is one of the many cases in which the canon can be relaxed and individual presuppositions may be resolved as they are generated.

¹² Perhaps the presence of an unused *alt* annotation should be treated as the trigger for further temporal location of the annotated discourse referent via the identification of rhetorical relations between the current sentence and the antecedent discourse, of the sort we touched upon earlier in this section. Here we will not explore this option further.

(6.15)

$$\left\langle \left\{ \begin{array}{c} t_{tp,2} \\ \hline \end{array} \right. \right\}_{TP,past_2} \right\rangle, \quad \left\langle \begin{array}{l} t_2 \quad t_s \quad s \quad e \quad ec \quad y \quad z \quad f \\ \text{Fritz}(f) \quad \text{paper}'(y) \\ \text{international-journal}'(z) \\ t_2 = t_{tp,2} \\ t_s \subseteq t_2 \\ t_2 \subseteq s \\ e: \text{submit}'(f,y,z) \\ s: \text{Cont.\&Resp.}(z,y) \\ \text{res}(s,e) \\ ec = e \oplus_{ev} s \end{array} \right\rangle$$

What remains is the resolution of the TPpt presupposition. Since we are dealing with a complex TENSE value here (viz. $past_2$), resolution is a more complicated business than it was for the simple TENSE value $past_1$ in the first sentence of (6.4). $past_2$ requires the identification of a time that can serve as TPpt, with the proviso that it must precede n . In cases like the one before us, in which no TPpt is made available by the sentence itself¹³, the TPpt can only come from the discourse context, which in our case is given by the DRS in (6.10.b) for the first sentence of (6.4). There are three discourse referents in the universe of this DRS that could in principle serve as TPpt for the state described in (6.10.b), t_1 , e_1 and t' . Identifying $t_{tp,2}$ with any one of these assigns an interpretation to the second sentence of (6.4) that corresponds to our intuitions: Fritz's submission of his paper preceded the time when he called Maria. But which of these should be chosen? This is one of the questions to which we do not feel we have reached a conclusive answer. But there is some relevant evidence. Consider the variant (6.16) of (6.4) in which the adverbial *at five* is replaced by *yesterday*:

(6.16) Yesterday Fritz called Maria. He had submitted a paper to an international journal.

One scenario in which (6.16) comes out true is that in which at some time (five o' clock, say) on the day preceding the utterance time Fritz calls Maria after having submitted a paper to some international journal *earlier that day*. This excludes the discourse referent t' for the day denoted by *yesterday* for identification with the TPpt of the second sentence, since that would lead to an interpretation which excludes this scenario (since the submission would

¹³ But see the next example

have had to have taken place before yesterday).

We believe that this argument applies quite generally, excluding the denotations of locating adverbials generally as possible antecedents for the TPpts of subsequent sentences, and we will proceed on this assumption henceforth. But that still leaves the choice between eventualities and the location times introduced by TENSE values. To address this matter we should return to the new rules for eventuality location given in (5.8), according to which the location of any eventuality ev – and this now applies to events as well as states – involves the introduction of a self-location time t_{ev} . Given this way of temporally locating the eventualities introduced by verbs, we have a further type of potential candidate for the resolution of subsequent TPpts; and as far as we can see it is this discourse referent that is the most likely candidate. And that is what we will assume.¹⁴ As stated in (6.17), our assumption only applies to a certain class of cases. But if we are right, then it covers all or most of those on which discussions of ‘temporal anaphora’ have concentrated. In particular it covers (6.4).

(6.17) Suppose that S_2 is the second of a pair of two consecutive past tense sentences ‘ $S_1.S_2$ ’ and that $t_{tp,2}$ is the discourse referent for the TPpt involved in locating its ‘main eventuality’ (the referential argument of the complement representation to its T node). Suppose further that the $t_{tp,2}$ -presupposition is resolved through identification with a discourse referent in the universe of the DRS for S_1 . Then there are two possibilities:

- (i) The main eventuality of S_1 is an event e_1 . In this case, $t_{tp,2}$ is to be identified with $\text{dur}(e_1)$.
- (ii) The main eventuality of S_1 is a state s_1 . In this case, $t_{tp,2}$ is to be identified with the self-location time t_{s_1} of s_1 .

Applying our hypothesis (6.17) to the resolution of the TPpt presupposition of (6.15) we identify $t_{tp,2}$ with e_1 . This way of resolving the TPpt presupposition leads from (6.15) to (6.18).

¹⁴ Note that on the compromise solution we adopted when discussing (5.8) self-location times are introduced for states but not for events. In this compromise it is the event itself that has to serve as resolution candidate for the TPpt presupposition. It is to this compromise solution that the statement in (6.17) of our hypothesis for the sentence-transcendent resolution of TPpt presuppositions has been trimmed.

(6.18)

$t_2 \quad t_s \quad s \quad e \quad ec \quad y \quad z \quad f$ Fritz(f) paper'(y) international-journal'(z) $t_2 = t_{tp,2} \quad t_s \subseteq t_2 \quad t_2 \subseteq s$ e : submit'(f, y, z) s : Cont.&Resp.(z, y) res(s, e) $ec = e \oplus_{ev} s$ $t_{tp,2} = e_1$

6.3 Sentence-internal resolutions of TPpt presuppositions

In (6.4) the TPpt presupposition of the second sentence is resolved via the discourse context that is contributed by the first sentence. But that isn't always how TPpt presuppositions are resolved. In (6.19) it is the adverb *at five/yesterday* that provides the resolution for its own TPpt presupposition.

(6.19) At seven/yesterday Fritz had submitted a paper to an international journal.

More correctly, identifying the TPpt with the denotation of the adverb gives one of the possible interpretations of this sentence, that according to which it was the case at seven, or yesterday, that Fritz had submitted a paper to an international journal, i.e. that the submission took place some time before the adverb time. The sentence also has another interpretation, viz. that at some unspecified past perspective time it was the case that Fritz had submitted a paper to an international journal at the earlier time of five o'clock (or the earlier time denoted by 'yesterday'). In this second interpretation the adverb is used to locate not the TPpt but the event e (or perhaps the event complex ec).

In fact, this ambiguity of sentences like (6.19) is one of the notorious puzzles in the domain of tense and aspect. Note that at least the second interpretation of (6.19) is also possible for the sentence in (6.20.a), in which the adverb occurs in sentence-final rather than sentence-initial position.¹⁵ Given that

¹⁵ The first interpretation for (6.19) is not all that easy to get for (6.20.a) and requires special intonation when the sentence is spoken. This is an information-structural effect of

the adverb *at three* of (6.20.a) can be interpreted as locating the submission event and that *at five* in (6.19) can be interpreted as identifying the TPpt, one would expect that (6.20.b) is an acceptable sentence too, in which *at seven* is interpreted as in the first interpretation of (6.19) and *at five* as in (6.20.a). But that is not the case: (6.20.b) is illformed. Apparently, the roles played by *at seven* in the first interpretation of (6.19) and *at five* in (6.20.a) cannot be combined in a single sentence.¹⁶

- (6.20)a. Fritz had submitted a paper to an international journal at five.
 b. At seven Fritz had submitted a paper to an international journal at five.

One general strategy for explaining this combination of data is as follows: sentences of the forms in (6.4) and (6.20.a) involve a certain kind of structural ambiguity and each of the two possible structures determines one role for a temporal adverbial adjunct. In particular, in the interpretation of (6.19) the adverb can be made to play either role, by assigning the sentence either one of its two possible syntactic structures. But for a sentence like (6.20.b) neither sentence structure will yield an acceptable interpretation, since the first structure excludes the second role for the second adverb and the second structure excludes the first role for the first adverb.

This is the general strategy we adopted in earlier work in order to account for this puzzle and that we also adopt here.¹⁷ But exactly what form should the

which we take note without making an attempt to go into details. We will return to this matter briefly in Section 9.

¹⁶ There is a complication here that we cannot discuss at this point and must postpone to Chapter 9. It has to do with the adjunction sites of temporal locating adverbials. So far we have been assuming that such adverbs are adjoined to TP. For the sentence-initial occurrences of such adverbials, to which our examples have so far been restricted almost without exception, this is likely to be correct (with few if any exceptions). But sentence-final occurrences are a different matter. We will discuss the question of the possible adjunction sites for temporal adverbials in some detail in Chapter 9. Until then we will assume that all adverb occurrences, sentence-final as well as sentence-initial, are TP adjuncts.

¹⁷ A different kind of strategy is adopted in (Klein 1994). Klein blames the ungrammaticality of (6.20.b) on a kind of semantic ‘overdetermination’, which he describes with the help of his notion of *p-definiteness*. Adverbs such as *at three*, *at five* and *yesterday* are ‘p-definite’ in the sense that they make temporal location in sentences like (6.19) and (6.20.b) ‘definite’. But you can make location definite just once, whichever way you do it. So two adverbs are too much of a good thing. Unfortunately it is not easy to define p-definiteness in such a way that it is immune to counterexamples. (For instance it is

strategy take? In earlier work we postulated a structural ambiguity between an analysis of the past perfect as past-shifted perfect and an analysis as past shifted simple past. This assumption was combined with the principle that temporal adverbs like those in (6.19) and (6.20) always refer to the described eventuality. When a past perfect is analysed as a shifted simple past, then an accompanying adverb must locate the eventuality introduced by the verb; if it is analysed as a shifted perfect, then the adverb must locate the result state.

This way of accounting for the data in (6.19) and (6.20) is still open to us, but it is unattractive in the light of our general strategy of analysing finite perfect forms as decomposable into a non-tensed perfect and a finite tense; analyzing the past perfect as a past-shifted simple past would break this general pattern. But given the changes in processing of temporal and aspectual information that we have already adopted in this essay, there is also another option. This is to assume a structural difference that is much like that between the regular perfect of German and the German Zustandsperfekt: The execution of the +perf value of T allows for two different ways of handling *alt*; *alt* can either be shifted to the result state *s*, as it is in the case of the Zustandsperfekt, or it can remain at the event *e*. Since temporal adverbs select as their location target the discourse referent that carries *alt*, the way in which the past perfect is executed will determine whether the adverb will locate *e* or *s*. But because the choice must be made one way or another, there will always be only one adverbial location target; so if there are two adverbs, they can never be used to locate *different* elements of the event structure described by the sentence. And of course, two adverbs like the ones in (6.20.b) cannot locate the same target since their denotations do not overlap. It is this second strategy that we adopt.

However, the strategy cannot quite stand as we have described it. The explanation that it gives us of the ill-formedness of (6.20.b) is in need of two qualifications. The first is that as we have stated it the explanation doesn't apply to (6.21); for we have no basis for claiming that the time described by *some time* is disjoint from that denoted by *at seven*. What accounts for the ill-formedness of (6.21) is, rather, that the role of adverbial locator may

unclear why the combination of *at five* and *at some time* is more 'definite' than *at five* by itself, but (6.21) seems just as ill-formed as (6.20.b.)

(6.21) At seven Fritz had submitted a paper to an international journal at some time.

The difficulties that the p-definiteness account runs into are discussed in detail in ((Rothstein 2008)). In the light of Rothstein's arguments it is hard to see how the p-definiteness account of these data could be fixed.

be filled only once. A clause with two adverbials both aspiring to this role violates some sort of Theta Criterion. One way to capture this prohibition formally is to assume that temporal adverbials can also be marked with the subscript *alt*, that only adverbs subscripted in this way can be used to locate an eventuality discourse referent marked with *alt*, and that only one adverbial per clause can bear the feature *alt*. What renders both (6.20.b) and (6.21) illformed on this account is when one adverbial in the sentence is *alt*-marked, then that adverbial will be used to locate the *alt*-marked eventuality discourse referent, but then there is nothing left to do for the other adverbial, which therefore cannot be integrated into the semantics of the clause.

The second issue we must face is that there are sentences which on a superficial perusal seem to allow for precisely that which is not possible in (6.20.b) and (6.21) and that the implementation we have just described rules out as well. Examples are the sentences (6.22.a,b). Both sentences are wellformed, and in each of them both adverbials seem to be making a genuine contribution to temporal location.

- (6.22)a. Yesterday Fritz called at five.
 b. Yesterday Fritz had called at five.

Intuitively it is clear how these sentences differ from the ones in (6.20.b) and (6.21): *yesterday* and *at five* provide temporal locations of the eventuality on question that belong to different ‘granularity levels’. But putting things this way doesn’t in and of itself give us an explanation of how the sentences in (6.22) can be well-formed. The following reformulation does better: the adverbial *at five* is *incomplete* in the sense that there are many times which it could in principle refer to and in order to do select one from all the others – one from all the times when it is five o’clock – some further information is needed, about the day that contains the five o’clock time that the given utterance of *five o’clock* is used to refer to. The best current option for dealing with the referential incompleteness of temporal phrases like *at five* is to assume that they come with an ‘identification presupposition’, a presupposition whose resolution must identify a temporal interval within which there is exactly one time that satisfies the descriptive content of the phrase. Sometimes the information needed for the resolution is given within the sentence itself, as it is in (6.22.a) and (6.22.b), where it is provided by the adverb *yesterday*. In others it has to be recovered from the context; and there are also cases where no recovery is possible and the presupposition must be accommodated. The adverb *yesterday* in (6.22.a) and (6.22.b) is just right for the resolution of the presupposition triggered by *at five*, since its denotation is a

day and any day contains just one five o'clock. But in (6.20.b) *at seven* cannot resolve the identification presupposition of *at five*, nor can *at five* resolve the identification presupposition of *at seven*. So there is no way in which the sentence can be given an analysis that meets the various constraints that we have assumed at this point – no matter how we proceed, one adverbial ends up ‘dangling’, in the sense that it cannot make a contribution to the semantics of the clause as a whole.

The same is true also of *at seven* and *at some time* in (6.21). Here we have to involve a further principle, to the effect that *at seven* and *at some time* belong to the same granularity level, and for that reason neither can be used to resolve that identity. Note that if we either replace *at seven* in (6.21) by *yesterday* or *at some time* by *some day*, then the sentence becomes felicitous again. Either way the two adverbs now belong to adjacent granularity levels rather than to the same one. In such cases we get a viable analysis by assigning *alt* to the adverb belonging to the lower level. In order to turn this sketch into a proper account, the details of temporal granularity need to be fully articulated. It should be intuitively clear that this ought to be done within the wider context of the repertoire of calendar-related expression that English and other languages have for referring to points and intervals of time. But this is not the place for such an analysis (for discussion see e.g. (Kamp and Schiehlen 2002)).

So let us set these details aside and return to the other features of the account we adopt for the English Past Perfect. The general strategy we have chosen is as follows: the execution of +perf can take two new forms, which differ in what happens to *alt*: in the first version *alt* moves to s; in the second it remains with the described event. But now we are facing two further difficulties. First, when +perf is part of a present perfect sentence, then, as argued extensively in the first four sections of this paper, the feature management at +perf should take the form of moving *tl* to s and *alt* to ec. Allowing *alt* to move to s would lead to the wrong predictions in this case. In particular, it would yield the wrong (viz. pure result state) interpretation for the sentences in (1.1), and thus destroy the point of departure for this entire essay. Clearly this has to be avoided at all cost. So introduction of the optional treatment of *alt* that we are advocating now must be linked to information about what kind of perfect has given rise to the feature +perf at Perf – is it a present perfect, or a past perfect, or some other kind of perfect?

The solution of this problem consists of two parts. First, the value of PERF must make explicit which operations must be performed to convert the input

representation into the desired output representation. That requires a differentiation of the feature value +perf. We retain the value as is for the case of present perfects, so that no changes are needed in any of the constructions of present perfect sentences that we have already presented. But in addition PERF must be able to select a value that selects the right operations for past perfect sentences. In fact, as we will find presently, past perfects allow for two distinct construals, which involve different operations in the transition from AspP to PerfP representation, so we need two new values. We will call those values ‘+perf(past,e)’ and ‘-perf(past,s)’, respectively. The choice of these labels is motivated thus: ‘+perf(past,s)’ means that *alt* is moved to the result state, ‘-perf(past,e)’ that *alt* remains with e.

The second part of the solution is a mechanism that correlates the choice of PERF-value with information about tense (i.e. the value of the feature function TENSE) which is overt only at a higher level of the syntactic tree. This is an issue we do not deal with here. But we will deal with it shortly.

The second problem arises in connection with the latter of the two options just mentioned. When *alt* is not moved to s, where exactly does it go? Part of our analysis of the English present perfect is that *alt* is moved to ec. But the parallel we drew above with the distinction between the German *Zustandspferkt* and the German regular perfect suggests that *alt* should stay with e. Indeed, we believe that this latter version is the correct one, for both English and German non-present perfects. But this too is something that needs further argumentation, and it is something that at this point we also place on our to-do list.

We are now ready to return to the question that gave rise to the above discussion about the sentence-internal resolution of TP_{pt} presuppositions, as it manifests itself in (6.19). We illustrate the treatment to which we have committed ourselves in the course of this discussion by first giving the construction stage at which the AspP representation has been constructed (see (6.23.a)), followed by the stage with the representation for PerfP (6.23.b), that with the representation for the lower TP (6.23.c) and then that for the upper TP (6.23.d). In (6.23.d) the TP_{pt} presupposition is still unresolved. The result of its resolution is given in (6.24).¹⁸

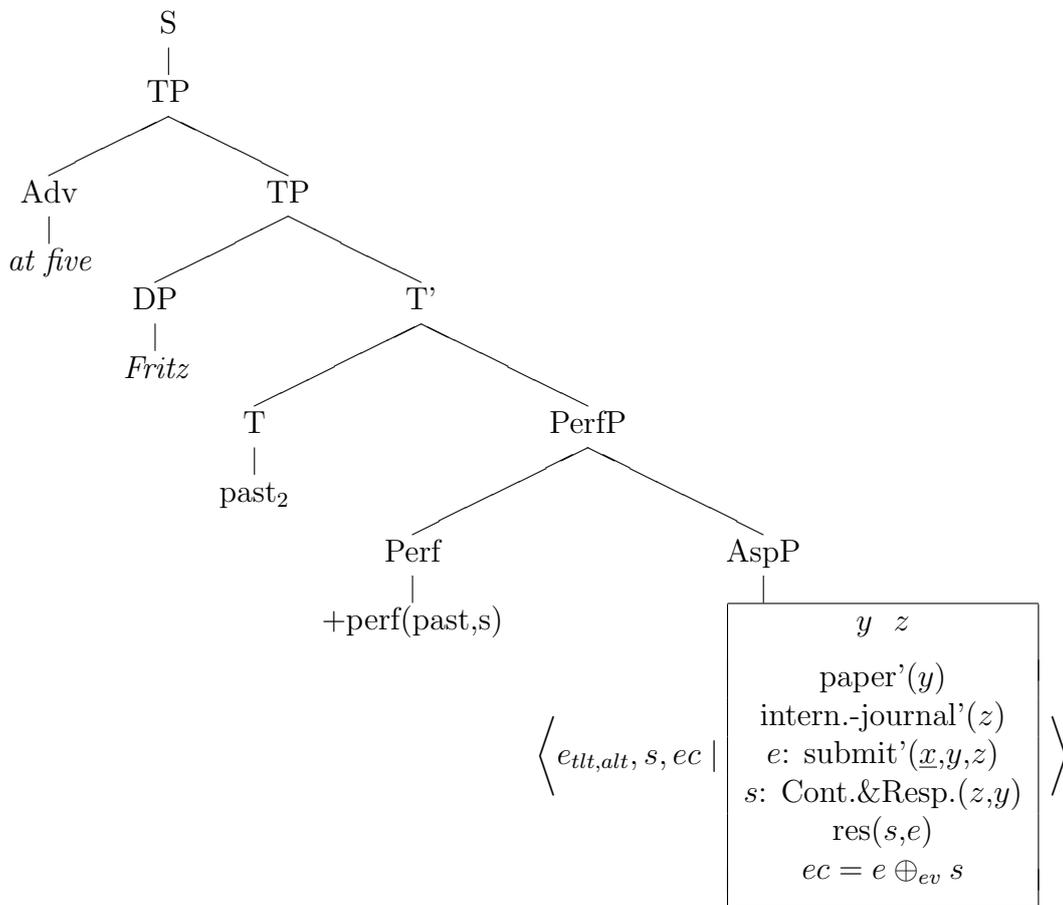
¹⁸ The construction is for the version of (6.19) in which the adverb is *at five*, but there is no significant difference when *at five* is replaced by *yesterday*.

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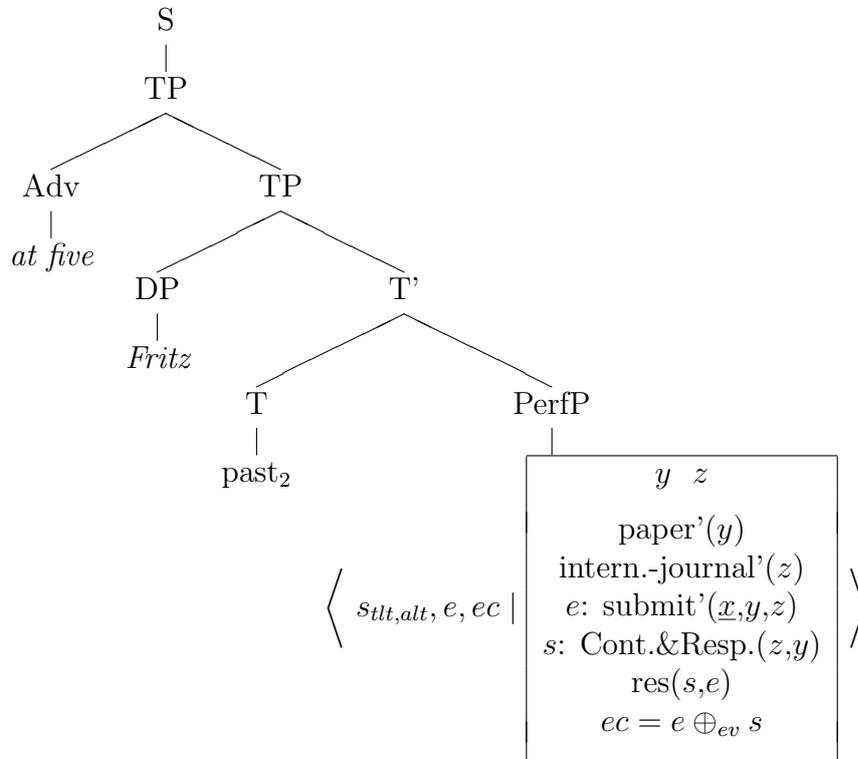
The construction shown in (6.23.a-d) and (6.24) traces the interpretation of (6.19) in which *at five* serves to locate the result state and, therewith, also the TPpt. The structures displayed in (6.23) show the decisive stages in the construction of the alternative interpretation, which treats *at five* as locating the submission event.

(6.23)

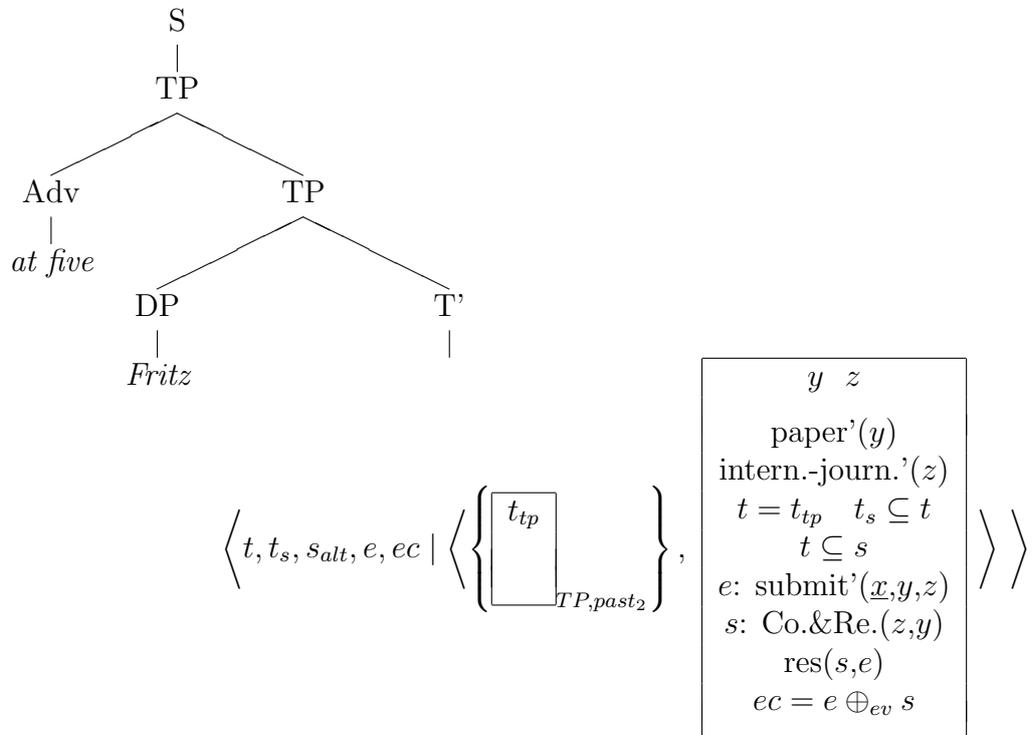
a.



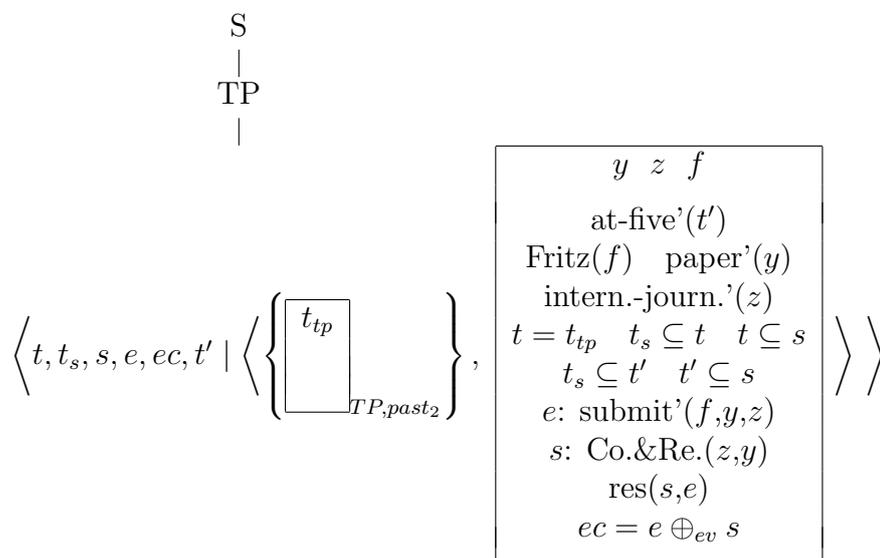
b.



c.



d.



(6.23.d) can be turned into a store-free representation in the by now familiar way by transferring the discourse referents in the store to the universe of the non-presuppositional DRS. But that still leaves the resolution of the TPpt presupposition. As noted, this is a case in which the resolution is sentence-internal and the constituent with which the discourse referent t_{tp} should be identified in this case is t' , which represents the denotation of *at five*. The classical constraint on presupposition resolution proposed in DRT – first for the presuppositions generated by anaphoric pronouns and by certain tenses and temporal adverbs ((Kamp 1981b), (Kamp 1981a)) and then for presuppositions generally ((Van Der Sandt 1992), (Van Der Sandt and Geurts 1991)) – is that all material used in the resolution of a given presupposition must be ‘accessible’ from the position of the presupposition. But is the discourse referent introduced by *at five* accessible to the TPpt presupposition in the relevant sense? Given what we assume to be the syntactic structure of the sentence (6.19) it seems intuitively clear that the answer ought to be ‘yes’; for the adverbial *at five* is adjoined above the point where the TPpt presupposition gets generated. However, the formal definitions of accessibility that are available in the DRT literature do not cater for cases like this one. Stating a definition that covers such cases too is not particularly difficult; but it requires a fair amount of careful adjustments of formal definitions and rule, which we prefer to keep for an occasion where this issue is of more central importance. Here we will just assume that t' is available for the resolution of the presupposition on t_{tp} .

Resolving t_{tp} to t' takes once again the form of (i) adding the condition ' $t_{tp} = t'$ ' to the condition set of the non-presuppositional DRS, (ii) adding the discourse referent t_{tp} to the universe of the DRS and then (iii) dropping the presupposition. The final result is as in (6.24).

$$(6.24) \quad \boxed{\begin{array}{l} t \quad t_s \quad s \quad e \quad ec \quad t' \quad t_{tp} \quad y \quad z \quad f \\ \\ \text{five o'clock}(t') \\ \text{Fritz}(f) \quad \text{paper}'(y) \\ \text{international-journal}'(z) \\ t = t_{tp} \quad t_s \subseteq t \quad t \subseteq s \\ t_s \subseteq t' \quad t' \subseteq s \\ e: \text{submit}'(f,y,z) \\ s: \text{Cont.\&Resp.}(z,y) \\ \text{res}(s,e) \\ ec = e \oplus_{ev} s \\ t_{tp} = t' \end{array}}$$

Note that this resolution of the TPpt presupposition is consistent with the information that is already present in the non-presuppositional DRS of (6.23.d): It tells us that t' includes t_s and is included in s , and that these same conditions hold for t ; and further that t is the same as t_{tp} . In fact, because of this last condition identification of t_{tp} with t' entails identification of t' and t ; but otherwise it contributes no substantive new information.

A practical consequence is that (6.24) can be subjected to a double simplification. First, as noted earlier, we can eliminate t_{tp} in favour of t' . And then we can also eliminate t in favour of t' . The two simplifications lead to the DRS in (6.25).

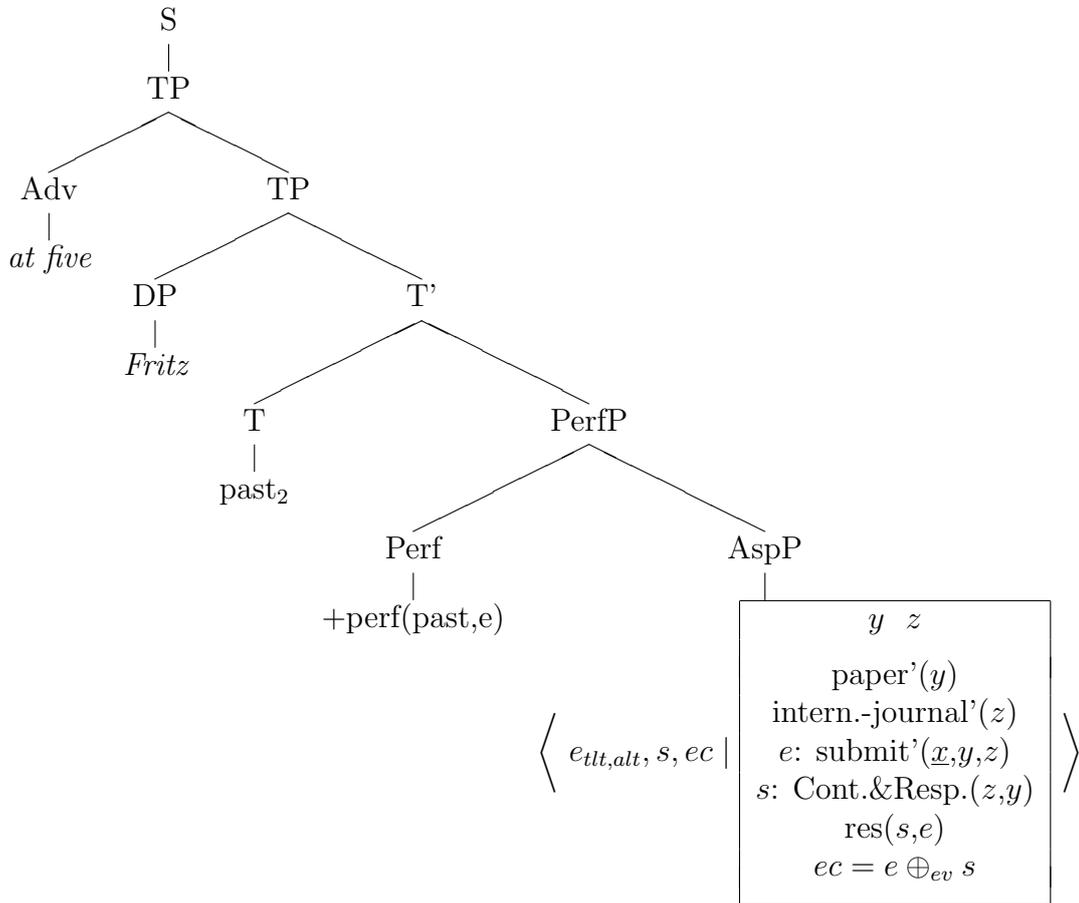
$$(6.25) \quad \boxed{\begin{array}{l} t_s \quad s \quad e \quad ec \quad t' \quad y \quad z \quad f \\ \\ \text{five o'clock}(t') \\ \text{Fritz}(f) \quad \text{paper}'(y) \\ \text{international-journal}'(z) \\ t_s \subseteq t' \quad t' \subseteq s \\ e: \text{submit}'(f,y,z) \\ s: \text{Cont.\&Resp.}(z,y) \\ \text{res}(s,e) \\ ec = e \oplus_{ev} s \end{array}}$$

The structures in (6.23)-(6.25) illustrate the use of temporal adverbials in past perfect sentences as means for the location of the result state and,

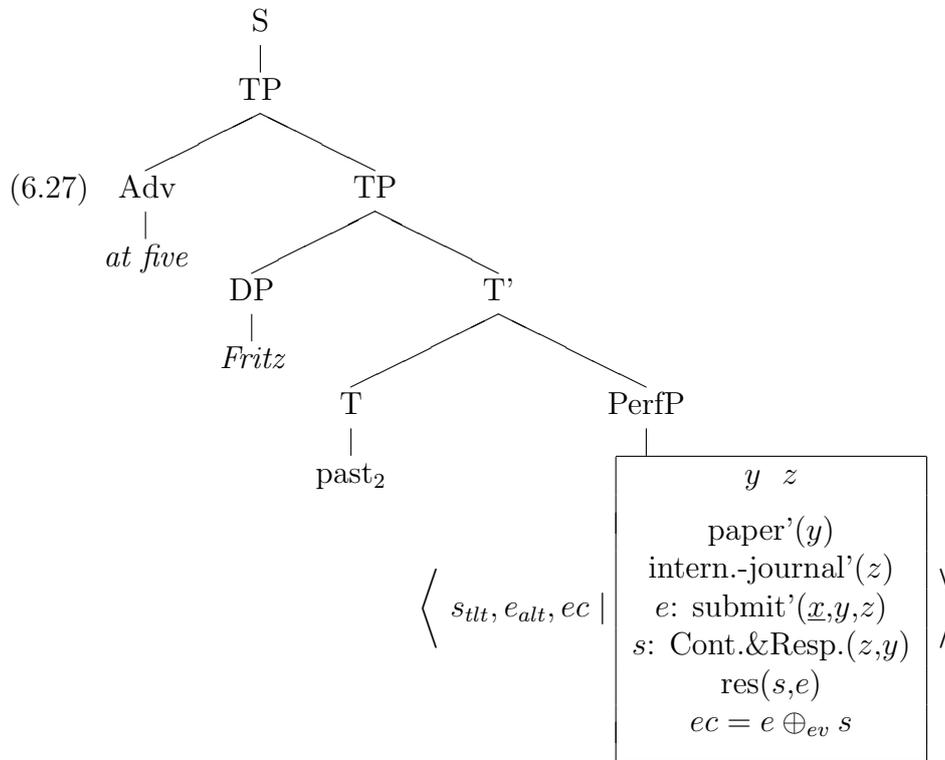
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derivatively, also as locators of the TP_{pt} (at which the result state must hold). But as noted above, a sentence like (6.19) also allows for another interpretation, in which its adverb serves to locate the submission event. This interpretation results when T carries the value +perf(past,e), whose execution involves leaving *alt* at e. We start with (6.26), the counterpart to (6.23.a), which differs from that structure only in its feature value at Perf.

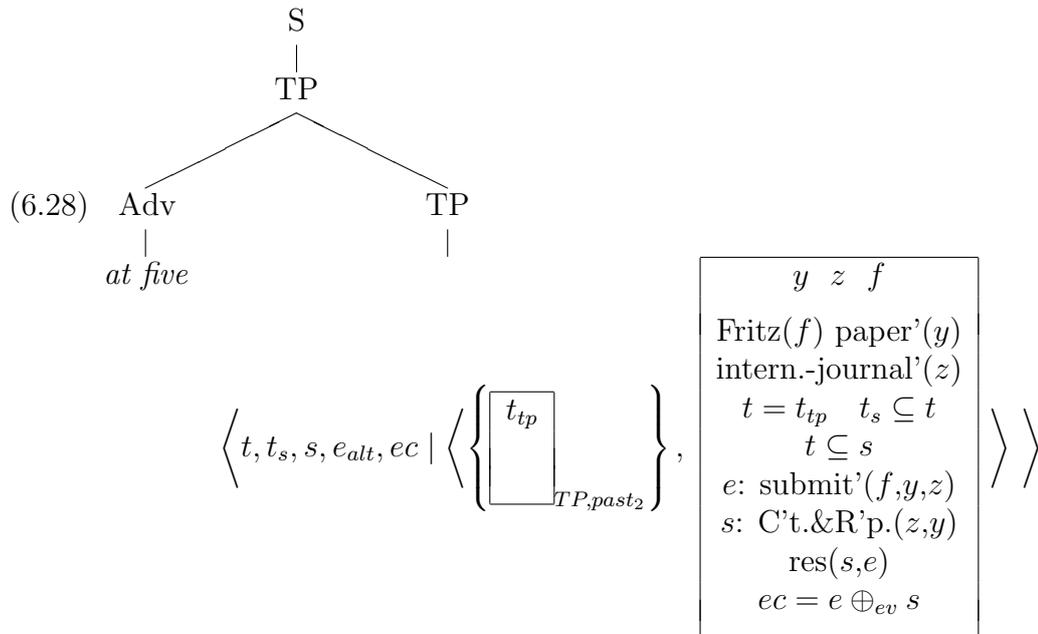
(6.26)



Execution of the operations triggered by +perf(past,e) differs from those which yielded (6.23.b) only in that *alt* has been left at e.



Via the application of $past_2$, and combining the result of that application with the semantics of the subject DP *Fritz*, we obtain the lower TP representation shown in (6.28).



This time the adverb *at five* selects *e* as location target. So the representation of the upper TP is as in (6.29).

$$(6.29) \quad \begin{array}{c} \text{S} \\ | \\ \text{TP} \\ | \end{array} \quad \left\langle t, t_s, s, e, ec, t' \mid \left\langle \left\{ \begin{array}{c} t_{tp} \\ \text{TP, past}_2 \end{array} \right\} \right\rangle, \right.$$

$$\begin{array}{c} y \quad z \quad f \\ \text{five-o'clock}(t') \\ \text{Fritz}(f) \text{ paper}'(y) \\ \text{intern.-journal}'(z) \\ t = t_{tp} \quad t_s \subseteq t \\ t \subseteq s \\ e \subseteq t' \\ e: \text{submit}'(f, y, z) \\ s: \text{Cont. \& Resp.}(z, y) \\ \text{res}(s, e) \\ ec = e \oplus_{ev} s \end{array} \right\rangle \right\rangle$$

In (6.29) resolution of the TPpt presupposition cannot make use of t' , as that would lead to a contradiction: e is included in t' and t_{tp} is included in s . So if t_{tp} is identified with t' , then that would entail that e is included in s . But that contradicts the condition ‘ $\text{res}(s, e)$ ’, as that condition entails that s right-abuts e . Resolution must therefore rely on sentence-external information. Typically this will be the discourse context, as in our treatment of (6.4). In fact, a natural example of this is obtained when we add an adverb like *at five* to the second sentence of (6.4), as in ‘At five he had submitted a paper to an international journal.’, or ‘He had submitted a paper to an international journal at five.’ In that case *at five* in the second sentence would have located the submission event and the t_{tp} -presupposition would have been resolved to the time of the phone call (at seven), introduced in the first sentence.

We conclude this section with a purely technical matter, which is connected with the new feature values $+\text{perf}(\text{past}, e)$ and $+\text{perf}(\text{past}, s)$ that we have introduced in the course of it. The problem that this introduction gives rise to is this: When the perf operators triggered by past perfects are allowed to perform transformations that are not permitted to the perf operator triggered by a present perfect, how can we make sure that our account doesn’t overgenerate? That is – put in more technical terms – how can we make sure that the feature values $+\text{perf}(\text{past}, e)$ and $+\text{perf}(\text{past}, s)$ are attached only to Perf nodes of sentences in the past perfect, and likewise that $+\text{perf}$ only gets

attached to Perf nodes of present perfect sentences?

This problem is, you might say, the result of the architectural assumptions we have been making. Specifically: (i) we assume syntactic structures in which Perf is below T and (ii) we have been operating on the assumption of a general principle governing our compositional semantics, according to which the construction of the semantic representation of a node X of a syntactic structure has access only to information at or below X. This entails among other things that when the operator determined by an ASP value is to be applied to the representation of its sister node, this operation is fully determined by the form of that representation and the feature value at Asp. And that is fine so long as we can be sure that the value at Asp is in accordance with the value of TENSE higher up. But how can we be sure of that?

We deal with thuds problem by dodging it. Or better, we pass it back to the processing stage immediately preceding that of computing the semantic representation of a sentence from its syntactic structure, that of assigning syntactic structure to wheat at that point has been identified as a string of words and morphemes. The module responsible for this immediately preceding stage, the syntactic parser, has, at the point where it passes the complete sentence structure on to the next ('semantic') module, access to all nodes of the structure it delivers, and so is in a position to impose on it alignment constraints between any nodes in the structure, however structurally related. We assume that these constraints have been imposed on the structures that the semantic module gets.¹⁹

¹⁹ Don't we, by admitting this kind of global control mechanism at the level of syntax, give away the essence and substance of semantic compositionality? Can't we, once these kinds of global constraints have been let in, fix any potential violation of semantic compositionality by introducing additional syntactic features as supplementary inputs to the composition process and use global constraints to control when and where these features may be inserted into syntactic structures? We do not know whether all violations could be got out of the way along these lines, but there is no doubt that a good many could. And with regard to those the question remains: Is allowing for such global constraints tantamount to giving up on at least a good part of the substance of compositionality? As regards this second, potentially somewhat more limited question we have no categorical answer to give. But then we do not think such an answer would be appropriate. Our views on the matter, to the extent that we have any, have become increasingly 'pragmatic' (in a non-linguistic sense of the word): Getting the syntax-semantics interface to work for non-trivial fragments of natural languages – in the sense that the account one comes up with predicts truth conditions that accord with speakers' intuitions while operating on the basis of a reasonable, independently motivated syntax – is so hard that even an account which is successful in this could well be considered a genuine achievement even if it makes use of such global constraints. No less than accounts that follow compositionality in every

6.4 More about the difference between present and past perfects

The time has come to return to the two questions we put on our to-do list earlier: (i) How do we avoid the overgeneration that threatens when +perf can be executed in the ways illustrated in our reconstructions of the two interpretations of (6.4)? (ii) What is the justification of leaving *alt* with *e* (rather than shifting it to *ec*) on the second of our new executions of +perf? We will see that there is a close connection between the answers to these two questions. We start with the second.

The answer to this question is quite straightforward. It is revealed by a variant of the sentence combinations that we have been discussing in this section. The variant has been mentioned in passing, but we repeat it here so that its relevance to the current issue can be more easily explained.

(6.30) At seven Fritz called Maria. At five he had submitted a paper to an international journal.

Intuitively the adverb *at five* in the second sentence of (6.30) locates the submission event. This makes it impossible to use the adverb for the resolution of the TPpt presupposition, which therefore has to be resolved in some other way. That too is in keeping with our intuitions about (6.30): the TPpt presupposition should be resolved to the duration of the call-event introduced by the first sentence. But that event is located by the adverb *at seven* and the denotations of the two adverbs do not overlap. This means that if we were, in applying the value +perf of the second sentence, to move *alt* to the event complex *ec*, the intended interpretation would produce a contradiction. For then we would require on the one hand that the result state *s* should, as part of *ec*, be included in the denotation of *at five*, while on the other hand the identification of the TPpt with the denotation of *at seven* would entail that *s* include that denotation, which is obviously impossible.

This shows that the intuitively natural interpretation of (6.30) rules out movement of *alt* to *ec*. Leaving *alt* at *e*, on the other hand, causes no difficulties in this case. And other cases we have looked at confirm that this principle leads to the right results for English past perfect sentences more

respect to the strict letter An account of this sort may give us important insights into how human interpretation works, and no less so than accounts that follow the strict letter of compositionality in every respect. Strict compositionality isn't the sacred cow that it often made into.

generally. So we adopt this rule without exploring further evidence.

The new processing options for +perf also pose another question, which hasn't been raised yet. What kind of result state do these new processing rules require? Or, to phrase the question more explicitly: Do the result states to which *itt* is moved in applications of these options have to be target states or can they be formal result states?

Our reason for assuming that the English Present Perfect requires target or target-like states as result states was based on evidence of the sort provided by sentence combinations like those in (4.2) and (4.3) of Section 4.1 and (4.7) of Section 4.2. But when we transpose these examples from the present perfect into the past perfect, judgements change. For instance, (6.31), the past tense counterpart of (4.2.a), seems unproblematic.

(6.31) Fred had left. But he had come back in the meantime.

The fact that the target state of the leaving event described in the first sentence was terminated between the event and the time that the interpreter will identify as TP_{pt} does not produce the sense of awkwardness (or even ungrammaticality) one has vis-à-vis (4.2.a). This points towards the conclusion that English past perfects of target state verbs do not involve moving *itt* to a target state but to a formal result state.

In the light of this observation about English past perfects of target state verbs it might be expected that in past perfects of non-target state verbs there isn't a need for a target-like state either. More specifically, when the input representation to a past perfect is an event description without a result state specification, there is no need to infer some target-like result state as *itt*-recipient. And indeed, this expectation appears to be confirmed. We give just one example to support this claim, which involves the verb *to call*, in its use – more common in the USA than in Britain – of making a phone call. As applied to phone calls the verb *to call* allows for two interpretations, a 'full' interpretation, according to which it describes a call that actually takes place, in the form of a verbal exchange between caller and called, and a 'partial' interpretation, to the effect that the caller dials the number but where it is left open whether the call goes through or whether it is picked up at the other side. When the verb *to call* occurs in the present perfect there seems to be strong presumption that it is used in the first sense; when such an interpretation is ruled out by the context, then some other target-like state pops up in the interpreter's mind, of the sort of: 'I have done what you

asked me to do' or the 'That has been crossed of the list', which, as we saw in Chapter 5, is one of the prominent uses of the *Zustandspassiv* in German. Consider the sentences in (6.32).

- (6.32)a. I have called them.
 b. I called them.
 c. I have called them, but they didn't answer.
 d. I have called them, but they haven't answered.
 e. I called them, but they didn't answer.
 f. I called them, but they haven't answered.

Although it is difficult to say anything definite about the differences between isolated sentences like (6.32.a) and (6.32.b), divergent tendencies can nevertheless be made out. (6.32.b) seems to be neutral between an understanding of it on which the call went through and one on which it didn't. But (6.32.a) definitely favours the former, with the 'I have done what you asked me' sort of interpretation in the wings in case this interpretation doesn't pan out. In (6.32.c) and (6.32.d) the *but*-clause blocks the 'full call' interpretation. This doesn't render the sentence infelicitous, but it propels the 'I have done what you asked me' interpretation onto centre stage. This effect disappears when the present perfect 'I have called' is replaced by a simple past, as in (6.32.e,f). In addition, there is a further notable difference between (6.32.c) and (6.32.d) and likewise between (6.32.e) and (6.32.f). In (6.32.c) and (6.32.e) the simple past 'they didn't answer' of the *but*-clause is most naturally understood as saying that the call wasn't picked up (at the time when it was made). In contrast, the present perfect 'they haven't answered' in (6.32.d) and (6.32.f) suggests that the speaker left a message on the answering machine of the people she tried to call but that they haven't yet reacted to it.

When the tenses in (6.32) are changed into past perfects, as in (6.33), none of the special effects that can be made out for the present perfects in (6.32), and that distinguish them from the corresponding simple pasts, survive.

- (6.33)a. I had called them.
 b. I had called them, but they hadn't answered.

(6.31) and (6.33) both seem to point in the same direction, viz. that target states and target-like states do not play a part in the semantic analysis of English past perfects. But we have to tread carefully here. For we have

already had to acknowledge two versions of the past perfect, corresponding to the two past tense features past_1 and past_2 . Recall that the first of these only triggers the shift of $_{tlt}$ to the result state while $_{alt}$ remains at e, whereas the second version triggers a shift to the result state of both $_{tlt}$ and $_{alt}$. But this still leaves room for the question we haven't answered yet: Does the conclusion that $_{tlt}$ is shifted to a formal result state apply to both versions of the past perfect or to only one of them?

The question is not so easy to settle. Consider (6.34).

- (6.34)a. At seven Fritz had already left.
 b. At seven Fritz had already left. But he had returned in the meantime.

For reasons that we do not go into here the presence of *already* is an indication that the sentence can only be analysed as a shifted perfect, viz. that its perf feature is $+\text{perf}(\text{past},s)$. In contrast to (6.34.a), (6.34.b) is decidedly awkward, and apparently incoherent. We would have an explanation for this if we assumed that $+\text{perf}(\text{past},s)$ requires shift of $_{tlt}$ to the target state and not to the formal result state. (For then the awkwardness of (6.34.b) would follow from the fact that according to its second sentence the target state of *leave* no longer holds at the TPpt of the interpretation of the first sentence.) Another example that seems to point in the same direction is (6.37).

- (6.35)a. Fritz was sitting by the fire. He had been working very hard for the past week. Now he had submitted his paper.
 b. Fritz was sitting by the fire. He had been working very hard for the past week. Now he had submitted his paper, but he had withdrawn it again only a few hours after having submitted it.

As we will argue at length in the next chapter, the adverb *now* invariably refers to the TPpt. Since on the other hand it functions as locator of the $_{alt}$ -marked eventuality, the only coherent analysis of the third sentence in (6.37.a) is one that involves the feature $+\text{perf}(\text{past},s)$ (an analysis involving $+\text{perf}(\text{past},e)$ is impossible given these assumptions). But here too the continuation of (6.37.a) given in (6.37.b) seems infelicitous and that would be explained by the requirement that the final clause of (6.37.b) entails that the target state of *submit* no longer holds at the TPpt.

But we need to tread carefully here. Perhaps the oddity of (6.34.b) and (6.37.b) is a pragmatic effect, or one that has to do with the semantics

of *already* and of *now*, rather than with the semantics of the English Past Perfect. Given our conclusions about the differences between the present perfects of English and German, viz. that the English Present Perfect shifts *tt* to a target state or target-like state, whereas the German Present Perfect shifts *tt* to a formal result state – it is natural to have a look at the German counterparts of (6.34.b) and (6.37.b):

- (6.36)a. Um sieben hatte Fritz das Haus schon verlassen. Aber er war inzwischen zurückgekommen..
- b. Fritz saß am Kamin. Die ganze Woche hatte er sehr hart arbeiten müssen. Jetzt hatte er sein Papier eingereicht. Aber er hatte es gleich wieder zurückgezogen.

Is there any difference between these examples and their English equivalents? We believe there is: The German examples in (6.36) are clearly better than the English examples in (6.34.b) and (6.37.b). This is consistent with what we concluded about the present perfects of English and German: in the English samples the perfect, now via its value $+perf(past,s)$, moves *tt* to the target state. The German perfect, also via its feature value $+perf(past,s)$, moves *tt* to the formal result state. Because of that the German examples are grammatical, and if there is anything funny about them, that should have to do with pragmatic factors. But the English examples are formally ungrammatical and to the extent that they are acceptable at all, that must be due to the kind of adjustment mechanisms that make us tolerant of what in the strictest sense violations of the rules of grammar we have internalised. With this we have arrived at the following conclusions about the past perfect of English: English past perfects come in two varieties. The first, formally identified by the feature value $+perf(past,e)$, behaves much like the regular present perfect of German: *tt* is shifted to a formal result state and *alt* is retained at e. The second, formally identified by the feature value $+perf(past,s)$, closely resembles the German Zustandsperfekt: it shifts *tt* and *alt* jointly to a result state and that result state must be a target state or target-like state.

However, the parallel between the two versions of the English past perfect and the two German present perfects is not perfect. There is a difference between the English $+perf(past,e)$ past perfect and the regular German present perfect. It has to do with the back-up options that are available when the input representation is a state description. On this point the $+perf(past,e)$ past perfect is like the English present perfect and not like the regular German present perfect: state-to-event coercion can be either via closure or inchoative. We give one example to illustrate this.

(6.37) In January 2003 Fritz was ready to move. He had been living in Tripoli for ten years.

The natural interpretation of the second sentence of (6.37) is that Fritz lived for a ten year period reaching up to and including January of 2003. This is the kind of interpretation that in our account involves inchoative coercion of the state description ‘x live in Tripoli’. The English past perfect that is characterised by $+perf(past,e)$ is thus a new version of the Perfect – one that combines the coercion flexibility of the English Present Perfect vis-à-vis state descriptions as inputs with the neutrality of the German Perfekt vis-à-vis the nature of the result state that is the recipient of *ult*.

6.5 The past perfect in German

So far we have only spoken of the past perfect in English. The gist of our findings was that this tense form allows for two interpretations, an ‘e-version’ and an ‘s-version’, which closely correspond to the regular German present perfect and the German Zustandsperfekt respectively. Given these resemblances – between the *English* past perfects and the *German* present perfects – it would seem a reasonable guess that the German past perfect shows a similar resemblance to the regular German present perfect and/or Zustandsperfekt. This guess can be confirmed by the same kind of evidence of which we presented a few samples in connection with the English past perfect. In particular, it can be shown by the same sorts of arguments that we used above for the case of English that the German past perfect also comes in two versions, an e-version, in which *ult* is moved to s and *alt* remains at e, and an s-version, in which *ult* and *alt* are both moved to s. Since the argument that leads to these conclusions is just like the one we have been presenting for the English case, there seems little point in going through that exercise once more.

important difference between English past and German present perfects: the e-version of the English past perfect differs from the regular present perfect of German in that the former permits inchoative state-to-event coercion when the input representation is a state description, while the latter only allows for coercion via closure. In the light of this discrepancy it is natural to ask what can be said about the German past perfect on this point: Does its e-version side with the past perfect of English or with the (regular) present perfect of German?

The answer is, we believe, that it sides with the former. (6.37) gives a few

examples that move us towards this thought. (The first example, given in (6.38.a), is the German translation of (6.37).)

- (6.38)a. Im Januar 2003 war Fritz bereit, umzuziehen. Er hatte zehn Jahre in Tripolis gewohnt. ('In January 2003 Fritz was ready to move. He had lived in Tripolis for ten years.')
- b. Im Januar 2003 war Fritz bereit, umzuziehen. Seit zehn Jahren hatte er in Tripolis gewohnt. ('In January 2003 Fritz was ready to move. For ten years he had lived in Tripolis.')
- c. Im Januar 2003 war Fritz bereit, umzuziehen. Seit seiner Ankunft in Tripolis vor zehn Jahren hatte er dort gewohnt. ('In January 2003 Fritz was ready to move. Since his arrival there ten years ago he had lived in Tripolis.')
- d. Im Januar 2003 war Fritz bereit, umzuziehen. Seit zehn Jahren wohnte er in Tripolis. ('In January 2003 Fritz was ready to move. For ten years he lived in Tripolis.')
- e. Im Januar 2003 war Fritz bereit, umzuziehen. Seit seiner Ankunft in Tripolis vor zehn Jahren wohnte er dort. ('In January 2003 Fritz was ready to move. Since his arrival there ten years ago he lived in Tripolis.')
- f. Im Januar 2003 war Fritz bereit, umzuziehen. Er war zehn Jahre lang unglücklich gewesen. ('In January 2003 Fritz was ready to move. He had been miserable for ten years.')
- g. Im Januar 2003 war Fritz bereit, umzuziehen. Er war zehn Jahre lang unglücklich. ('In January 2003 Fritz was ready to move. He had been miserable for ten years.')
- h. Im Januar 2003 war Fritz bereit, umzuziehen. Seit zehn Jahren war er unglücklich gewesen. ('In January 2003 Fritz was ready to move. For ten years he had been miserable.')
- i. Im Januar 2003 war Fritz bereit, umzuziehen. Seit zehn Jahren war er unglücklich. ('In January 2003 Fritz was ready to move. For ten years he was miserable.')

The bits of discourse that are most directly relevant to our assessment of the question before us are (6.38.a) and (6.38.c). Both of these have a prominent interpretation according to which the time during which Fritz lived in

Tripolis was the period of ten years leading up to January 2003. The same reading can also be obtained from the simple past versions in (6.38.b) and (6.38.d), which is what we would expect if these simple pasts can be analysed as involving shifts of the TPpt from n to some time before n , given our observations about the differences between simple presents and present perfects in Section 4.3 (see in particular (4.25)): Just as the German simple present can be used to state what has been the case for a period of time leading up to the utterance time, so the simple past, in the interpretation involving backwards shifting of the TPpt, should be usable for the purpose of describing what was the case during some interval leading up to the past TPpt. We also noted in that section that the interpretation of a German present perfect in the same position should be compatible with such a scenario, but its preferential use seems to be to describe the situation in which there was a ten year period not reaching to the utterance time during which the described state held (see (6.38.a)).²⁰

Are the past perfects and simple pasts in (6.38) just like the presents and present perfects as we described them before? It is not easy to be sure, but our impression is that the parallels are not perfect. It seems to us that the German past perfects in (6.38) behave very much like English past perfects in similar environments, as we have described them in the last section (see (6.37)), and thus in this regard like the English Present Perfect, and not like the German Perfekt. So we conclude, if somewhat tentatively, and awaiting the verdict from larger sets of data investigated, that German past perfects allow, like present and past perfect of English, for inchoative coercion of state descriptions they get as inputs.

Our exploration of the past perfects of English and German has led to a couple of new members for our stock of perfect operators. So as to have an easy way referring to the different versions of the past perfect that we have introduced so far in the course of the discussions in this Chapter, we introduce one more bit of notation. We denote as ‘+perf_E(past,e)’ the English past tense that involves the feature +perf(past,e), as ‘+perf_E(past,s)’ the

²⁰ The evaluation of the examples in (6.38) that involve the verb *wohnen* is slightly complicated by the question whether *wohnen* is a state verb or an event verb. In the discussion above we have tacitly assumed that at least in the examples of (6.38) *wohnen* is a state verb. Given the assumptions of this essay that entails that the semantic representation of its AspP is a state description as well and the story then runs as sketched. If *wohnen* is analysed as an activity verb, then the story will have to be told in slightly different way, presumably by assuming that at or below the Asp-level there is a transformation from event into state description; but we have no good idea what *that* story might be like.

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English past tense that involves the feature $+\text{perf}(\text{past},s)$, and likewise for the two versions of the German past perfect.

The upshot of our conclusions – but we remind ourselves and the reader that these are quite provisional – the operator determined by $+\text{perf}_{\mathbb{E}}(\text{past},e)$ is the same as that determined by $+\text{perf}_{\mathbb{G}}(\text{past},e)$ as it is one that already is part of our operator collection. It consists in shift of $_{tt}$ to the formal result state, of keeping $_{alt}$ at e and allowing only for state-to-event coercion via maximisation. This is the operator our earlier analysis associates with the regular present perfect of German.

But our assumptions about the $+\text{perf}(\text{past},s)$ perfects have led to a new operator. First, according to the assumptions we have made, the operators determined by $+\text{perf}_{\mathbb{E}}(\text{past},s)$ and $+\text{perf}_{\mathbb{G}}(\text{past},s)$ are not identical. They are both like the operator of the German Zustandperfekt in moving $_{tt}$ and $_{alt}$ are moved to the result state. But the difference is that the first operator, determined by $+\text{perf}_{\mathbb{E}}(\text{past},s)$, requires this result state to be target or target-like, whereas the second is happy with the formal result state as recipient of the two features. In this the English operator is like the operator from the Zustandperfekt, but the German operator is weaker. On the other hand the two operators coincide in that both allow for inchoative coercion of stative inputs. In that regard they both differ from the Zustandperfekt operator. In other words, we now have two more operators that are like the Zustandperfekt operator in both features – $_{alt}$ as well as $_{tt}$ – are shifted to the result state, but they differ from it along other dimensions, viz. state-to-event coercion and (ii) in the conditions imposed on the nature of the result state that receives the two features.

6.6 Once more: The English Present Perfect and the Perfect in cross-linguistic Semantics

Before moving on to other non-present perfects, let us see where our explorations of the past perfects of English and German have left us. One provisional conclusion – not a very surprising one, given our general view that present, past and other perfects are all instances of one single type of operation – is that when the semantics of the perfect is separated from the semantics of tense, the perfect operators involved in past perfect morphology

are not all that different from those involved in what, morphologically speaking, are present perfects. It should perhaps be seen as more surprising that our look at past perfects has turned up any new perfect operators at all.

When we look at the line-up of perfect operators we have collected along the way at this point, the one that sticks out as a kind of exception is the English Present Perfect. Given our formal characterisation of perfect operators the operator expressed by English Present Perfect is the only one that shifts *alt* to *ec*. (Recall that this is our formal way of capturing the prohibition of combining the Present Perfect with locating adverbials whose denotations are entirely in the past of *n*.) At this point we can see that this property not only sets the English Present Perfect apart from both the regular present perfect and the *Zustandspferkt* of German, but also from the past perfects of German *sand* English. In other words, the English Present Perfect stands out, for the theorist almost as a sore thumb.

Since the facts that make the English Present Perfect special are so easy to detect, the question why it should be special in this way has been one of the most prominent in the Tense and Aspect literature about English (and therewith of the Tense and Aspect literature simpliciter). But it is not easy to see what a satisfactory account could be like. On the one hand we need to explain why the Present Perfect is different from the past perfects (and as we will see in the remainder of this chapter from all non-present perfects) of English. If that was all that needed explaining, then it would be natural to find an explanation in terms of the special properties of the Present Tense; and indeed attempts in this direction have been made, see for instance (Portner 2003). But the difficulty with this kind of approach is that it must leave room for an explanation why the present perfects of other languages – for us the directly relevant case is German – do not behave in the special way of an operator that shifts *alt* to *ec*. One attempt that has been made to deal with this second problem is to derive this difference between the English and German present perfects from a general difference between the present tenses of English and German, with the German present tense allowing for reference to the future in a way that the English present tense does not. (For instance, the natural English translation of the German sentence ‘Er ruft dich morgen an.’ (literally: ‘He calls you tomorrow up’) is ‘He will call you tomorrow.’ and not ‘He calls you tomorrow.’) But as shown in (Rothstein 2008), it is hard to see how such an argument could work, since there are languages like Swedish, in which the simple present is as flexible as it is in German, but in which the Present Perfect shows the same incompatibility with past tense

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adverbs that we find with the Present Perfect in English.²¹

If we cannot rely on the special properties of the present tense, or of the constraints imposed by talking about what is going on as one is making one's utterance, than what can be invoked to 'explain' the special status of the Present Perfect in English (and a few other languages such as Swedish)? We do not really know what to say. There is a sense of causal or conceptual unity between event and result state that seems connected with the English Present Perfect and that in the analysis offered here formally manifests itself in two distinct ways: that of *alt* moving to *ec* and that of *tl* moving to a target or target-like state. But in the account developed in this essay these are distinct properties of perfect operators, and not just because their formulations are logically independent but also because they do come apart in practice – or that at any rate is the conclusion to which we have been led: the property of *tl* moving to a target state or target-like state is one that the English Present Perfect shares with the Zustandsperfekt, but the moving of *alt* to *ec* is, so far, a property that is unique to it.

Perhaps there is some systematic connection between these two properties after all, capturing the idea that both are manifestations of the unity between event and result state. It is compatible with the assumptions we have been led to make up to this point that whenever *tl* moves to a target or target-like state, then that places severe constraints on the adverbial temporal location of the event: Either there is no possibility of locating the event at all – it is not even 'visible' to a potential adverbial locator; this is the case of the Zustandsperfekt – or it can be located only as part of the eventuality complex that includes the causally related result state as well; this is the case of the Present Perfect in English. But even if this principle has general validity,

²¹ Another source of trouble for this strategy is French (and, to the extent that we can judge, also other Romance languages). In French the simple present tense is subject to much the same constraints as the Simple Present in English; for instance, translation of the German simple present tense sentence above into French would also involve a future tense, just as the translation into English. But the French present perfect form (the so-called *Passé Composé*) is not subject to the past adverb constraint of the Present Perfect in English. Perhaps this difficulty would be considered less serious since the *Passé Composé* has become (even more so than the Perfekt in German) a kind of substitute for the Simple Past. But in order to be able to use this fact to save the strategy under discussion for explaining the special status of the English Present Perfect one would have to show that there is a distinct use of the *Passé Composé* in which it behaves like a perfect rather than a simple past, and that when used in this way the *Passé Composé* is subject to the same constraints as the English Present Perfect. It is hard to see how such an argument could be pulled off.

and even if we are willing to accept that the English Present Perfect is a perfect tense form that is committed to the conceptual unity of event and result of which the general principle speaks, that still doesn't explain why the English Present Perfect functions the way it does and not as the German *Zustandspferkt*.

As things are we do not see our way through to a better account of what makes the English Present Perfect behave in the precise ways it does. Perhaps a more thoroughly cross-linguistic investigation of perfects, which includes many more languages than the English and German on which we concentrate, will throw further light on this question.

6.7 Non-finite perfects

This is going to be a long and somewhat heterogeneous section, in which we look at the range of perfect constructions that are neither present nor past perfects. One easily drowns in the multitude of intriguing (and less intriguing) syntactic and semantic facts that can be observed about the constructions that we will have come to review; and it will therefore be important for our investigation to have a clear focus. One of the central goals of this essay – that of defining a general notion of perfect operator and to study its manifestations within English and German – provides us with the needed focus: We will look at non-finite and future perfects with the specific aim of determining which perfect operators are involved in these forms of the perfect and in particular to see if there are any among them that we have not encountered so far.

The flip side of an investigation with this focus is that many interesting properties and problems connected with the perfect constructions we will review will be skimmed over or not even mentioned at all. This will be true in particular of the infinitival perfects that we find add complements to control verbs, raising verbs and modal verbs. Each of these three types of verbs has become a research topic in its own right, with its own substantial literature. Much that can be found there is not directly relevant to our concerns in this section. But our knowledge of these areas is limited and for all that is known to us there may well be facts and analyses that are documented in these literatures, but that have escaped our attention and that *are* directly relevant to what we are going to discuss. We hope that others will put us right when this essay becomes accessible to them.

We start with the non-finite perfects. Of these we distinguish three forms in English – infinitival perfects with *to* as in (6.40.a), naked infinitival perfects as in (6.40.b) and gerundival perfects as in (6.40.c) – and two forms in German, infinitival perfects with *zu* as in (6.41.a) and naked infinitival perfects as in (6.41.b).²²

- (6.40)a. Fritz claims to have lived in Paris.
 b. Fritz should have been in her office.
 c. Fritz admits to having spent the night in the Casino.
- (6.41)a. Fritz behauptet, in Paris gewohnt zu haben. (English: see (6.40.a))
 b. Fritz sollte in ihrem Büro gewesen sein. (English: see (6.39.b))

To have a proper basis for assessing the contributions that non-finite perfects make to sentences like those in (6.40) and (6.41) we need to say a few things about the way in which the temporal location of the complements of such sentences is connected with that of the matrix verb. To that end it will be useful to first look at a few sentences with similar verbs and non-perfect complements. We start with *to*-infinitives in English. Consider the sentences in (6.42).

- (6.42)a. Fritz claims to live in Paris.
 b. * Fritz claims to go to the party.
 c. Fritz intends to live in Paris.
 d. Fritz intends to go to the party.
 e. Fritz intends to be admired.
 f. Fritz wants to live in Paris.
 g. Fritz wants to go to the party.
 h. Fritz wants to be admired.
 i. Fritz expects to live in Paris.

²²English *to*- and German *zu*-infinitives can also occur as purpose clauses, as in (6.39).

- (6.39) a. Fritz is going to the party only (so as/in order) to have been there.
 b. Fritz wird zum Empfang gehen, nur um dabei gewesen zu sein. (English: see (6.39.a))

Since the semantics of purpose clauses presents problems of its own that are of no relevance to what we are after, we set purpose clauses with infinitival perfects aside.

- j. Fritz expects to go to the party.
- k. Fritz expects to be admired.
- l. Fritz is happy to live in Paris.
- m. Fritz is happy to go to the party.
- n. Fritz is happy to be admired.
- o. Fritz claimed to live in Paris.
- p. * Fritz claimed to go to the party.
- q. Fritz intended to live in Paris.
- r. Fritz intended to go to the party.
- s. Fritz intended to be admired.
- t. Fritz wanted to live in Paris.
- u. Fritz wanted to go to the party.
- v. Fritz wanted to be admired.
- w. Fritz expected to live in Paris.
- x. Fritz expected to go to the party.
- y. Fritz expected to be admired.
- z. Fritz was happy to live in Paris.

Our central assumption here is that the infinitival complements of matrix verbs like those in (6.42) contribute eventuality representations to the semantics of the verb-complement combinations. (In particular, when the complement clause is a perfect, then it contributes the description of a result state.) It is part of the semantics of the verb-complement combination to relate the eventuality described by the complement temporally to that contributed by the matrix verb. Or, in the terms of the revised algorithm proposed in Section 4.3, it is part of the semantics of the verb-complement combination to establish a temporal relation between the self-location times of these two eventualities.

What this relation is can vary from one matrix verb to the next. The verb *to claim* is one where the relation is coincidence. For instance, in (6.42.a) the claim that Fritz is said to be making is that he is living in Paris at the time that he is making the claim. And since the latter time is n , the same is true for the content of Fritz' claim: it is that the state of Fritz living in Paris holds at n . By the same token, the content of the claim reported in (6.42.1)

is that Fritz lived in Paris at the past time at which he did the claiming of which the sentence speaks (whatever time that may have been). For a verb like *intend* this is different. The eventuality description provided by the complement of *intend* always functions as the description of an eventuality that the subject of *intend* intends to hold or occur at some future time. This is so both for the state descriptions in (6.42.c) and (6.42.e) and for the event description in (6.42.d) (and likewise for (6.42.n), (6.42.o) and (6.42.p), where the *intend* eventuality is itself located in the past of *n* rather than at *n* itself). The verbs *want* and *expect* differ subtly from the verb *intend* in that they do not require that the time of the complement eventuality follows the time of the matrix eventuality. However, *want* and *intend* share the property that they presuppose that at the time of the wanting/intending what is being said to be wanted or intended is not in fact the case. (In this regard *expect* is neutral, just as *claim* and most other saying verbs are.) Given this presupposition the only way of satisfying both wants and intentions is for the content of the complement to become true at a later time, and because of this a distinction in the temporal relations required and permitted by the two verbs is not so easy to detect. But nevertheless there appears to be a difference. Compare the sentences in (6.43).

- (6.43)a. I wanted to be nice to him. But I just couldn't.
 b. I intended to be nice to him. But I just couldn't.

It seems to us that in (6.43.a) the time at which the speaker was wanting to be nice to the referent of *him* can be the very same time as the one at which she was interacting with him and didn't manage to be nice. But in (6.43.b) the time of intending to be nice can only be understood to have preceded the actual interaction. The 'verb' *to be happy* exemplifies yet another twist to the range of possible patterns. Unlike *to want* and *to intend*, *to be happy* is compatible with the truth of its complement. For instance, (6.42.i) can be true in a situation in which Fritz does currently live in Paris, and in fact that seems to be the more prominent scenario, and likewise for (6.42.k), and the same applies, *mutatis mutandis*, to (6.42.t,v). But combinations of *be happy* and a state-describing complement can also be understood prospectively – i.e. in the sense that the self-location time of the former follows that of the latter – as when B says to A: 'I am happy to live in either house.', when they are in the process of deciding which one of two houses they should buy in the town to which they will soon be moving. And when the complement of *be happy* is an event description, as in (6.42.j) and (6.42.u), then the temporal relation between complement and matrix eventuality must be prospective.

These are just some examples of the diverse patterns of ‘temporal control’ that matrix verbs can exert on their complements. In view of our goals in this essay there is no point in trying to give an exhaustive overview of all the variants; the impressionistic description we have given of the few cases considered is meant only to point out the pitfalls one has to be aware of when trying to assess the semantics of those infinitival complements of such verbs that take the form of perfects.

One noteworthy feature of the verb *claim* is that sentences like (6.42.b) and (6.42.m), in which the complement is not a state but an event description, are ill-formed. This indicates that the rule which describes the temporal control properties of *claim* – the rule that the self-location time of the eventuality described by the complement is identified with the self-location time of the matrix verb eventuality – cannot be overwritten. But it is also indicative of something else, viz. that simultaneity of an event description with the time of the matrix eventuality is not allowed; and the question is: Why should that be so?

Within the general framework we are using there is a ready explanation for this. Notoriously, English event descriptions resist the standard use of the present tense and if they want to make present tense statements involving such descriptions, English speakers must resort to the progressive – compare ‘He goes to the store.’ which only has a generic interpretation (if it has any at all) with the perfectly grammatical ‘He is going to the store.’ The explanation of this fact within our framework is that the TENSE value *pres*, and more generally TENSE values which identify the self-location time of the described eventuality with the TP_{pt}, do not accept event descriptions as inputs but only state descriptions. (For detailed argumentation see also (Reyle et al. 2007), the introduction to Section 6 as well as Section 7 below.) Identity of the self-location time of the described eventuality with the TP_{pt} always signifies internal viewpoint aspect, and internal viewpoint aspect, which in our terminology is nothing other than imperfective aspect, is represented, and only represented, by descriptions of states. The need for state descriptions as inputs to the normal present tense (characterised by the TENSE feature value *pres*) is the most salient consequence of this principle. Another feature value that has this effect is the value *past*₂ which we introduced in Section 6.2.²³

²³ In more recent work it has been shown that there are occurrences of *now* in which it refers to a time in the past of *n* while combining with an event description. (See in particular (Hunter 2012).) The instances of this we have seen so far all suggest that what makes these cases of ‘past *now* + event description’ possible is an implied change of

If this is to give us an explanation of the ungrammaticality of (6.42.b) and (6.42.m), however, then we have to make a further assumption, viz. that TPpts are also involved in constructions involving a matrix verb and an infinitival complement: the temporal relation between matrix eventuality and complement eventuality also involves introduction of a TPpt, by the complement and obligatory resolution of the TPpt via the matrix eventuality. More precisely, the control properties of the given matrix verb now play the part that TENSE feature values play in finite clauses: the control verb makes, as part of its semantics, a feature value available which introduces a TPpt presupposition and at the same time relates the self-location time of the eventuality described by the ‘input representation’ (i.e. the semantic representation of its non-finite complement) to the TPpt in a certain way, which varies from one control verb to the next. Moreover – this is an aspect of the verb’s temporal *control* – the resolution of the TPpt presupposition is fully determined in this case: the TPpt is identified with the self-location time of the matrix eventuality.

The ‘TENSE feature value’ introduced by *claim* is one that identifies the self-location time of the input representation with the TPpt. In that respect it is like *pres* and *past₂*, and with the same supplementary effect that the input representation must be a state description. We have seen that other control verbs differ from *claim* in this respect. So, in order to remain faithful to the formalisation mode we have adopted we should assume that the different control verbs introduce their respective ‘TENSE features’. As labels for these features we propose ‘TENSE_{Verb}’, where ‘Verb’ is the verb lemma in question. Thus the feature value introduced by *claim* is ‘TENSE_{claim}’ and likewise for other control verbs.

This much by way of background to the issue that really matters, viz. what the semantics is of *to*-infinitival perfect clauses that occur as complements to verbs like those in (6.42). To see what the semantics of such complements is, it is best to focus on a verb like *claim*, which insists on the coincidence of the self-location time of the complement eventuality, TPpt and the self-location time of the matrix verb eventuality. Consider the sentences in (6.44).

circumstances. We are not certain whether it is possible to analyse all such cases away by assuming that they involve some kind of coercion from event to state description. (There may also cases that are like reportive uses of the simple present tense.) Here we ignore these complications for the simpler view according to which *now* always combines with a state description.

- (6.44)a. Fritz claims to have left the house at five, but to have come back at seven.
- b. Fritz claims to have lived in Paris.
- c. Fritz claims to have lived in Paris for five years.

First (6.44.a). As far as we can tell, there is nothing wrong with this sentence. If we are right about this, then the conclusion it suggests is that *to*-infinitives of perfects are like past perfects in that, first, they do not move *alt* to *ec* but leave it at *e* and, second, that they are content with formal result states. The evidence available to us so far – with *claim* as matrix verb, but also with matrix verbs whose temporal control properties are different – generally points to this conclusion. So we see no reason to query it any further and we adopt it.

Furthermore, (6.44.b) and (6.44.c) show that when the input representation to Perf is a state description, then both state-to-event coercion via closure and inchoative coercion are possible options. Again this evidence extends to other control verbs.

There is, however, one difference between the infinitival perfects of (6.44) and the past perfects we investigated in Sections 6.1-6.5. Past perfects can, we saw, interact in two different ways with temporal locating adverbs: the adverb can either be taken as locating the result state *s* or as locating the eventuality of which *s* is the result state. We captured this distinction by distinguishing between two feature values, $+perf(past,s)$ and $+perf(past,e)$, with certain restrictions on the choice of these values (see footnote ?? in Section 6). With the *to*-infinitival perfects discussed in this section such a choice is not available. For instance, consider the sentence (6.45.)

(6.45) At ten Fritz claimed to have left the house at five.

Because of the sentence-initial adverbial *at ten*, which can only be construed as an adjunct to a projection of the matrix verb *claim*, *at five* can only be construed as constituent of the infinitival complement. And the only way in which this second adverbial can be interpreted is as location of the time of leaving, and not of a time at which the leaving had already taken place. This restriction appears to apply generally to sentences with infinitival perfects, pointing to the conclusion that with such perfects $+perf(past,e)$ is the only option.

In this way we arrive at the first part of our unsurprising general conclusion about the semantics of non-finite perfects: except for the restriction

to the value +perf(past,e), English *to*-infinitives of perfects behave semantically like past perfects as analysed in the first three subsections of Chapter 6.

German *zu*-infinitives occur by and large in the same syntactic contexts as English *to*-infinitives. In particular, they occur as complements to matrix verbs with semantically comparable counterparts in English. A few German matrix verb-complement constructions with counterparts to the verbs in (6.42) are given in (6.46).

- (6.46)a. Fritz behauptet, in Paris zu wohnen.
 b. ? Fritz behauptet, zur Party zu gehen.
 c. Fritz behauptet, bewundert zu werden.
 d. Fritz beabsichtigt/hat vor, in Paris zu wohnen.
 e. Fritz beabsichtigt/hat vor, zur Party zu gehen.
 f. Fritz beabsichtigt/hat vor, bewundert zu werden.
 g. Fritz mag es, in Paris zu wohnen.
 (literally: Fritz likes it, to live in Paris.)
 h. ? Fritz mag es, zur Party zu gehen.
 i. Fritz mag es, bewundert zu werden.

The sentences in (6.46) allow us to observe the same differences that we found with the sentences of (6.42). Noteworthy is especially the fact that (6.46.b) does not seem very good (and in this respect is like (6.42.b)). This may seem somewhat surprising given that the regular German present tense allows for prospective interpretations (as noted explicitly in Section 6.8). But the absence of this option for the complements of a verb like *behaupten* suggests that this is a special property of the German finite present tense form, and not an alternative interpretation that is available for TENSE features that identify the self-location time of the input with the TP_{pt}.

Otherwise the temporal control properties of *behaupten* are like those of *claim*. Once this has been established, we can use sentences in which *behaupten* takes a complement with the form of the *zu*-infinitive of a perfect to determine the semantics of such non-finite perfects. (6.47) gives the German equivalents of the sentences in (6.44). The conclusions are the same: (6.47.a) is as felicitous as (6.44a) and (6.47.b) and (6.47.a) show that both state-to-event coercion via closure and inchoative state-to-event coercion are possible.

- (6.47)a. Fritz behauptet, das Haus um fünf verlassen zu haben, aber dann um sieben wieder zurückgekommen zu sein.

- b. Fritz behauptet, in Paris gewohnt zu haben.
- c. Fritz behauptet, seit fünf Jahren in Paris gewohnt zu haben.

(For translations see (6.44.a-c).)

The conclusion that this evidence suggests is that the semantics of German *zu*-infinitives of perfects is, like that of their English counterparts with *to*, the same as the semantics of past perfects with the feature value +perf(past,s).

6.7.1 Semantic representation construction for a couple of sentences with *claim* and infinitival perfect as complement

As a summary of the observations made in the last section and as stepping stone towards the discussion of naked infinitival perfects in the next section we present the construction of the semantic representation of two sentences of the types just discussed. They are given in (6.48).

- (6.48)a. Fritz claimed to be ill.
- b. Fritz claimed to have submitted a paper on Wednesday.

In order to be able to carry out the semantic representation construction itself, we must settle a couple of questions about the syntactic structure of sentences with control verbs and infinitival complements (and certain semantic issues directly connected with it) and also about the lexical entries of control verbs, such as *claim*. We deal with the syntactic questions first, then show the construction of the semantic representations of the relevant infinitival complements, then deal with the lexical entry for *claim*, and finally carry out the relevant parts of the representation construction for our sample sentences.

There are two syntactic issues that need sorting out. The first concerns the way in which the infinitival complement combines with the matrix verb. We assume that verb and complement together form a VP – that they can, is one of the selection properties of the verb.²⁴ The second question is: What kind of structure is the syntactic structure of the infinitival clauses that act

²⁴ Not all verbs that take sentential complements take infinitival complements. The verb *dispute* for instance takes *that*-complements but no infinitival complements. Likewise *agree* in its sense of *agree with* (as opposed to *agree to*); and more.

as complements in the sentences we are considering in this and the last section? We assume that these structures are like the syntactic structures of main clauses we have been assuming so far in that they involve one projection level above TP. For main clauses we have not been very precise about this level. We have been assuming that it is the level at which remaining discourse referents in the store are structurally bound by transfer to the universe of the main non-presuppositional DRS, but did not bother to work out the exact details.

to-infinitivals, we now assume, also have a projection level above TP, consisting of a maximal node which we label ‘S’ and a functional head for which we use the label ‘Comp’. We leave open the question what the values are for the feature function COMP associated with this label, and simply assume that the value which is compatible with matrix verbs that select for *to*-infinitival complements trigger an operation which involves λ abstraction over the referential argument of the input description and transfer of all discourse referents in the store that do not occur in presuppositions of the input to the universe of the main non-presuppositional DRS. (This will always be abstraction over an eventuality discourse referent; in the case of *claim*, which ‘selects for state descriptions’, this discourse referent will always be one representing a state.)

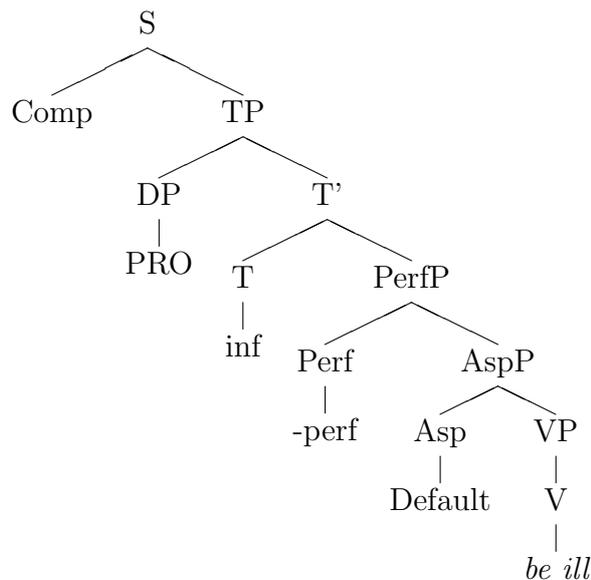
The second matter about the syntax of the complement concerns the subject. The semantically crucial fact about the subject arguments of the complements of control verbs is that they get ‘bound’ to the right argument of the control verb. There are various ways in which this ‘binding’ could be realised. Choices between the different options are constrained by general syntactic considerations and by the general syntactic framework one is using (which should of course be in accordance with established syntactic facts). We do not consider ourselves called upon here to defend the solution we will propose. (The matter is tangential to this paper and we also see it as lying beyond our competence.) We adopt the widely assumed analysis according to which the subject of a *to*-infinitival clause is the phonologically empty constituent PRO, that PRO introduces a discourse referent of its own which is inserted into the subject argument slot of the complement’s main verb – ‘PRO is a variable’ – and that this discourse referent gets ‘bound to’ the referential argument of the phrase that fills the controlling slot of the matrix verb. We will assume that this discourse referent is introduced as the anaphoric element of a presupposition that can only be resolved through its identification with the discourse referent that fills the controlling argument slot of the matrix verb. We follow our earlier practice of abbreviating the details of how presuppositions of this kind are to be resolved in the form of

a subscript that is attached to the representation of the presupposition; we use *PRO* for this purpose.

We also need to make a decision concerning the feature values at T for non-finite clauses. As we will argue later on in this section, the other two types of infinitival complements, naked infinitives and gerunds, require the same semantic operations at T as the *to*- infinitives considered now, so we need only one feature value to cover the three cases. We call this value ‘inf’. The semantic effect of inf is that it prompts the introduction of a self-location time t_{ev} for the eventuality discourse referent that serves as referential argument to the input representation, but no TPpt presupposition. (The absence of TPpt introduction is the distinctive feature of inf as ‘non-finite’ tense value.) Temporal location of the (self-location time of) the eventuality described by the input representation is executed directly by the control properties of the matrix verb. We implement this control mechanism in the same way that we deal with the ‘binding’ of PRO, viz. by introducing a presupposition with t_{ev} as anaphoric discourse referent and with a strictly prescribed resolution mechanism. The resolution mechanism is indicated by the subscript *TeCon* (for ‘Temporal Control’).

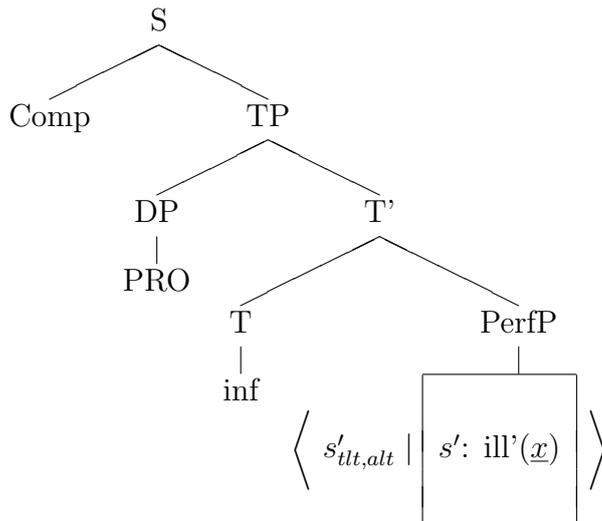
These assumptions lead to the syntax and semantics for the *to*-infinitival ‘to be ill’ given in (6.49) - (6.53) and for ‘to have submitted a paper on Sunday’, given in (6.55) - (6.59).

(6.49)



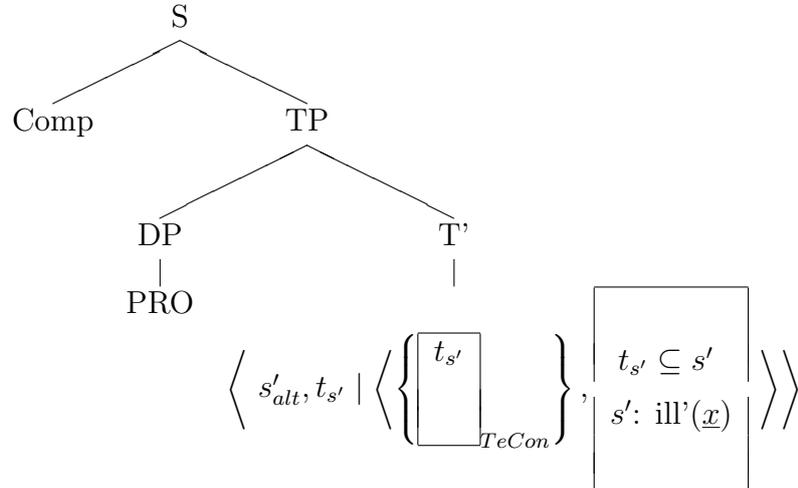
Lexical insertion for *be ill* (which once again we treat as a single verb) and passing on the representation to VP, AspP and then PerfP gets us to the representation in (6.50).

(6.50)



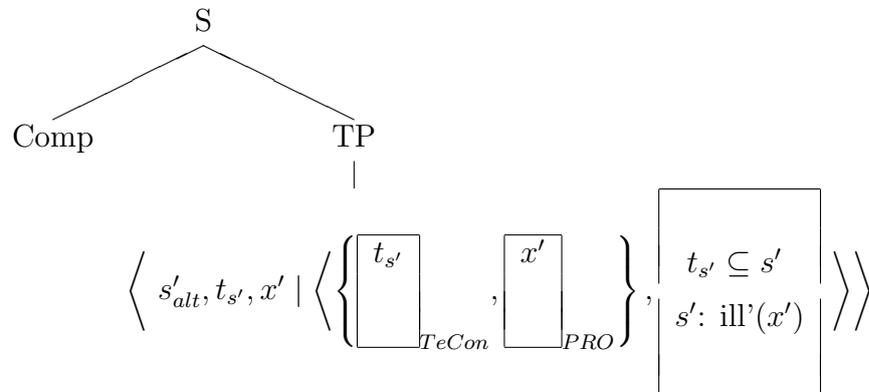
The operation triggered by the T value *inf* consist in (i) introducing a discourse referent $t_{s'}$ for the self-location time of the state s' together with its presupposition and (ii) relating $t_{s'}$ to s' by the condition appropriate for states, viz. ' $t_{s'} \subseteq s'$ '. The result is shown in (6.51).

(6.51)



Integrating the contribution by the subject DP PRO leads to the introduction of a new discourse referent x' as PRO's referential argument, with its PRO-annotated presupposition, and to insertion of x' into its argument slot \underline{x} :

(6.52)



The effect of combining the TP representation in (6.52) with Comp (whose feature value we leave unarticulated) is to produce the intensional λ abstraction mentioned above. Since the combination of TP with Comp also acts as sign that there are no further TP adjunctions in the offing, the *alt*-annotation of S' can now also be eliminated. The result is shown in (6.53)

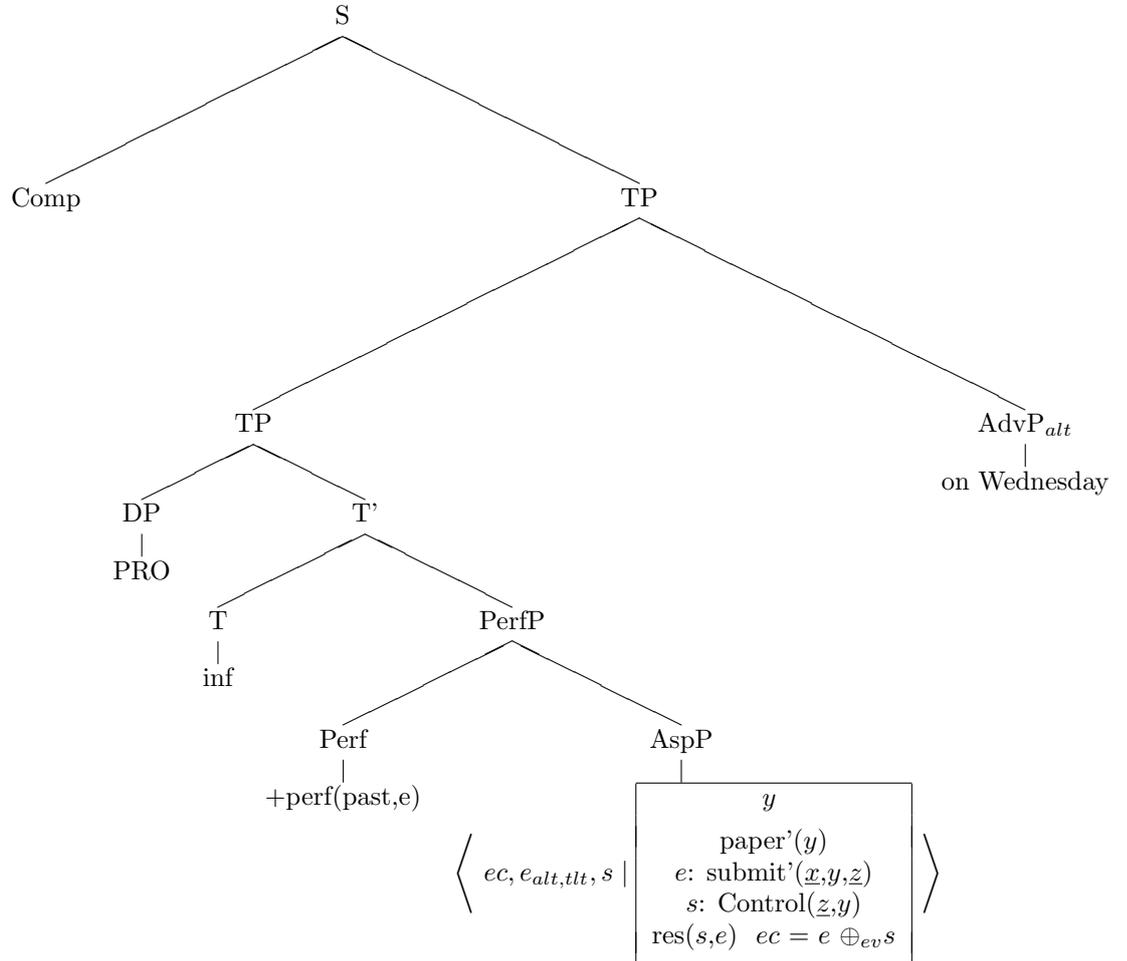
(6.53)

$$\begin{array}{c}
 S \\
 | \\
 \left\langle t_{s'}, x' \mid \wedge \lambda s'. \left\langle \left\{ \begin{array}{c} t_{s'} \\ \text{TeCon} \end{array}, \begin{array}{c} x' \\ \text{PRO} \end{array} \right\}, \begin{array}{c} t_{s'} \subseteq s' \\ s': \text{ill}'(x') \end{array} \right\rangle \right\rangle
 \end{array}$$

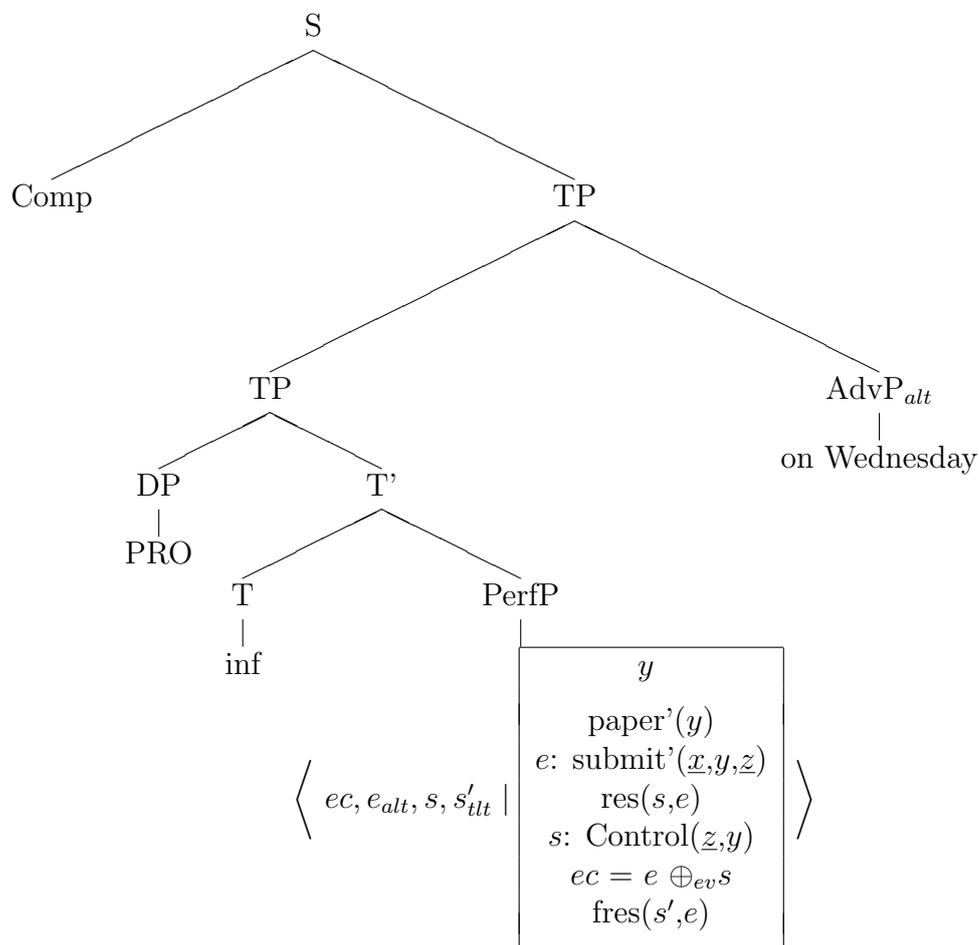
The syntax and representation construction for the infinitival clause ‘to have submitted a paper on Wednesday’ are much as for the example above. But there is one issue that still needs to be settled: what is or are the possible PERF values for infinitival perfects? This is a difficult question, which we cannot settle definitively at this point. In our discussion of the past perfects of English and German in Sections 6.1 - 6.3 we settled for two possible values, +perf(past,e) and +perf(past,s). As we saw, the difference between these two values concerns what they say about *alt*: +perf(past,e) leaves *alt* at e, +perf(past,s) moves *alt* to the result state that also gets the feature *itt*. The effect of this is that an adverb adjoined to the TP of the infinitival clause will locate the event if the Perf value is +perf(past,e) and the result state if it is +perf(past,s). For *to*-infinitives of perfects, like the phrase *to have submitted a paper on Wednesday*, it seems that only +perf(past,e) leads to a correct interpretation: *on Wednesday* is the day of the submission, not some day after the submission. (The alternative reading may be marginally available, as, say, in ‘He emphatically claimed to have submitted a paper at that point.’, but we are not sure that even for a sentence for which this interpretation seems intuitively natural, the combination of *claim* and infinitival perfect allows for it.) But the matter is complicated by the question what is or are the possible adjunction sites for the phrase-final adverb, and we cannot do more than adopt a provisional hypothesis, until this question is taken on in earnest in Chapter 9. Our provisional hypothesis is that *to*-infinitival perfects only admit the value +perf(past,e).

We start the representation construction for the *to*-complement of (6.48.a) at the point when the AspP representation has been established. Up to this point the construction is identical to that given in Section 4 (cf. (4.28)).

(6.54)



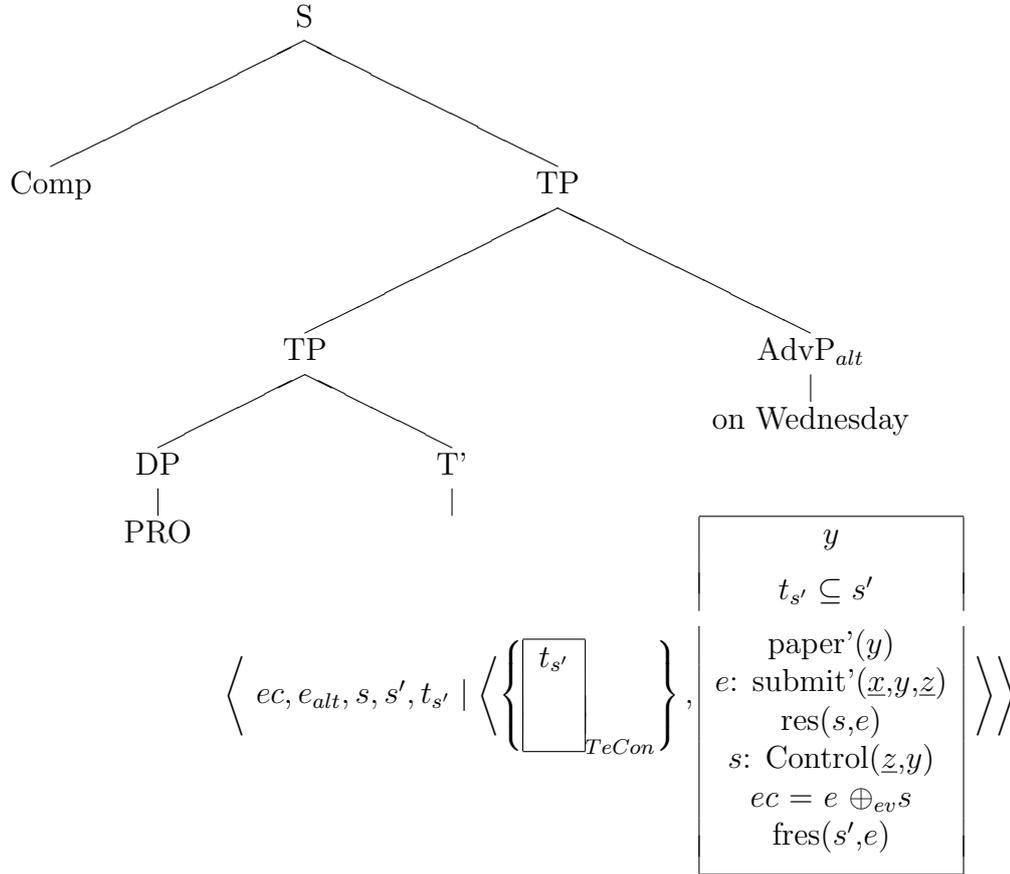
The operations triggered by the value +perf(past,e) are those we saw in action in Section 9.3, i.e. the introduction of a formal result state *s*' of *e* which is made into the carrier of *tlt* while *tlt* remains at *e*. The result is shown in (6.55).

(6.55)²⁵

As before, the value *inf* at T leads to the introduction of $t_{s'}$. The effects – identical to what they were in (6.51) – are shown in (6.56).

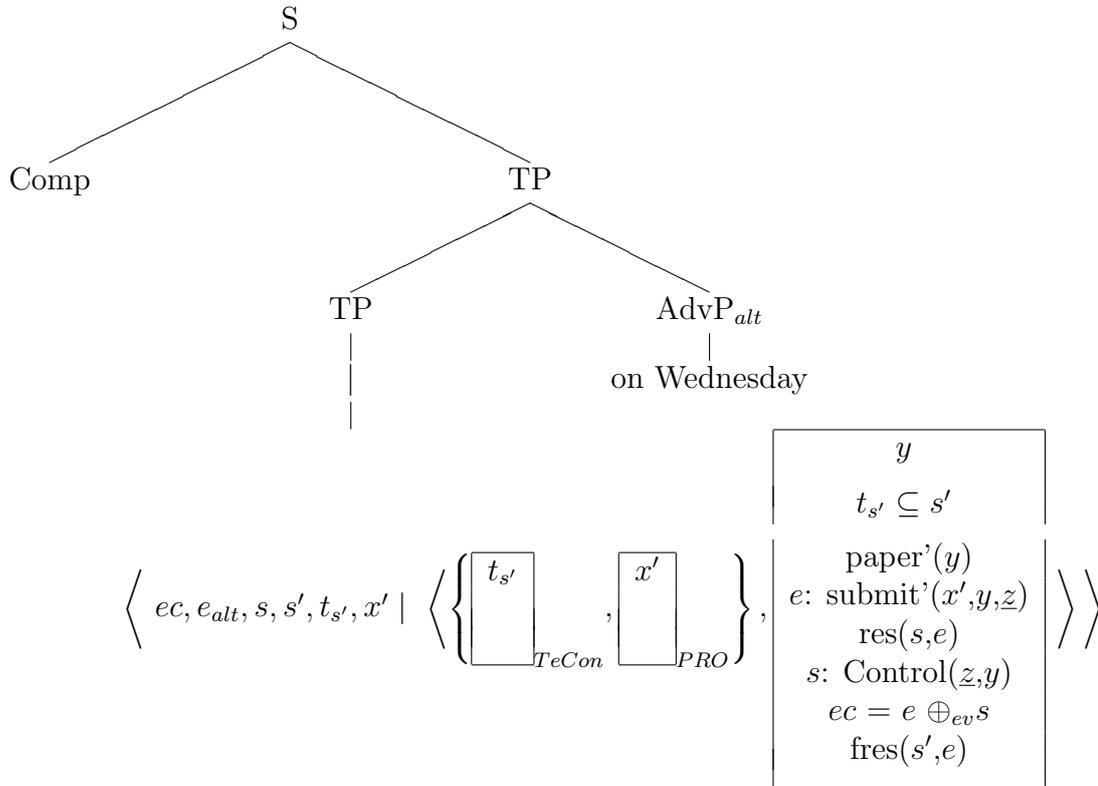
²⁵ In this DRS construction we have implemented for the first time the proposal of Section 6.3 according to which the *alt*-marked eventuality can be temporally located by an adverb only when that adverb is also *alt*-marked, all *alt*-marked adverbials must be interpreted in this way and there can be only one *alt*-marked adverbial per clause.

(6.56)



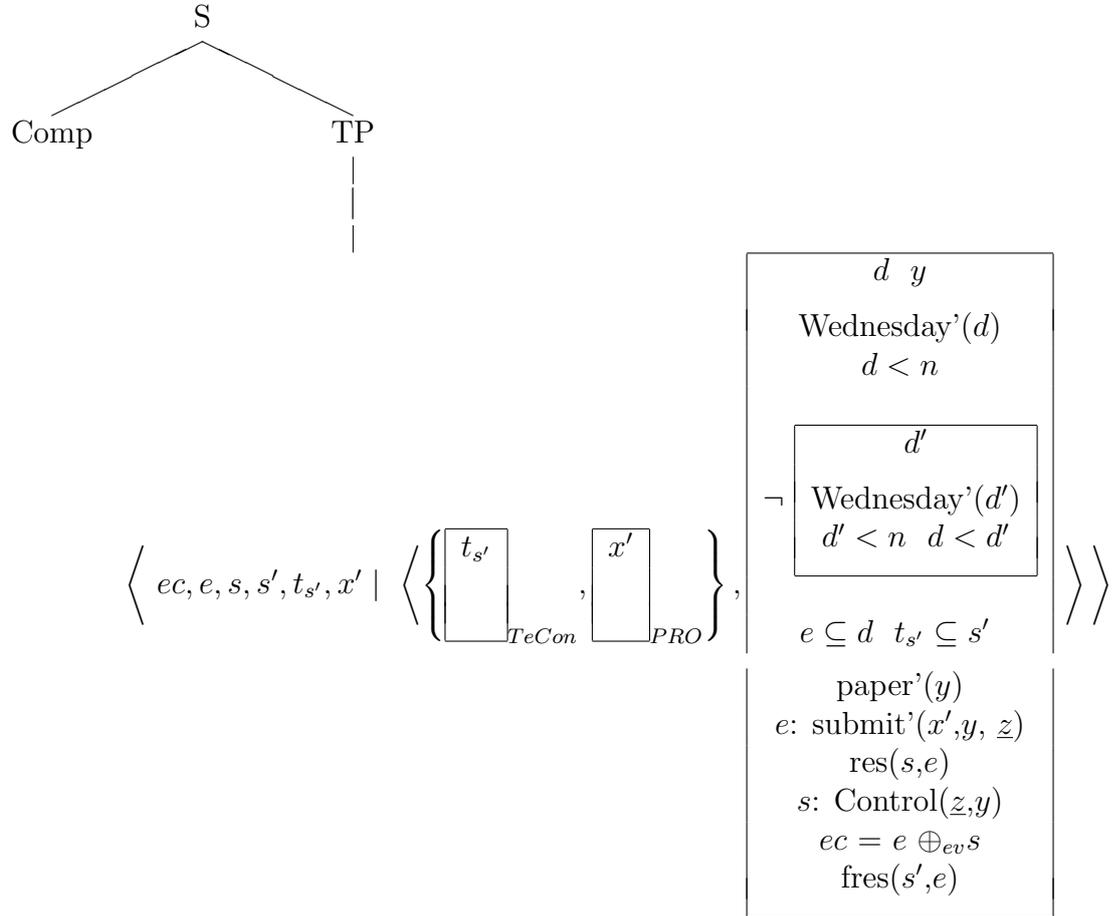
Integration of the subject DP is just as in the last example. Nevertheless we show the result, since it contains the input representation to the temporal location by *on Wednesday*.

(6.57)



Temporal location by the AdvP *on Wednesday* is as usual. We simplify matters a little by assuming without further argument that *on Wednesday* refers to the last Wednesday before n. With this assumption the representation of the upper TP becomes as shown in (6.58).

(6.58)



Comp once again leads to lambda abstraction over the referential argument of its sister representation, which in this case is the formal result state s' . Moreover, as part of this operation the other discourse referents in the store of the input representation that do not occur in presuppositions – that is: ec, e, s – are moved to the universe of the main non-presuppositional DRS. See (6.59).

in our view should be treated as a control property too. (For discussion see (Abusch 2004).)

As we saw, the temporal control properties of control verbs differ in that some verbs insist on locating the relevant eventuality time $t_{ev'}$ of the complement *at* the self-location time t_{ev} of the eventuality *ev* described by the control verb, while others locate $t_{ev'}$ in the future of t_{ev} or allow for either option – $t_{ev'}$ is either at or in the future of t_{ev} . We have also seen that *claim* is a verb of the first category and that that entails that the complement cannot be the description of an event but must be the description of a state (cf. (6.42.b) and (6.42.m)). The fact that simultaneity of $t_{ev'}$ with t_{ev} blocks event descriptions as inputs indicates that in such control structures the time of the matrix eventuality plays the role of determining perspective time, i.e. of what in our account has thus far been represented as the TPpt: eventuality descriptions that are located at such a time are ipso facto presented from an internal, imperfective viewpoint, which in our set-up amounts to their being descriptions of states. We could make the fact that t_{ev} plays the role of a perspective time explicit by identifying it formally as TPpt. We won't actually do that; but that t_{ev} plays such a role in relation to $t_{ev'}$ should be kept firmly in mind.

Since we have decided to encode the control properties of control verbs as part of their lexical entries, we have to create a place for this within the format for the lexical entries of verbs that we have been using. We do this by introducing a separate tier in this lexical representation format, labelled 'Contr. Prop.', situated in the upper part of the entry. The nominal control property will be encoded by marking the controlling (non-referential) argument of the verb as the one that controls (= is to be identified with) PRO of the complement. This information is listed in the column of the argument in question. (In the case of *claim* the controller is the discourse referent for the argument phrase that occupies the subject position in active uses of the verb.) The temporal control property is listed below the referential argument of the verb (the eventuality it describes), since it is the self-location time of the eventuality that guides the resolution of the TeCon presupposition. For *claim* the resolution of this presupposition is identification of the two self-location times, and since the self-location time of the *claim*-eventuality acts as TPpt, this imposes as we saw the further constraint that the input representation is a state description. We represent this information by a combination of (i) the condition ' $t_{TeCon} = t_e$ ', where e is the referential argument of *claim*²⁶,

²⁶ We have assumed that the eventualities introduced by *claim* into the representations of sentences in which this verb occurs are always events. This decision is open to criticism.

and the selection restriction ‘state description’ on the complement, listed in yet another tier, that of ‘Sel(ection) Restr(ictions)’ – a tier of which we haven’t made use in our entries so far, but which plays a large part in lexical entries we have been assuming in work on other issues in natural language semantics.²⁷ (This way of encoding the restriction to state descriptions as complements of *claim* fails to make its systematic connection to the identity condition ‘ $t_{TeCon} = t_e$ ’ transparent, and so is certainly not optimal, but we will just make do with it here.)

A last point about the entry of *claim* given in (6.60) below is the use of the symbol ‘*P*’. ‘*P*’ serves as identifier of an ‘argument slot’, but one which can be filled only by expressions that denote properties of eventualities. (This restriction is meant to be conveyed by the choice of the italicised upper case ‘*P*’.) Note that there are sentences in which *claim* has a direct object DP (as in ‘Chomsky claimed something very much like this in the early sixties.’) and in which ‘*P*’ will be replaced by a discourse referent that acts as referential argument of this DP. Such discourse referents can then serve as anaphoric antecedents to pronouns and demonstratives, but in that respect they do not differ from the complements that *claim* takes in the sentences we consider here. Anaphora to such ‘higher type entities’ is a topic in its own right that has no place in this essay. For a detailed and extensive study of such phenomena see (Asher 1993). (The entry for *claim* below does not cater for uses with direct object DPs but could easily be extended so that it would cover such cases as well.)

For some uses of *claim*, where it describes a particular speech act – an act of assertion, or one with essentially that force – it is right. But there are also uses of *claim* in which it expresses a state, that of the subject having gone on record as ‘claiming’ that something or other is the case and, therewith, as prepared to stand up for this claim and to defend it. That there is such a use of *claim* is indicated by the fact that one can use the simple present tense *claims*, as in ‘He claims that he was not on the scene of the crime.’, in normal present tense sentences. One possible account of these two uses of *claim*, the eventive and the stative, dispositional use, is that the second is derived from the first by some kind of ‘disposition-forming’ operator. In that case the assumption that the lexical entry of *claim* only mentions an event is legitimate. But it might also be argued that the verb is ambiguous between the two uses and in that case the state describing use should be mentioned in the lexical entry for *claim* as well. We leave this question unresolved. In addition, *claim* is ambiguous between the use we focus on here, in which it takes an infinite or finite clause as complement, and one exemplified by ‘He claimed the territory for his Queen.’, in which *claim* takes a direct object denoting a piece of land or some other possession. In the entry below this last meaning is ignored.

²⁷ Use of selection restrictions goes back to the work reported in (Kamp and Roßdeutscher 1994a), (Kamp and Roßdeutscher 1994b), (Roßdeutscher 1994) and (Roßdeutscher 2000).

The semantic part of the entry we adopt for *claim* shares with that of earlier lexical entries that it tells us very little about the actual ‘meaning’ of the verb. We have simply assumed that *claim* is a predicate with a slot for the kinds of eventuality properties that can be provided by the verb’s clausal complements. We think that the use of lexical entries which show such nearly total absence of information about the actual meanings of particular lexical items is legitimate in studies like the present one; as we have seen, aspects of meaning can be added piecemeal via Meaning Postulates as the need arises. The lack of further information about the meaning of *claim* in our entry for it may be felt to be a more serious drawback than for the other verbs considered so far; but the difference is at most one of degree. We will return to this point in the next section in connection with modal verbs taking naked infinitives as complements.

This much by way of elucidation of the entry we assume for *claim*, which is presented in (6.60).

	<i>claim</i> (verb)	nom	<i>to-</i> infinitive
	e	x	<i>P</i>
(6.60)a.	Sel. Restr.	state	
		description	
	Contr. Prop:	$t_{TeCon} = t_e$	PRO = x
b.	$\left\langle e_{tlt,alt} \mid \boxed{e: CLAIM(x,P)} \right\rangle$		

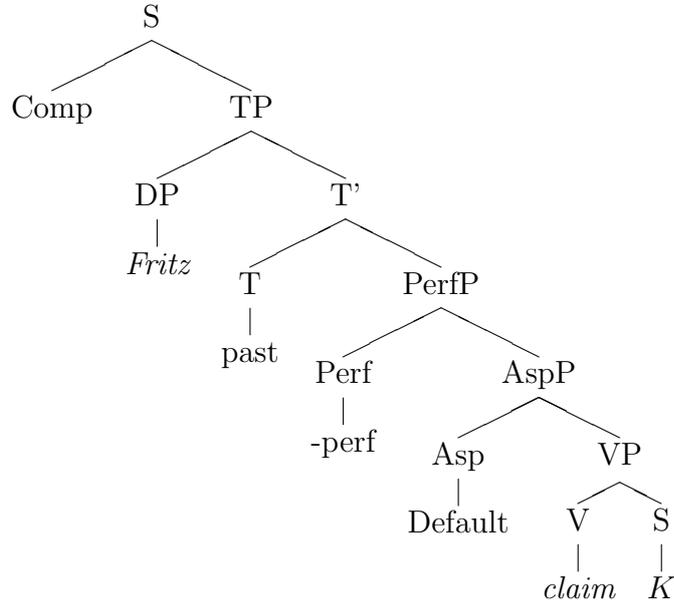
Insertion of the lexical semantics of *claim* for occurrences of the verb in syntactic sentence structures involves two problems with which we haven’t had to deal so far. The first is the ‘higher order argument slot’ for the complement of *claim*. We handle the symbol ‘*P*’ that marks this position in our lexical entry for *claim* in the same way as slot identifiers for ‘ordinary’ (‘first order’) argument slot identifiers: in the inserted semantic representation for the given occurrence of the verb: we replace ‘*P*’ by an actual slot holder of the right logical type, i.e. by an underlined symbol whose form destines it as place holder for arguments of the intended logical type. (We use italicised upper case letters for this purpose; as in earlier examples we will use the

symbol from the lexical entry itself unless it has been used already in building the discourse representation in question.)

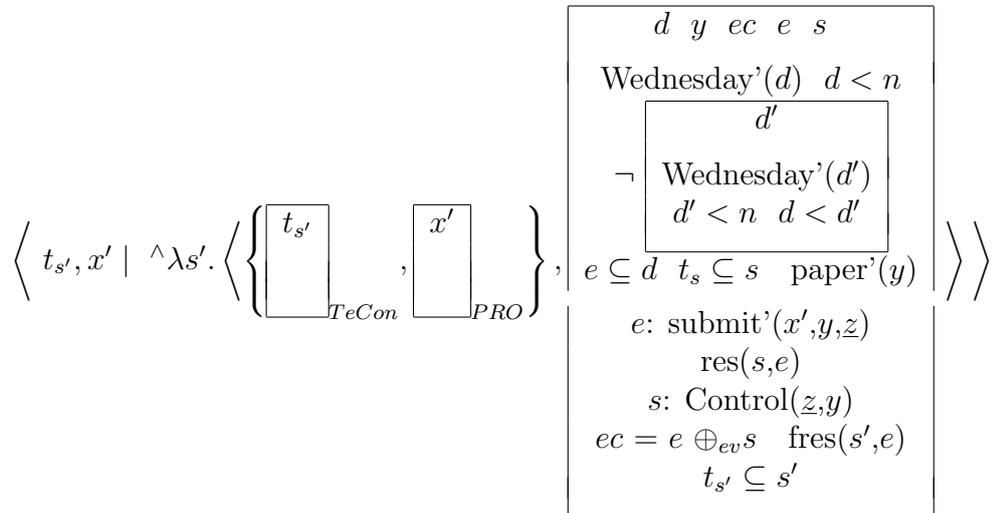
The second matter that requires a new convention is the information pertaining to the resolution of the PRO- and TeCon presuppositions of the complement of *claim*. This information must be transferred in some form to what gets inserted into the sentence representation that is being built. Since we want it to be possible that the presuppositions be resolved only at some later construction stage – recall that our official policy is that presuppositions are resolved only after the preliminary sentence representation has been put in place – the result of lexical insertion should make it clear how those presuppositions are to be resolved when the time for their resolution has come. We implement this requirement by attaching the relevant information to the items that are directly involved in the resolutions. That is, we attach the subscript *PRO* to the slot symbol for the argument that carries ‘PRO’ in the lexical entry; and we add the relevant resolution information for the TeCon presupposition to the referential argument of the verb, in the form of yet another subscript. As subscript we use the condition itself for this purpose (a bit of a mouthful for a subscript, but at least its meaning should be clear). In this case the condition is ‘ $t_{TeCon} = t_e$ ’. Finally, in those axes in which the lexical entry has a Selection restriction on the complement – such as ‘StDsecl’ in (6.60) – then this restriction is added as a further subscript to the referential argument of the verb. The structure in (6.62) shows what this comes to for sentence (6.48.b). (We will only show the remainder of the representation construction for this sentence. The remainder of the construction for (6.48.a) is identical and there is no point in displaying the remaining steps of that construction as well.)

We first give, in (6.61), the representation for (6.48.b) in which we will insert the lexical semantics of *claim*.

(6.61)

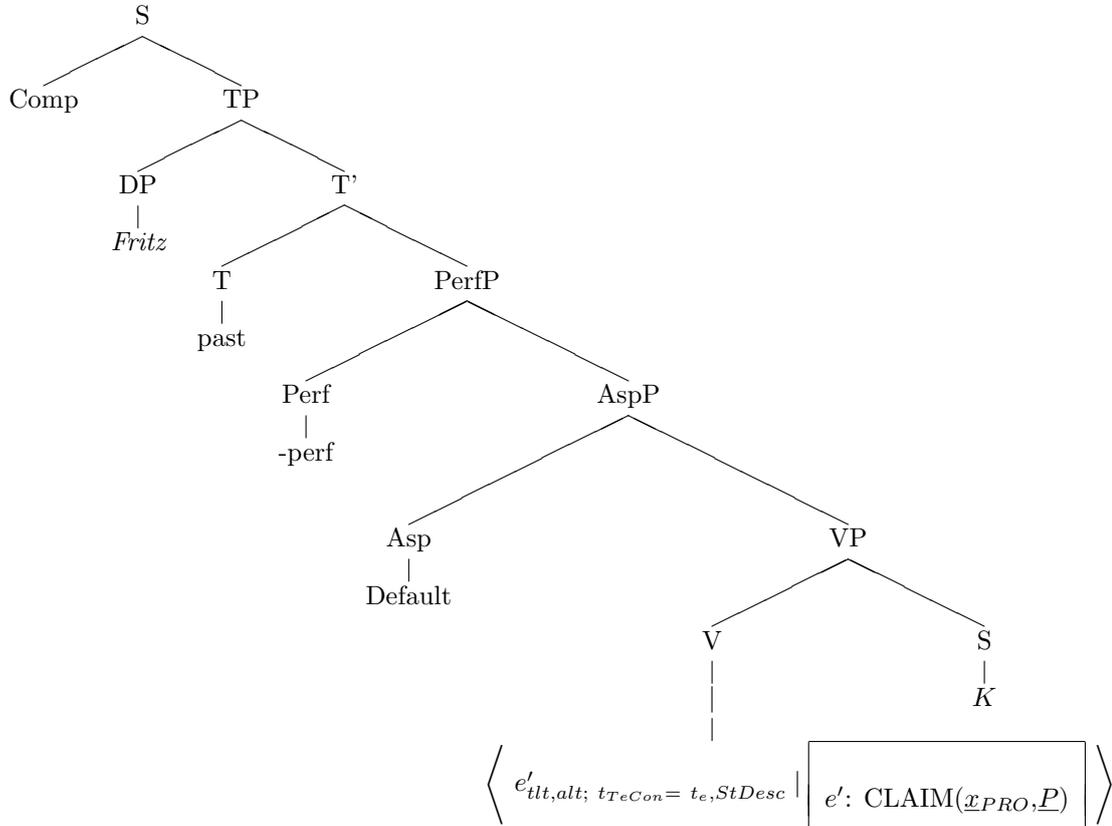


where K is the structure:



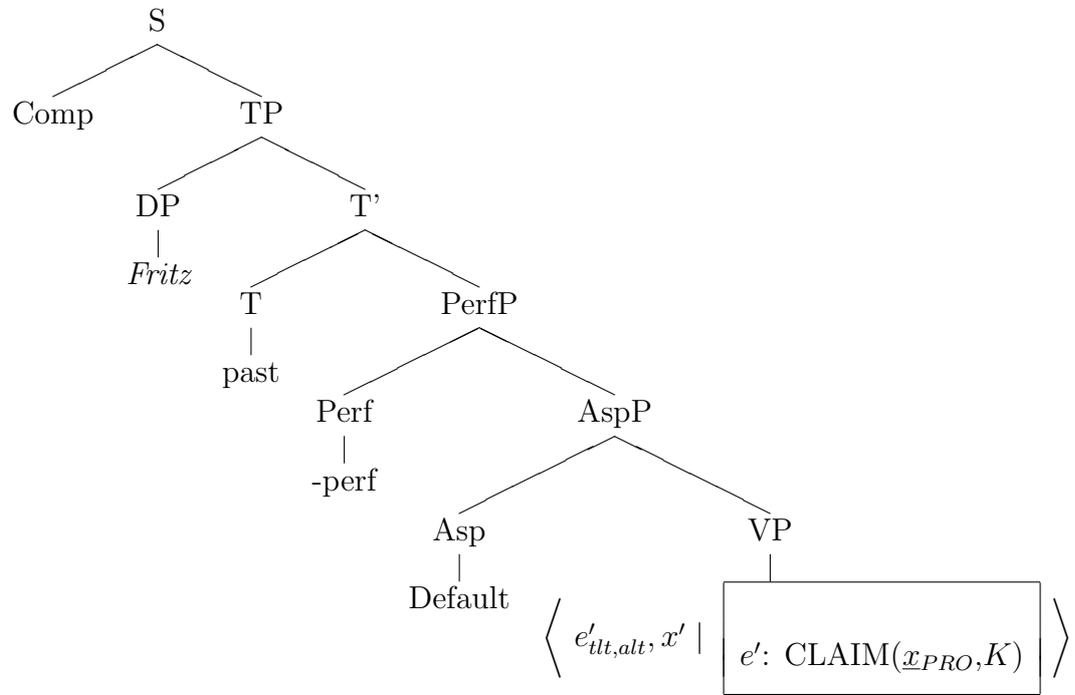
The insertion of the lexical semantics of *claim* converts (6.61) into (6.62).

(6.62)



Combining the semantics of the V node with that of its complement leads to the VP representation in (6.63), in which K' is the structure displayed in (??). In obtaining this representation we have resolved the TeCon presupposition on the fly, by identifying $t_{s'}$ with the self-location time $t_{e'}$ of the CLAIM-event e . Following our earlier practice we suppress $t_{e'}$, but record the effect of the identification with the condition ' $e' \subseteq t_{s'}$ '. As a consequence of the resolution of this presupposition the discourse referent $t_{s'}$ has been transferred from the store to the universe of the DRS to its right; the condition ' $e' \subseteq t_{s'}$ ' that results from the resolution has been added to the Condition Set of that DRS.

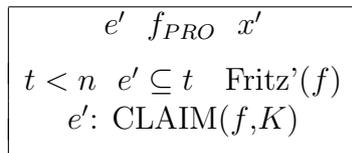
(6.63)



Here K is the representation following (6.61).

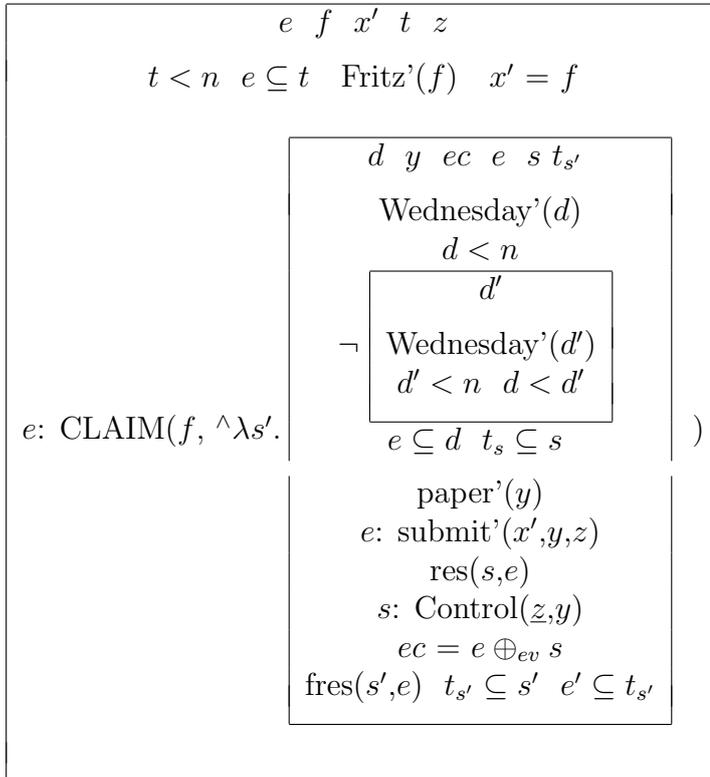
The steps needed to obtain the representation for the outer S node of (6.63) are familiar and of no interest. This leads to the representation in (6.64), in which the resolution indicator PRO has been transferred from the argument slot \underline{x} to the discourse referent f that now fill that slot.

(6.64)



This representation is not yet final, since the PRO-presupposition in K still has to be resolved. But its resolution is predetermined by the placement of PRO in (6.64): x' must be identified with f . Furthermore, an argument has to be accommodated for the as yet unfilled slot \underline{z} . The discourse referent we choose for this accommodation is z . The result of this resolution is the DRS in (6.65).

(6.65)



This last representation can be simplified, in two ways, without loss of essential content. First, we can eliminate x' from the universe of the outer DRS together with the equation $x' = f$, while the third occurrence of x' is replaced by f . Second, the information about the target state of the *submit*-event in the DRS in the scope of the lambda operator can be omitted without harm, since it plays no part in the interpretation of the perfect operator. (The information could be recovered at any time it might be needed – for instance in order to draw certain inferences from (6.66) – by making use of the relevant Meaning Postulates for *submit*.) Carrying out these simplifications leads to the DRS in (6.66).

$$\begin{array}{c}
 \begin{array}{c}
 e \quad f \quad t \quad z \\
 t < n \quad e \subseteq t \quad \text{Fritz}'(f)
 \end{array} \\
 \left(\begin{array}{c}
 \begin{array}{c}
 d \quad y \quad e \quad t_{s'} \\
 \text{Wednesday}'(d) \quad d < n \\
 d' \\
 \neg \text{Wednesday}'(d') \\
 d' < n \quad d < d'
 \end{array} \\
 \begin{array}{c}
 e \subseteq d \quad \text{paper}'(y) \\
 e: \text{submit}'(f,y,z) \\
 \text{fres}(s',e) \quad t_{s'} \subseteq s' \quad e' \subseteq t_{s'}
 \end{array}
 \end{array} \right)
 \end{array}
 \tag{6.66}$$

This concludes our discussion of (6.48.b). And as we said, the remainder of the representation construction for (6.48.a) is just like what has just been shown: the only difference between the two cases is that in (6.48.b) the lambda abstraction in the representation of the infinitival complement is over a result state, whereas in (6.48.a) it is over the state of being ill that is contributed by the complement's VP.

Our final remark in this Section concerns present tense uses of *claim*, as exemplified by the sentences in, among others, (6.40) - (6.42). As we noted above, such uses involve an interpretation of *claim* as dispositional predicate. We left it open whether this interpretation should be treated as a lexically distinct reading, with its own entry in the lexicon, or as one that can be derived from the event reading that is the target of the lexical entry (6.60) which we have been using in our representation construction for (6.48.b). But either way the referential argument of the representation that is to be combined with the semantic representation of the complement of *claim* has a state s'' for its referential argument. This means that the resolution to the TeCon-presupposition of the complement representation now involves setting the self-location time $t_{s'}$ of the referential argument of the complement equal to the self-location time $t_{s''}$ of this state. Otherwise these cases are just like the ones we have discussed.

The sentences (6.48.a) and (6.48.b) evidently also admit interpretations which assign a dispositional, state describing interpretation to *claim*. In that case

the identification of the self-location time of the referential argument s' of the complement with the location time of the referential argument s'' of the matrix verb leads to the interpretation according to which at the past time that the sentence is understood to be about Fritz was in the state of claiming that at that time he had submitted his paper.

6.7.3 *Intend*

In this section we have a look at *to*-infinitival perfects that are complements to a future-oriens control verb. For our sample verb we take *intend*. As we have seen future-oriented control verbs can take both event-describing and state-describing complements. The reason for this is that they locate the eventualities developed by their complements in the future of their own referential arguments. So the special restriction to state descriptions that we find with a matrix verb such as *claim*, which for such verbs follows from the fact that their temporal control is simultaneity, does not apply.

That *intend* can take event descriptions as complements is not directly relevant, however, to our concerns here, as perfect complements a rev always state descriptions anyway. And what is important is that the temporal control property of *intend* is temporal succession, for it is this which creates the possibility for independent temporal location of the referential argument of the complement. For instance, in both (6.67.a) and (6.67.b) *on Friday* locates this referential argument – an event discourse referent in (6.67.a) and a state discourse referent in (6.67.b).

- (6.67)a. Fritz intends to go to Paris on Friday.
- b. Fritz intends to be in Paris on Friday.
- c. Fritz intends to have submitted his paper on Friday.
- d. Fritz is planning to leave for Paris on Sunday. He intends to have submitted his paper on Friday.

When the complement clause is a perfect, then its referential argument will always be a result state. By analogy with (6.67.b) we would expect that in such cases a temporal adverb can locate the result state. But another possibility would be that it locates the event of this state is the result state. Sentence (6.67.c) seems to us to confirm both options, although perhaps neither reading comes easily when the sentence is offered out of the blue. This

seems so in particular for the interpretation of Friday as the day of submission, but this interpretation becomes easier, when the context provides a temporal anchor for the result state, as in (6.67.d).²⁸

The lexical entry we adopt for *intend* (see (6.68) below) leaves out everything that has to do with its being a propositional attitude verb.²⁹ The entry treats *intend*, on a par with *claim*, as a predicate with an argument slot for a property of eventualities, which in the cases that matter here is filled by the property described by its infinitival complement. The only differences as compared with the earlier entry (6.60) for *claim* are: (i) the weaker constraint on the slot filler *P* and (ii) the different temporal control property (eventuality described by the complement is later than the matrix eventuality, rather than simultaneous with it).

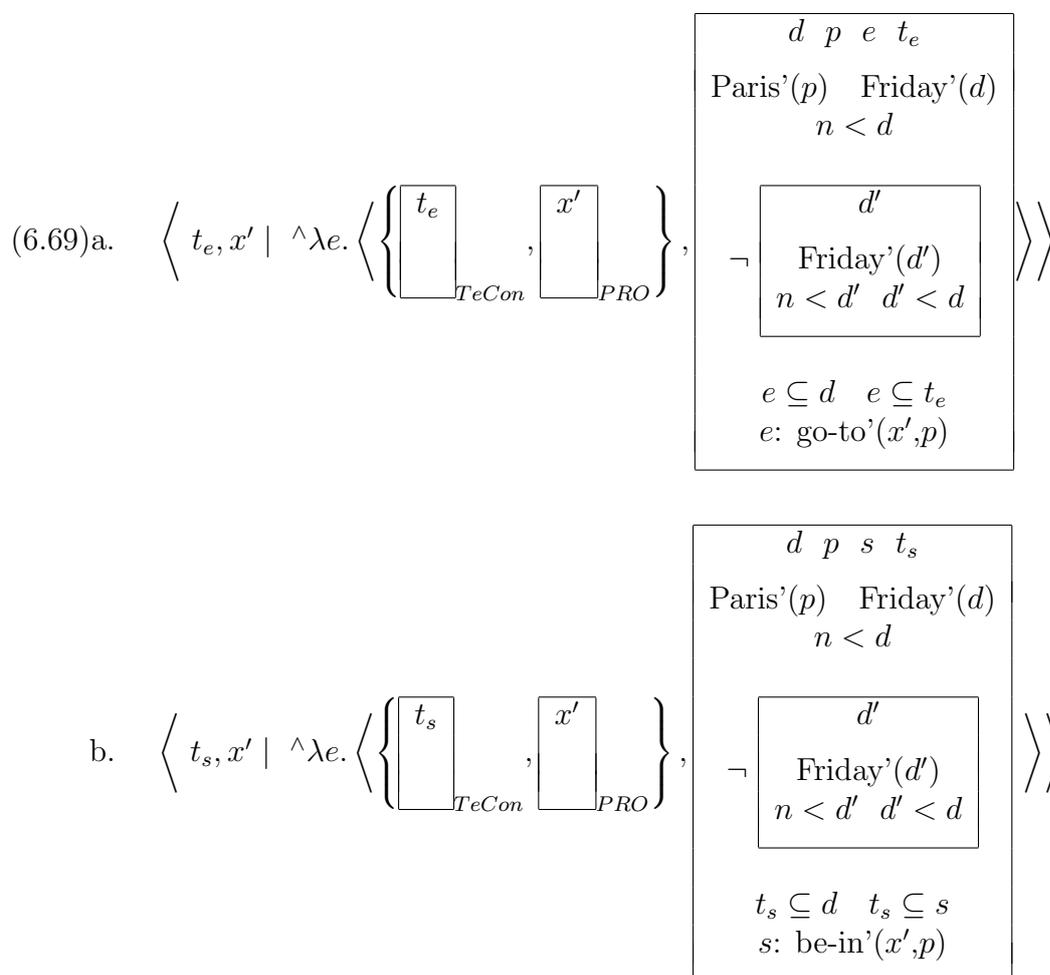
	<i>intend</i> (verb)	nom	<i>to-</i>
			infinitive
	s	x	<i>P</i>
(6.68)a.			
	Sel. Restr.		eventuality
			description
	Contr. Prop:	$t_{TeCon} > t_s$	PRO = x

$$\text{b. } \left\langle s_{\text{ult,alt}} \mid \boxed{s: \text{INTEND}(x, P)} \right\rangle$$

When the complement of *intend* is *to go to Paris on Friday*, as in (6.67.a) or *be in Paris on Friday*, as in (6.67.b), and *intend* is in the present tense (as it is in (6.67.a,b)), then there is no ambiguity about the interpretation of *on Friday*: the only way of construing it is as locator of the referential argument of the complement. So in this case the property description contributed by the complement of (6.67.a) is that given in (6.69.a) and the property description contributed by the complement of (6.67.b) is that given in (6.69.b). (*on Friday* is taken to refer to the next Friday after *n*.)

²⁸ Another way of expressing the reading in which the adverb locates the result state is to use *by Friday* instead of *on Friday*. We don't quite understand why this should be so, but that is because we do not fully understand the semantics of *by* in phrases like *by Friday*. We believe however that even in the face of the competition by *by Friday on Friday* does have the result state modifying reading.

²⁹ For more on attitudinal verbs in DRT see in particular (Asher 1986), (Asher 1987) as well as more recent DRT-based work on attitudes and attitude reports ((Kamp 2003), (Kamp et al. 2011)).



The matter gets more complicated when the matrix verb *intend* bears a tense other than the present. In (6.70.a) *on Friday* can act as a modifier either of *go to Paris/be in Paris* or as a modifier of *intend*. This ambiguity can be dealt with as an attachment ambiguity – *on Friday* can be a constituent either of the complement clause or of the matrix clause.

- (6.70)a. Fritz intended to go to/be in Paris on Friday.
 b. Fritz intended to go to/be in Paris on Friday on Tuesday.
 c. On Tuesday Fritz intended to go to/be in Paris on Friday.

(6.70.b,c) confirm this evidence in that here one of the adverbs is understood as modifier of the complement and the other as modifier of the matrix. And moreover, word order determines which modifies what: in (6.70.c) the only possible interpretation is that in which the sentence-initial adverb modifies]em *intend* and the sentence-final adverb modifies the complement; in

(6.70.b) it is the sentence-final adverb that modifies *intend* and the pre-final adverb that modifies the complement. Given our assumption that the adverbs semantically modify their adjunction sites, this is predicted by familiar arguments about the syntax of adverbial adjunction and its manifestation at the level of surface word order. We omit details.³⁰

Armed with these observations we now return to the sentences that really matter, those in which *intend* combines with an infinitival complement whose verb is in the perfect, as in (6.72).

- (6.72)a. Fritz intends to have submitted on Friday.
 b. On Friday Fritz intended to have submitted his paper.
 c. On Friday Fritz intended to have submitted his paper on Tuesday.

The point of this last batch of examples is to demonstrate that with complements of *intend* whose verbs are perfects temporal adverbs can be ambiguous between an interpretation in which they localise the result state and one in which they localise the event. In this regard such complements are like past perfects. Let us elaborate this point a little, focussing on (6.72.a). We assume that *on Friday* is an adjunct within the complement clause (more precisely, that it is adjoined at the TP-level of the syntactic structure of the complement, as we have been assuming generally for temporal adverb conjunction) and that it gets *att*-marked. The two interpretations of (6.72.a) can then be obtained by making the further assumption that the Perf-node of a *to*-infinitival clause allows for two different feature values, viz. +perf(past,e) and +perf(past,s) introduced in connection with the past perfect. When the PERF value for the complement in (6.72.a) is +perf(past,e), the resulting interpretation is that in which *on Friday* localises the submission event, whereas taking the value to be +perf(past,s) yields the interpretation in which *on Friday* localises its result state. Likewise, (6.72.c) comes out as two-way ambiguous on this account, with *on Friday* modifying *intend* and

³⁰ Note however that a single fronted adverb, as in (6.71.a), can be interpreted as modifying the complement. (Some special prosody seems needed to get this interpretation when the sentence is spoken. Presumably this is an instance of fronting motivated by information structure.) On the other hand a sequence of two successive locating adverbs, as in (6.71.b), appears to be ungrammatical, suggesting that there is only one sentence-initial slot for a locating adverb. We note these facts but will not try to include them in our formal discussions.

- (6.71) a. On Friday Fritz intended to go to/be in Paris.
 b. On Friday on Tuesday Fritz intended to go to/be in Paris.

on Tuesday modifying either the submission even or its result state. And on the assumption that a complement-internal adverb can be moved to the front of the sentence, the account predicts a three-way ambiguity for (6.72.b), with *on Friday* modifying either (i) *intend*, (ii) the submission event, or (iii) the result estate of the submission event. (There may be some doubt whether the predictions for these last two sentences are really borne out. But we think we can detect the different meanings that our account predicts.)

The assumption that *to*-infinitival perfects are compatible with the two feature values +perf(past,e) and +perf(past,s) enables us to account for the kind of ambiguity illustrated by the sentences in (6.72). But do the feature values of the Perf nodes of *to*-infinitival perfects also have the other properties we have associated with +perf(past,e) and +perf(past,s) as past perfect features? Recall what these further properties were:

- (a) *ut* is moved to a formal result state;
- (b) state-to-event coercion can be either via closure or inchoative.

To the extent that we can tell both of these properties are satisfied by the PERF values that are compatible with *to*-infinitival perfects. Let us take the second property first. One difficulty here is that examples which decide the matter one way or the other are not all that easy to come by, when we insist on the matrix verb *intend*. (This seems to be connected with the fact that on the whole *intend* prefers complements that describe actions, and less easily combinable with estate descriptions.) But they are not so hard to find when we allow for other matrix verbs, such as *expect*.³¹

Consider the sentences in (6.73).

- (6.73)a. Fritz expects to have been a full professor for two decades in 2040 (the year he is retiring).
- b. Fritz claims to have lived in Stuttgart since 2005.

³¹ *expect* is a raising verb, not a control verb. This difference entails a non-trivial number of further differences that arise for the syntax-semantics interface for sentences with *expect* as matrix verb, both when its complement is a *to*-infinitival and when it is a *that*-clause or interrogative *wh*-clause. These differences are orthogonal, however, to the issues we are discussing. On the one hand this means that there is little point in going through the extra effort that an explicit presentation of the semantics construction for a sentence with *expect* – it wouldn't teach us anything of interest in relation to the things that matter here – but on the other hand informal evidence is as relevant as it would be if it came from sentences whose the matrix verb was *intend*.

- c. Fritz expects to have taught abroad for some semesters when he retires in 2040.
- d. Fritz claims to have taught abroad for some semesters.

The prominent interpretation of (6.73.a) is that the state of Fritz being a full professor will hold for the last two decades before his retirement. This reading is obtained when the state-to-event coercion required to combined the perfect in the complement of (6.73.a) is inchoative. The same is true of (6.73.b). Here it is the property of living in Stuttgart that is said to have gone on from 2005 till today.

We conclude then, albeit somewhat tentatively, that for English *to*-infinitival perfects state-to event coercion can be inchoative. (6.73.c) and (6.73.d) show that coercion via closure is possible as well.

It is more difficult to find evidence that can help us decide whether the state that the feature *itt* shifts to is a formal result state. Evidence in favour would have to come from sentences like the one in (6.74).

(6.74) We expect Fritz to have left the house but to have already returned at that time.

We take it that (6.74) has an interpretation according to which at the time indicated by *at that time* Fritz will be in the state that consists in his having left and then come back. If this is right, then that is evidence in favor of the claim that *itt* shifts to a formal result state. But (6.74) is awkward, so that the intuitions that can be made out – sort of – in connection with it should not count for too much. Ands we haven't found sentences that prove the point and that sound much better.

But the thesis that the shifts of *itt* effected by *to*-infinitival perfects are to formal result states also receives support from another, more general; consideration. Like many many other languages English does not have infinitival forms that refer explicitly to the past. For instance, if we try to express that Fritz stands in the claim relation to a proposition to the effect that there was something he did in the past, such as, say, having gone to Paris, then there is no simple past infinitive of the phrase *go to Paris* that one could use as complement of *claim* to express Fritz' claim that he went to Paris. If we want to use an infinitival complement at all to express this, then the only for that can be used is the infinitival perfect *to have gone to Paris*. In other words, infinitival perfects are the only forms we have in English to play the part of

past tense infinitives. But if that is so, one would expect that at least in some of their uses infinitival perfects have the simple past-like behavior that we have found with the regular perfects of German: *tt* moves to a formal result state.

In our discussion of the infinitival complements of *claim* in the last section we did not raise the possibility of different PERF val,use for the complement. The issue didn't arise there because the result estate of the comp,meant receives its temporal location through identification of its self-location time with that of the matrix verb. But now that we have seen the need for making such a distinction in connection with the infinitival complements to *intend* and *expect*, it is a natural question whether this distinction isn't after all applicable to the complements of a verb like *claim* as well.

We think the answer to this question is positive: Yes, the values +perf(past,e) and +perf(past,s) are the possible PERF values for *to*-infinitival perfects that occur as complements of *claim* just as they are the possible PERF values for *to*-infinitival perfects that occur as complements of *intend* or *expect*. But in the case of *claim* the +perf(past,s) gets eliminated on account of its Temporal Control property being is simultaneity: Because the result state of the complement is located through identification of its self location time with that of *claim*, there is no room left for additional location by a temporal adverb. Thus, if the complement contains a temporal adverb, then that can only be used to locate the event, but not its result state. And that kind of temporal location is possible only when the PERF value for the complement is +perf(past,e).

The principle on which this last argument relies, viz. that because the result state of a *to*-infinitival perfect that occurs as complement of *claim* is located through Temporal Control it may not be located additionally by a temporal adverb is one to which we have appealed here for the first time. We will not take the trouble here of formulating the new principle in formal terms (though our statement of it should make it clear enough how such a formulation would go). But the more interesting question, it seems to us, is whether the principle is a special case of a more general one, to the effect that a variable or discourse referent 'may not be bound more than once'. But what if anything is the right, sufficiently general notion of binding here?

6.7.4 Naked infinitival perfects

In English, naked infinitives occur as complements of modal verbs, including *may*, *must*, *should* and *might*, and also as part of certain small clause constructions. These small clause constructions do not admit state descriptions in general, and so in particular they do not admit the result state descriptions generated by (infinitival) perfects. Therefore they are irrelevant for present purposes. This leaves us with the constructions involving modal verbs. We restrict attention to the four verbs just mentioned.

English modal verbs lack inflectional morphology: no past tense, no infinitive, no gerund. They only occur in a single, morphologically inert form, and this form functions semantically as a present tense, in that the contribution made by unembedded occurrences of these verbs is always to the effect that a certain state of affairs obtains at the utterance time. [reference to Abush?] This state is obtained by applying the semantic operator expressed by the modal verb to the input representation supplied by the infinitival complement. (In this regard modal verbs express operators in the same sense as the progressive and the different kinds of perfect operators, of which we have now encountered a fair sample.)

To illustrate the properties of such constructions that matter here we concentrate on one of the modals listed above, viz. *should*. Consider the sentences in (6.75).

- (6.75)a. Fritz should be here now.
- b. For all we can tell, Fritz should be here now.
 - c. Fritz should be here now. I told him very clearly.
 - d. Fritz should be here within half an hour.
 - e. Fritz should have been here yesterday morning.
 - f. * Fritz should be here yesterday morning.
 - g. Fritz should have left at five and come back at seven.
 - h. Fritz should have been waiting here for at least three hours.
 - i. Fritz should have been waiting here for the last three hours.
 - j. Fritz should submit his paper.
 - k. Fritz should be here.
 - l. Fritz should have left Paris (by) tomorrow evening.

It is a familiar observation that *should* is ambiguous between an epistemic and a deontic use and that similar ambiguities are also found with most of the other modal verbs. Sentence (6.75.a) is ambiguous in just this sense. The ambiguity is often resolved in context, as in (6.75.b) where the predominant interpretation is epistemic and in (6.75.c) where the predominant meaning is deontic. (But note well that neither context fully excludes the sub-dominant reading). What the two interpretations have in common (at least in a first approximation) is that they both speak about a certain property – that of being a state to the effect that Fritz is here – ‘should’ be instantiated at the utterance time. On the epistemic interpretation the ‘should’ of the last sentence amounts to something like ‘in all possibilities (or ‘possible worlds’) suggested by the information available to us the property is instantiated at the (actual) utterance time’; on the deontic reading ‘should’ comes to something like: ‘in all deontically optimal worlds – the best worlds to be had from the relevant deontic perspective given the facts (including deontically reprehensible ones) that are taken as given – there is an instantiation of the property at the actual utterance time’.³²

As in the last section our central concern is to determine what perfect operators are involved in the use of the perfect forms we are looking at. But in order to deal with this matter we must first look at another, viz. the temporal control properties of *should*. As it turns out, these control properties are not quite the same for the epistemic and deontic reading of *should*. The main difference between epistemic and deontic *should* is that the former only admits state descriptions whereas the latter admits event descriptions as well. This can be seen from examples like (6.75.j), in which the complement is an event description. When that is the case, *should* is unambiguously deontic, whereas for complement that describe states – all the other examples in (6.75) – *should* can have both readings. (Though of course the context may make clear which reading is intended, cf. (6.75.b,c).) This difference between deontic and epistemic *should* also has an implication for temporal control, in that the combination of (deontic) *should* with an event description is always future-oriented: the obligation is for an event of the described

³² There is a rich literature on the nature and exact articulation of the sets of worlds that enter into the semantics of different modal operators. But the central concerns of this paper lie elsewhere, so we do not go into this aspect of the semantics of the modals of natural languages. As representative for the extensive work that has been done on this topic over the last five decades we mention two studies by Kratzer, (Kratzer 1977) and [Kratzer 2011], whose work has not only been exceptionally influential, but has in fact spanned most of this period. We will have more to say on the status of such possible world analyses of modal verbs in the next section.

kind to occur in the future of n . When the complement is a state description, then this is in general not so. To see this compare (6.75.j) and (6.75.k).³³

Since we are only interested here in complements that are perfects, this difference between epistemic and deontic *should* isn't of great import, since perfects are always state descriptions. Indeed, as the relevant examples in (6.75) show, when *should* is followed by a perfect complement it is ambiguous between an epistemic and a deontic reading unless disambiguation results through some other, independent feature of the context.

This then is the general picture according to what we have just said: deontic *should* can combine with event descriptions as well as state descriptions; and when it combines with an event description then its interpretation is future-oriented. When it combines with a state description, however, then the claim it makes pertains to the utterance time, and in that respect it is like epistemic *should* when combined with state descriptions, which for epistemic *should* is the only possibility. And as far as this is concerned, perfect complements behave like any other kinds of estate descriptions. But this assessment ignores an important twist. It is twist that English construction in which modal verbs combine with infinitival complements share with main clause present tense sentences in German. Compare the following sentences.

³³ For combinations of *should* and a state description there is an apparent difference between the temporal properties associated with the deontic and the epistemic reading. The epistemic reading of *should* asserts of the state description given by its complement that a state of the kind described obtains at the utterance time in all worlds compatible with the assumptions the speaker is making. It might seem that the deontic interpretation is different in this regard: the obligation it expresses should not just hold for the utterance time itself, but also for some time following it. Consider (6.75.k). On its denoting reading it is the sort of thing that you typically say when the obligation is *not* fulfilled – in the case at hand: when Fritz is *not* here. But in such a case it is typically not the case that with that the obligation is over: As long as Fritz hasn't turned up, he continues to be under an obligation to do so. In other words, it seems that the deontic reading of *should* has a future-oriented component too, whereas this appears not to be the case for the epistemic reading. We believe, however, that this is not the right diagnosis. Both epistemic and deontic *should* only make claims relating to the time of utterance. But it is feature of undischarged obligations that they typically remain in force until they have been discharged. It is that which makes us think that statements about current obligations are statements about future obligations as well. But that is only because we do not carefully distinguish between the content of the statement itself and a strong and usually valid implicature. I can say to you, over the phone and in a mightily annoyed tone of voice: 'Well I told you perfectly clearly: You should be here right now. But since you evidently haven't made it, don't bother to turn up later.'. In that case the current obligation of which I remind you is lifted within the same breath.

- (6.76)a. Fritz should be in Paris.
 b. Fritz should be in Paris next week.
 c. Fritz should go to see his grandmother.
 d. Fritz should go to see his grandmother tomorrow afternoon.
 e. Fritz ist in Paris.
 (Fritz is in Paris.)
 f. Fritz ist nächste Woche in Paris.
 (lit: Next week Fritz is in Paris.)
 g. Fritz geht nach Paris.
 (lit: Fritz goes to Paris.)
 h. Fritz geht nächste Woche nach Paris.
 (lit: Fritz goes next week to Paris.)
 i. Fritz geht jetzt nach Paris.
 (lit: Fritz goes now to Paris.)

First the German facts. The sentences (6.76.e-i) are all well-formed and do not require a special context to be acceptable. And their readings are as follows. (6.76.g), with its event verb *gehen*, only has a future-oriented interpretation, which in English one would express using the future tense ('Fritz will go to Paris.'). We get the same semantic effect – not surprisingly – when an adverb is added that refers to a future time, as in (6.76.h). And even when we add the adverb *jetzt* ('now'), as in (6.76.i), the interpretation is still future-oriented: this sentence means that Fritz' departure will take place immediately; but the whole trip, which may take a considerable amount of time, is situated in the future. When the VP describes a state, as in (6.76.e) and (6.76.f), the situation is different. In (6.76.f), where the state description is combined with the future time denoting *nächste Woche*, the meaning is the only one the sentence could have, viz. that Fritz will be in Paris next week. But (6.76.e), in which there is no such adverb, the only possible reading is that Fritz is in Paris now. In short, German simple present tense event sentences have a future-oriented reading whether or not a future time denoting adverb is present. But simple present tense state sentences have a future-oriented reading if and only if accompanied by such an adverb, and otherwise express that the described state holds at the utterance time.³⁴

³⁴ The situation is even more complicated than this. Present tense accomplishment sentences, such as 'Fritz schreibt einen Brief.' (lit: 'Fritz writes a letter.')

have the same reading that is expressed by the Present Progressive in English. Thus the correct English translation of 'Fritz schreibt einen Brief.' is 'Fritz is writing a letter.': the writing of

The English *should*-sentences in (6.76) show the same pattern: all are well-formed. But (6.76.b,c,d) only have a future-oriented reading and (6.76.a) only the reading that the state of Fritz being in Paris should hold now. And for (6.76.a) and (6.76.b) this is so irrespective of whether *should* is taken in its deontic or its epistemic sense.

What goes for state descriptions in general, we already ventured, goes for result state descriptions in particular. That is true also for the interaction between state descriptions and *should*, as shown by the examples in (6.77). Thus (6.77.a) only seems to have a reading according to which the state of Fritz being in Paris should hold now, where again ‘should’ can be taken either deontically or epistemically. (6.77.b) and (6.77.c) on the other hand show that when a future denoting adverb is added, then that forces the temporal location of the state described by the complement to be at the future time it denotes.

- (6.77)a. Fritz should have left Paris.
 b. Fritz should have left Paris (by) tomorrow evening.
 c. Tomorrow evening Fritz should have left Paris.
 d. Fritz should have been here yesterday morning.
 e. * Fritz should be here yesterday morning.
 f. * Tomorrow night Fritz should have been here tomorrow morning.
 g. * At six Fritz should have left at five.
 h. Fritz should have left at five and come back at seven.
 i. Fritz should have been waiting here for at least three hours.
 j. Fritz should have been waiting here for the last three hours.

However, since we are dealing with perfects now, the interaction with temporal adverbs is more complicated, in the way we have ample occasion to observe in our discussion of past and *to*-infinitival perfects. Note that (6.77.d), with an adverb that denotes a time in the past of now, is perfectly acceptable, whereas the same sentence with a non-perfect infinitive, as in (6.77.e), is not. The explanation of this last difference is not hard to come by, of course. In

the letter is going right now, at the time when the sentence is uttered. The dividing line between those event sentences that behave like this one and those that behave like (6.76.g) is roughly that between accomplishments and achievements, but this is only a rough approximation. However, we digress and should digress no further.

(6.77.d) *yesterday morning* locates the state of Fritz' being here: what holds now is the obligation (or the inferential certainty) that Fritz *was* here yesterday morning – a current obligation (or certainty) concerning a past state. But in (6.77.e) there is only one eventuality, viz. the state of Fritz being here, that is located on the one hand by *should* as pertaining to the utterance time and on the other by *yesterday morning* as holding at some time before the utterance time. That is contradictory, in the way that rules sentences out as ungrammatical.

But if it is possible that the eventuality described by the input to an infinitival perfect can be modified by an adverb denoting a past time, shouldn't the same option exist likewise for adverbs denoting future times? The answer to this question is: 'Yes, but it doesn't make any difference'. What we mean is this: If a future denoting adverb such as *tomorrow evening* were to motivate the eventuality *ev* of which an infinitival perfect describes a result state then the result state itself would have to be located in a time even farther in the future than the denotation of the adverb. But when the infinitival perfect is a complement to *should*, that would, according to what we have said, only be possible if a future denoting adverb were locating the result state in the future, in the manner of (6.77.b) as opposed to (6.77.a).³⁵ But if there is a future denoting adverb in the sentence that does this, then there is no room for another adverb that locates the eventuality *ev* – this is just another instance of Klein's Past Perfect Puzzle (see (6.77.f,g)). And the explanation of why such double adverbial locations are out is, we assume, the same as it is for past perfects: the naked infinitival complements of *should* involve either the feature value +perf(past,e) or the feature value +perf(past,s); the former allows for adverbial location of *ev* the second for adverbial location of the result state of *ev*, but neither allows for adverbial location of both *ev* and its result state. To summarise: There is no intrinsic prohibition against temporal location by a future denoting adverb of the eventuality described by the input to an infinitival perfect. But such locations are made impossible by the particular interaction between such infinitival perfects and a modal verb like *should* of which they are the infinitival complements.

In the last paragraph we skipped in the assumption that naked infinitival

³⁵ There is a puzzling detail about (6.77.b) that we do not know what to say about. The perfect in this sentence seems to combine more naturally with the adverb *by tomorrow evening* than with the plain *tomorrow evening*. Many perfects show some preference for adverbials beginning with *by*, although as far as we can tell phrases without *by* (and perhaps with another preposition such as *on* or *at* in its stead) seem possible also. A proper analysis of this use of the preposition is something that still needs to be addressed.

complements of modal verbs require the distinction between $+perf(past,e)$ and $+perf(past,s)$ just as past and *to*-infinitival perfects. After all that has come before that assumption shouldn't have come as a surprise. But once again we should check whether the perfect operators that are determined by these features in the context of naked infinitival perfects are the same as those we were led to assume are determined by these feature values in the context of past perfects or *to*-infinitivals. Once again the decisive evidence is not all that easy to come by, but the same tests that we have been using earlier point once more in the same direction. The examples in (6.78) bring out what little data we have looked at.

- (6.78)a. Fritz should have left at five and come back at seven.
 b. ?? Fritz should have left now and returned again in the meantime.
 c. Fritz should have been waiting here for at least three hours.
 d. Fritz should have been waiting here for the last three hours.
 e. Fritz should have been waiting here since five o'clock.

The difference between (6.78.a) and (6.78.b) patterns with the same difference in the case of past perfects and the *to*-infinitival perfects that occur as complements to control and raising verbs. And we draw the same tentative conclusion: $+perf(past,s)$ carries the information that the result state is target or target-like, $+perf(past,e)$ that it is formal result state. Furthermore, (6.78.c) and (6.78.d) suggest that both inchoative coercion and coercion via closure are possible when the input to the perfect operator is a state description. As before, we assume that the first option is associated with $+perf(past,s)$ and the second with $+perf(past,e)$.

We conclude this section with the DRS construction of two sentences of the types considered in our informal discussions so far, displayed in (6.79).

- (6.79)a. Fritz should have submitted a paper.
 b. Fritz should have submitted a paper on Friday.

In order to construct semantic representations for these sentences we need a lexical entry for *should*. As a matter of fact, if we want to do justice to the various observations we have been making we need both a lexical specification for epistemic *should* and one for deontic *should*. Ideally one would like all this information to be packed into a single entry, which captures what the two *shoulds* have in common as well as what distinguishes them. But we do not see an illuminating way of doing this and therefore will give separate

entries for the epistemic and the deontic interpretation. The entries we adopt treat *should* semantically along the same lines as we have treated the matrix verbs to *to*-infinitives discussed in the previous sections: as 2-place predicates whose first argument is realised by the subject argument and whose second argument is the eventuality abstract provided by the infinitival complement. About the relations expressed by these predicates (the epistemic and the denoting one) we have no more to say here. (But for some reflections on this see the next section.)

Another matter that must be settled before we can give the lexical entries for *should* has to do with the syntactic structure of its complements. Here we make life easy for ourselves, by assuming that naked infinitives have the same structure as *to*-infinitives. In other words, we assume that the syntactic structures of naked infinitives have a PRO constituent and thus that the combination of *should* with such a structure involves control (for subject) just as the combination of a *to*-infinitive with a verb like *claim* or *intend* involves control. (Arguably this isn't quite right, but will do well enough for our purposes.)

The final matter concerns the 'coercion' that can be observed in the presence of future denoting adverbs: of current state descriptions that serve as arguments to *should* to future-located descriptions. 'coercion' has been placed within quotes here, because it is a different form of coercion from those we have encountered earlier. In fact, a viable implementation of this new kin of coercion poses more than one problem, some of which we will address when we have to, in the DRS constructions for the sentences in (6.79). But one problem has to be addressed now, before we can finalise our entries for *should*. In English, we saw, coercion from a state description that represents the state it describes as holding at *n* to a description that locates its state in the future of *n* that is encoded as current to one isn't possible in general. (That is one of the differences between English and German.) So the coercion option that we have in the case of *should*-sentences is specific to them (and some other special constructions). So the possibility of current-to-future state coercion that we see in sentences like (6.79.b) must be restricted to the special cases where this is possible. What is at issue in the case we are discussing is the Temporal Control property of epistemic and deontic *should*. It is this property that can be coerced from current to future. We indicate this possibility by an annotation on the Temporal Control relation of *should*, which is the identity relation '='. The annotation we use is *ctf* (for 'current-to-future'). We will see presently what effect this feature has on the construction of the semantic representation.

Given these decisions, the semantic entries for epistemic *should* that we will be using can be specified as in (6.80).

	<i>should_{ep}</i> (modal verb)	(modal nom x)	naked infinitive <i>P</i>
(6.80)a.		s	
	Sel. Restr.		state prop- erty
	Contr. Prop:	$t_{TeCon} =_{ctf} t_s$	PRO = x

b. $\left\langle s_{tlt,alt} \mid \boxed{s: \text{SHOULD}_{ep}(x,P)} \right\rangle$

The entry for deontic *should* presents yet a further problem, which also has to do with Temporal Control. As we saw, when the complement is an event description, then Temporal Control locates the described event in the future of the utterance time; when the complement is a state description, then Temporal Control locates it at the utterance time, albeit with the possibility of current-to-future coercion. This means that different selection options go together with different control properties. The simplest way to deal with this issue is to allow lexical entries with disjunctions between pairs of selection restrictions and corresponding control properties. The lexical entry for deontic *should* can then be presented as in (6.80.1).

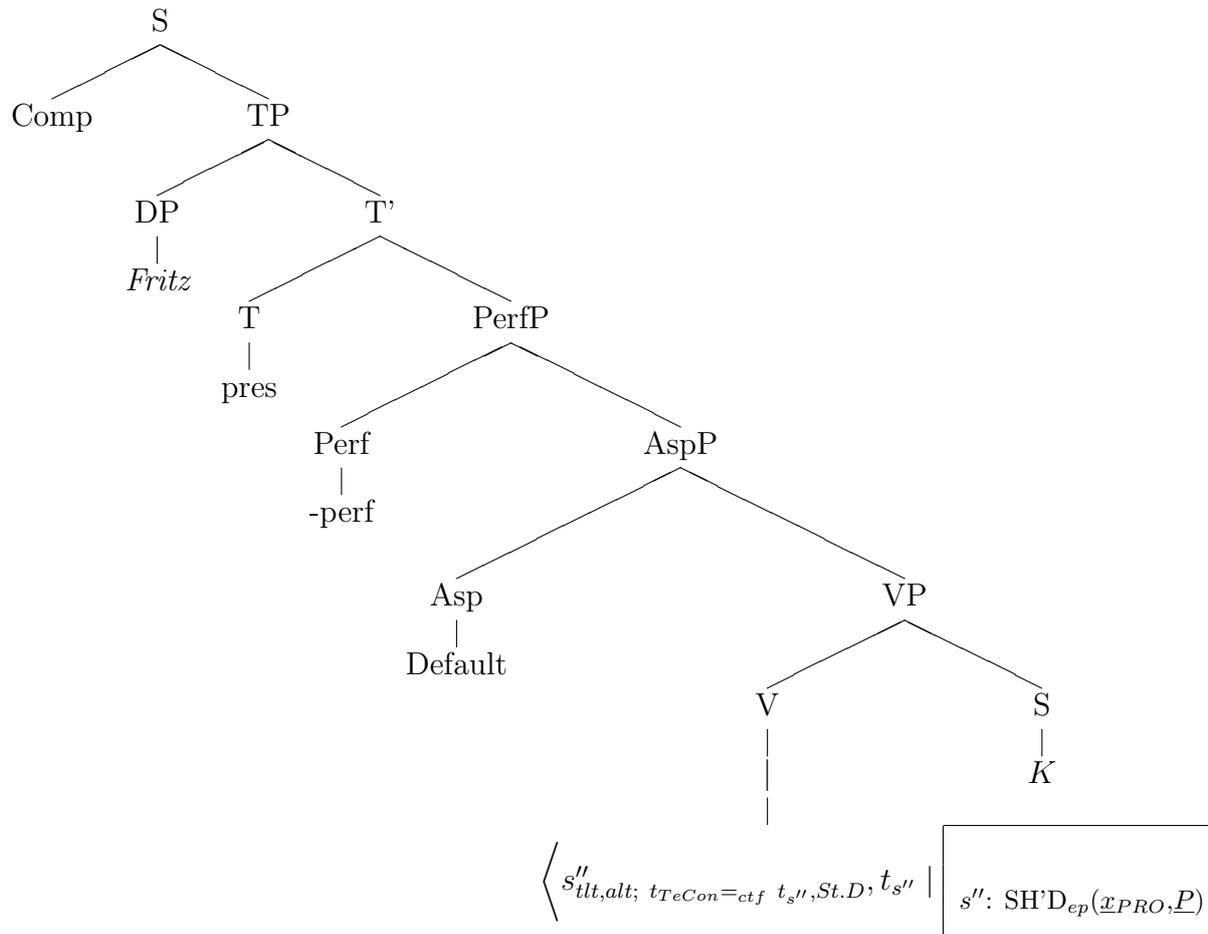
	<i>should_{de}</i> (modal verb)	(modal nom x)	naked infinitive <i>P</i>
(6.81)a.		s	
	(i) Sel. Restr.		state prop- erty
	Contr. Prop:	$t_{TeCon} =_{ctf} t_s$	PRO = x
	(ii) Sel. Restr.		event property
	Contr. Prop:	$t_{TeCon} =_{<} t_s$	PRO = x

b. $\left\langle s_{tlt,alt} \mid \boxed{s: \text{SHOULD}_{de}(x,P)} \right\rangle$

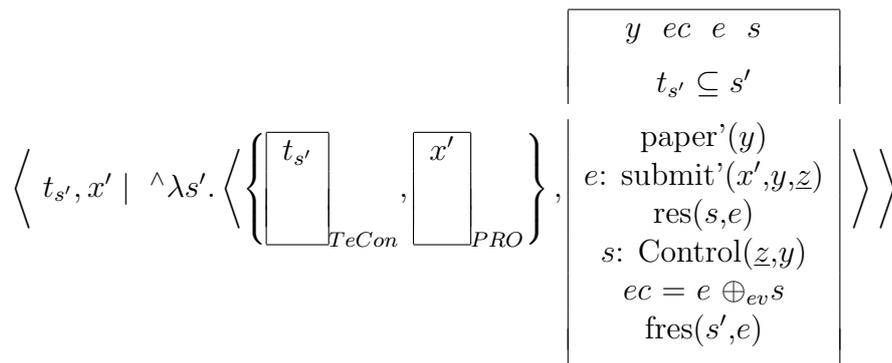
(6.82.a) shows part of the syntactic structure for (6.79.a). The syntactic structure of the complement of *should* is assumed to be like that of the *to*-infinitival perfects discussed in Section 6.9.1 (see (6.59) and following structures). Lexical insertion for *should* has already taken place and so has the semantic construction for its infinitival complement. The lexical inset ion demonstrates the choice made in this interpretation for the epistemic meaning of *should*. (Note that this is a legitimate choice for the interpretation of *should*, since the complement is a perfect and perfects are always state descriptions. Had the complement been an event description, then on the choice of epistemic *should* ‘the derivation would have crashed’ because of a violation of the selection restrictions of epistemic *should*.) Interpretation of the complement has led to the representation *K*, which is displayed in full in (6.82.b). (*K* is in spirit identical to the representation of the lower TP in (6.56). But note that it is immaterial in this case whether the PERF feature on which the construction of *K* is based was +perf(past,e) or +perf(past,s), since (6.79.a) contains no temporal adverb.)

(6.82)

a.



b.

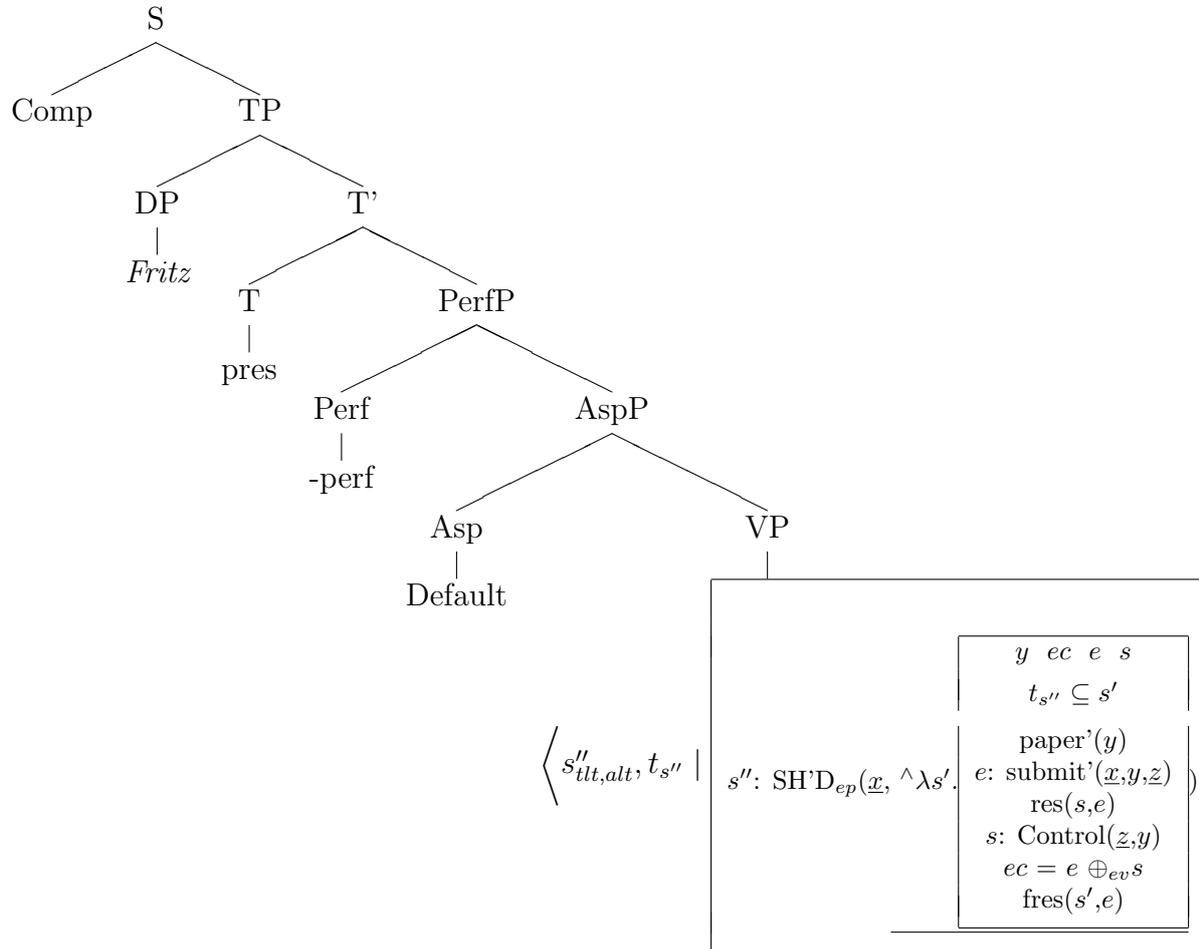


In order to combine K with the semantic representation of *should* it is necessary to first resolve its two presuppositions. Once again the resolution is guided by the control property properties of *should*: the TeCon-presupposition is resolved by identifying $t_{s'}$ with $t_{s''}$ and the PRO-presupposition

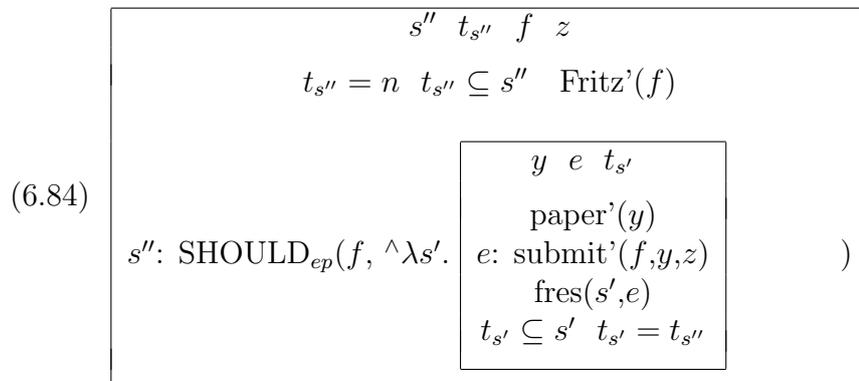
by turning x' in an argument slot coindexed with the subject DP *Fritz* of the matrix verb. Once these resolutions have taken place, the discourse referents $t_{s'}$ and x' of the resolved presuppositions can be transferred to the DRS of K , with the equality conditions that express the resolutions. The resulting property abstract is given in (6.83.a). After that the state property description given by K can be inserted into the slot \underline{P} of the semantic for epistemic *should*. The result is shown in (6.83.b), in which we have simplified the property terms by eliminating $t_{s'}$ and x' and replacing them by their resolvers $t_{s''}$ and the place holder \underline{x}_{PRO} for the subject of *should*.

$$(6.83)a. \quad \wedge \lambda s'. \quad \boxed{\begin{array}{l} y \quad ec \quad e \quad s \quad t_{s'} \quad x' \\ \\ t_{s'} \subseteq s' \\ \\ \text{paper}'(y) \\ e: \text{submit}'(x', y, z) \\ \text{res}(s, e) \\ s: \text{Control}(z, y) \\ ec = e \oplus_{ev} s \\ \text{fres}(s', e) \\ \\ x' = \underline{x}_{PRO} \quad t_{s'} = t_{s''} \end{array}}$$

b.



The remaining steps needed to complete the construction of the DRS for (6.79.a) are all familiar and of no interest to the analysis of perfects. The final result is shown in (6.84).



(N.B. It would of course also have been possible to interpret the *should* of (6.79.a) as deontic *should*. This would have made no difference to the interpretation except that the modal relation would have been the deontic relation SHOULD_{de} instead of SHOULD_{ep} .)

Next the DRS construction for sentence (6.79.b), which we repeat:

(6.79) b. Fritz should have submitted a paper on Friday.

The DRS construction for this sentence is much like that for (6.79.a). But it is of some interest even so because it illustrates some of the points made informally above through various ways in which the semantic representation for this sentence *cannot* be constructed. First consider the infinitival complement and let us assume that the adverb *on Friday* is part of the syntactic structure and that it is adjoined to TP (as we have been assuming throughout). Then as far as the complement itself goes it allows for two different interpretations, one in which the PERF value is $+\text{perf}(\text{past},e)$ and *on Friday* locates the submission event e , and one in which the PERF value is $+\text{perf}(\text{past},s)$ and *on Friday* locates the result state. Now *on Friday* is one of those temporal adverbs that are referentially ambiguous in that in principle there are different Fridays that it could denote. Among the possible denotation of a given occurrence of the phrase there are typically the next Friday after the utterance time and the last Friday before it. Often there are other candidates as well, but let us focus just on these two options since that is enough to bring out the complexity of the case before us. We then have, as far as the complement is concerned four possibilities:

(i) *on Friday* denotes the last Friday before n and it locates e ;

(ii) *on Friday* denotes the last Friday before n and it locates the result state s_{res}

(iii) *on Friday* denotes the next Friday after n and it locates e ;

(ii) *on Friday* denotes the next Friday after n and it locates the result state s_{res} .

When we try to combine each of these four options with the semantics of *should* (whether epistemic or deontic) we see the following:

(i) is fine: the Temporal Control of *should* locates the result state at n and

on Friday locates the submission event e within the last Friday preceding n ;

(ii) is out: the Temporal Control of *should* locates the result state at n and *on Friday* locates that state e within the last Friday preceding n ; this is a contradiction;

(iii) is out: *on Friday* locates that state e within the next Friday following n ; but as in the previous cases the Temporal Control of *should* locates the result state at n since there is no adverbial modification of the result state that could overrule the Temporal Control; so again we have a contradiction;

(iv) is fine: because *on Friday* modifies the result state and *on Friday* denotes a time in the future of n the Temporal Control of *should* gets overridden. So the result state is located as holding at the next Friday after n and the submission event e happened at some time before that.

We leave it at these two examples of DRS construction for sentences with *should*, but not without noting a problem that we cannot address with the tools that are at our disposal right now, but that will need to be confronted at some point. The sentence in (6.85) seems to have the same possible interpretations. In a way this is in keeping with earlier observations: there is a certain freedom, often exploited for information-structural purposes, in where temporal locating adverbs are placed within a sentence. We have seen a number of cases where sentence-initial and sentence-final adverbs make the same truth-conditional contributions. But (6.85) is on the face of it different in that its sentence-initial adverb is, like the sentence-final adverb of (6.79.b), semantically a modifier of the complement of *should* and not of *should* itself. How can the adverb do that given its initial position in this sentence, where it appears in front of what on our analysis is the verb that expresses the main predication of the sentence? We postpone discussion this question until Chapter 7.

(6.85) On Friday Fritz should have submitted a paper.

6.7.5 Modal verbs and possible worlds: an interlude

(6.84) is our semantic representation for (6.79.a). But how much of a semantic representation is it? It clearly falls short of the demands of those who see it as essential to the analysis of modals – and among them are epistemic and deontic *should* – that it tell us in which possible worlds the complement of a modal verb must be true or satisfied in order that the combination of verb

and complement can count as true in the world in which the combination is evaluated (which most often is the actual world in which the combination is uttered and we, the speakers, are situated ourselves). And that is something that (6.84) has nothing to say about as it stands. In order for us to be more explicit about the satisfaction conditions of DRS conditions like ‘ s'' : $\text{SHOULD}_{ep}(f, K)$ ’ it is necessary to delve into the realm of modal logic and the semantics of modality.

Over the past half century the literature on modality has grown into a large, substantive body of work that it is hard to stay abreast or even just to retain some reasonably overview of. Since the topic is only marginally relevant to the semantics of perfects, there is no justification for going into it at any length in this essay. But while modality is a topic orthogonal to our concerns there is nevertheless a close connection between it and the general framework in which our formalisms are carried out. We have been keeping the global architectural aspects of this framework in the background so far. That hasn’t posed a problem for the way in which we have presented the semantic representations for sentences and bits of discourse and the ways they are constructed from syntactic input, and anyone for whom this mode of presentation is satisfactory without further elucidation the remainder of the essay should present no problems on this score either. But we ourselves feel that it is important that the framework has the formal foundations that has always been a *sine qua non* for all work within DRT. The present essay too should give explicit testimony to this, however brief. This is as good a place fort that as any, since it gives us an opportunity to say about how the semantics of modality is related to this general framework, even if abstain from any effort to go into details about the semantics of *should* and other modal verbs.

What follows in this section is going fairly formal and abstract. It can be skipped without loss by anyone who, as we put it just now, is happy with the mode of presentation that we have chosen here, and that will be resumed after the section is over.

Our explicit treatment of sentences has thus far taken the form of constructing semantic representations for natural language sentences. These semantic representations – the DRSs we have been constructing – belong to a representation language that comes with its own syntax and model-theoretic semantics, as explicated in detail in many of the extant introductions to DRT (e.g. (Kamp and Reyle 1993), (Eijck and Kamp 1997), (Kamp and Reyle 2011), (Kamp et al. 2011)). It is in the model theory of the representation formalism

that the semantics of the primitive symbols of the representation language must be defined or circumscribed, including primitives like SHOULD_{ep} . The effect of such definitions or circumscriptions is always to narrow down the set of admissible models. One way to do this is to adopt Meaning Postulates (see e.g. Sections 3.1, 3.2); the effect of a Meaning Postulate is to narrow the set of admissible models down to those in which the Postulate holds throughout.

But Meaning Postulates of the kind we have encountered in Section 3 constitute only one method for confining the set of models to those in which primitives of the representation language behave, or behave more closely, in accordance with their intuitive semantics. When given in the form in which they are usually formulated, possible world analyses of modals constitute a different method, in which the semantics of primitives is specified by constraints on models that are formulated in some ‘metalanguage’, whose expressive power typically exceeds of the representation language itself. Since this will be of occasional use later on, we may as well state – in very general terms – what form such semantic specifications typically take.

We assume that our models are *intensional* in that a single model provides information about what is the case in different possible worlds. More specifically, we assume that a model M for our representation language minimally consists of a world-indexed set $\{M_w\}_{w \in W}$ of *extensional* models M_w . Each M_w gives the extensions of the primitives of the representation language in the world w . More precisely, we assume that each M_w presents a ‘history’ of the world w in that it specifies the extensions of the primitives for each of the times that make up the duration of w . For many applications it is not only convenient, but in fact necessary to assume that all the worlds in W have the same time, i.e. that there is a single time structure $\langle T, \prec \rangle$, made up of a set T of instants and an ‘earlier-later’ relation \prec (a strict linear ordering) between the members of T , that is shared between all worlds from the world set of a given intensional model M , and that thus is characteristic of M as a whole. Furthermore, depending on the representation formalism we adopt and the use that is to be made of it, an intensional model may involve several relations between the worlds in its world set W and the instants from its time structure $\langle T, \prec \rangle$. The ‘ontology’ of such a model, one might say, consists of (i) its world set W , (ii) its time structure $\langle T, \prec \rangle$, and (iii) a set of relations involving members of W and T . (Strictly speaking, we should see \prec as one of those relations, which is special in that it only involves times, but no worlds.) It is often assumed that one of the worlds in the world set W of an intensional model M is the *actual world*, i.e. the world which is ours. This world is usually referred to as ‘ w_0 ’. Thus it is the extensional model M_{w_0}

that is to be considered as giving an (extensional) description of this world.

Given these assumptions an intensional model M can be represented as a tuple $\langle W, \langle T, \prec \rangle, \dots, \{M_w\}_{w \in W} \rangle$, where the dots represent the relations between worlds and times that are part of the model's ontology.

Each intensional model of this form determines a language of two-sorted first order predicate logic – with one sort of first order variable for worlds and the other for time – whose non-logical constants correspond to the relation \prec and the different relations represented by its ‘dots’. And conversely, for any such two-sorted language L of first order logic and any representation formalism F there is the class $C_{L,F}$ consisting of all intensional models M for F such that L is the language determined by M in this way.

Such languages L of two-sorted predicate logic can be used to define the semantics of various modal notions and also to formulate constraints on their semantics. Here we focus just on those options that the literature on modality – involving on the one hand modal notions that can be found in natural languages and on the other modal notions that one may want to include in formal languages and representation formalisms – has been primarily concerned with: the notions studied have typically been ‘modal operators’ and their semantic characterisation has typically been that of full specification, or definition. By a ‘modal operator’ we understand here an expression which turns one or more proposition-determining expressions into a new proposition-determining expression. (For any intensional model M a *proposition-determining expression relative to M* is an expression ϕ from the representation formalism F for which M is a model of from the language L determined by M which at each time t in each model M_w from M denotes a truth value.) Let O be an n -place modal operator (i.e. one that turns combinations of n proposition-determining expressions into a new proposition-determining expression) belonging to a formalism F and let L be a two-sorted language of predicate logic (with variables for worlds and variables for times) determined by some intensional model(s) for F . A *definition for O in L* is a formula of the extension of L with n 2-place predicate variables P_1, \dots, P_n , each with one argument place for worlds and one for times (so that ‘ $P_i(w', t')$ ’ is a well-formed formula whenever w' is a variable ranging over worlds and t' a variable ranging over times). (6.86) contains a schematic display of such a definition.

$$(6.86) \Psi(P_1(w,t), \dots, P_n(w,t), w, t),$$

where the P_i occur in Ψ only as parts of atomic subformulas ' $P_i(w,t)$ '.

A formula of the form given in (6.86) can be used to *define* the operator O in any class C that is a subclass of $C_{L,F}$ in the following sense. Let M be any member of C , \mathbf{w} a world from the world set of M , \mathbf{t} an instant from the time structure of M and let ϕ_1, \dots, ϕ_n be proposition-determining expressions of F , each of which determines a truth value at \mathbf{t} in M_w for any world w of M and any \mathbf{t} in the time structure of M . Let, for $i = 1, \dots, n$, $[[\phi_i]]_M$ be the M -*proposition expressed by* ϕ_i , i.e. the 2-place function which when it is applied to any pair $\langle \mathbf{w}, \mathbf{t} \rangle$ yields the truth value of ϕ_i in M at \mathbf{t} in \mathbf{w} . Then the *truth value of* $O(\phi_1, \dots, \phi_n)$ *at* \mathbf{t} *in* \mathbf{w} *in* M *defined by* (6.86) is given by (6.87).

$$(6.87) O(\phi_1, \dots, \phi_n) \text{ is true at } \mathbf{t} \text{ in } \mathbf{w} \text{ in } M \text{ iff the tuple } \langle [[\phi_1]]_M, \dots, [[\phi_n]]_M, \mathbf{w}, \mathbf{t} \rangle$$

satisfies the formula $\Psi(P_1(w,t), \dots, P_n(w,t), w, t)$ in M ,

(where the $[[\phi_i]]_M$ are assigned as extensions to the predicate variables P_i and \mathbf{w} and \mathbf{t} are assigned to w and t).

This is a very general characterisation of the semantics of 'modal' operators, and most of the literature has focussed on special cases. A large part of the literature is concerned with Kripkean characterisations of 1-place operators in terms of so-called *alternative relations* between worlds. In such cases the formula Ψ in (6.86) is built, using the logical vocabulary of L , from a single 2-place predicate P_1 and a single 2-place relation R between worlds (i.e. R is a 2-place predicate of L with two world argument places); and furthermore the time variable t mentioned in (6.86) is the only time variable occurring in Ψ ³⁶. And even within this already quite strongly restricted set of options most of the attention has been paid to very simple formulas Ψ . (For an authoritative account of much of the work in this area see [Blackburn, De Rijke and Venema].)

But many of the modal notions found in natural languages cannot be characterised in such simple ways. For one, many are not 1-place operators. They may be 2-place *modal* operators in the sense that t is the only time variable occurring in Ψ ; but the fact that they are 2-place operator means that Ψ is built from two predicates P_1 and P_2 ; and moreover the semantics of these

³⁶ The effect of this restriction is that the truth value of $O(\phi_1, \dots, \phi_n)$ in w at t only depends on truth values of argument expressions ϕ_i in various worlds at t

operators will typically involve more than a single 2-place alternative relation R . There is also a substantial body of formal work that is sensitive to some of these modal operators that cannot be analysed as 1-place. A central place among these in logical and semantic work of the past half century have been conditionals. Seminal work was done by Lewis in the late sixties and early seventies ((Lewis 1973); see also Sobel). Lewis treats conditional as 2-place modal operators of a special kind, in which the first argument – the ‘antecedent’ of the conditional – is used to select a certain set of possible worlds, throughout which the second argument – the conditional’s ‘consequent’ – must be true in order that the conditional count as true. The set of worlds selected by the ‘antecedent’ are intuitively speaking, the most plausible worlds in which the ‘antecedent’ is itself true. This scheme of analysis was rephrased and extended by Kratzer, whose work was mentioned earlier. Kratzer provides a general semantics for modals which allows them to be treated as context-dependent 1-place modal operators – context-dependent in the sense that the context c in which the modal occurs may determine the set of possible worlds W_c to which the interpretation of the modal is confined (e.g. in that the combination of the modal operator and its input is true if the input is true in all the worlds of W_c) – or as conditional operators in the sense of Lewis, or as context-dependent such operators, which allow the context to determine a context set W_c) within which the antecedent then makes its further selection of ‘plausible’ worlds. This kind of analysis has been designed to apply to modal verbs and can therefore be applied in particular to deontic and epistemic *should*. But when it comes to distinguishing between the deontic and the epistemic interpretation of *should* this kind of analysis still doesn’t go far enough (or not as far at any rate as many of us would want a semantic account of *should* to go).

But even the more liberal of these approaches to modal semantics are still quite restrictive. One restriction is that all the analyses so far mentioned only make use of relations between worlds, and not of any relations involving times. Many modal notions that we find in natural languages – perhaps ‘intensional’ would be a better term here than ‘modal’ – do involve times in an interesting way, and not just worlds. One such notion, which has been investigated within philosophical logic into considerable depth, is that of *historical necessity*. A widely accepted assumption about the notions of *historical necessity* and *historical possibility* is that the semantics of these operators can be given with the help of a 3-place relation \approx with two argument places for worlds and one for times. (Usually, the temporal argument is written as subscript, while the two world arguments are written on opposite sides of the relation symbol; i.e. an atomic well-formed formula involving \approx will look

like this: ' $w_1 \approx_t w_2$ '.) Since this relation will reappear briefly later on, when we turn to future tenses, we may as well say a little more about this and do that right here.

The intuition behind \approx is that the future is open while the past is closed. That is, a possible world can develop in more than one way – can ‘grow’ different futures’ you might say; or, in the terminology we will use, two worlds can remain identical up to some time t but then diverge. That the relation ' $w_1 \approx_t w_2$ ' holds means that up to and including t the worlds w_1 and w_2 have been identical, though they may diverge at some later time. This interpretation entails that \approx must satisfy some general conditions. First, for any t the relation which holds between two worlds w_1 and w_2 iff $w_1 \approx_t w_2$ is an equivalence relation; and second, if $t < t'$, then if it is the case that $w_1 \approx_{t'} w_2$ it must also be the case that $w_1 \approx_t w_2$. Since the relation \approx seems conceptually plausible and since it proves indispensable for a range of semantic analyses for which intensional models are needed, it is both natural and convenient to assume that intensional models contain it as part of their ontology, and from now on we will do this.³⁷

The work in modal logic and semantics of modality that took flight in the second half of the fifties was motivated (like pretty much all foundational work in logic or semantics) by the behavior of certain words and constructions in the languages we speak. But as time went on, the success of this work turned into a danger: the particular formal patterns of analysis that it had it had deployed to such remarkable effect in its applications to the words and constructions for which it was originally developed more and more became a kind of straight jacket, which was used to analyse parts of language for which they were't meant and that were not meant for them. That has led to tensions between the predictions that our theories force us into and the intuitions of speakers whose minds have not been closed by those theories. And in addition there are any number of linguistic phenomena that are ‘intensional’ in the purely negative sense of not being extensional, but for which it is so plain that the established modes of analyzing modality and intension-

³⁷One application of \approx is the original one of providing the semantics for the 1-place operators of historical necessity and possibility. For historical necessity, which we represent as \Box_{nec} , the definition is as follows: for any proposition-determining expression ϕ , $\Box_{nec} \phi$ is true in M at \mathbf{t} in \mathbf{w} iff for all \mathbf{w}' , if $\mathbf{w}' \approx_t \mathbf{w}$, then ϕ is true in M at \mathbf{t} in \mathbf{w}' . Or, more formally, the formula Ψ in the sense of (6.86) which provides this semantic definition of \Box_{nec} is the formula $(\forall w')(w' \approx_t w \rightarrow P_1(w', t))$. For some of the sophisticated metamathematical results about historical necessity as defined in this way see [Zainardo].

ality will not yield anything of value and which have therefore simply been ignored. Among the former are attitude verbs like *believe*, *know*, *want*, *regret* and their likes. In their syntactic behaviour these verbs are much like the control verbs (such as *claim*) that we discussed in Sections 6.9.1 and 6.9.2. The modal analysis of attitudinal verbs *believe* goes back to the proposals of Hintikka in the sixties, according to which, for instance, *x believes that ϕ* is analysed as true in a world *w* iff ϕ is true in all worlds that satisfy the totality of what *x* believes. [references: Hintikka ‘Knowledge and belief’ (and ?); (Heim, 1992), and ?]. The predominance of analyses along these lines of verbs like *believe*, *want*, etc. continues to this day and it has, we believe, led to a very narrowly focussed and significantly distorted preoccupation with the ways in which these verbs work, from which the community is freeing itself only with difficulty. Among the latter are phenomena having to do with the way in which the information that speakers put into words is available to them – phenomena which have to do with the sources of information, with the forms in which it is presented to us and the way we process it and want others to process and represent it. ‘Evidentiality’ is at the present time a kind of catch-all term for linguistic phenomena that have to do with the speaker’s information sources, the possibility of deriving the linguistically expressed information from other information and, as used by some, also for the antecedent availability of the expressed information to the intended audience. That it has taken semanticists so long to try and come to terms with such phenomena may have had to do with the fact that in the languages that have long been in the centre of their preoccupations, with English in first position, evidentiality is not grammaticised. But it has also had to do with the fact that the formal semanticist’s tool box did not contain anything that was even halfway suitable to tackle these phenomena. (It deserves to be stressed that once your mind is primed to phenomena of this kind, you find them everywhere, also in languages such as English and German, the two that are prominent in this essay.)

Evidentiality is of direct relevance to the constructions we looked at in the last section. Deontic *should* falls arguably quite squarely within the approach to modality that is associated so prominently with the name of Kratzer. But epistemic *should* rather falls within the province of evidentiality and thus belongs for which we are still in the process of developing proper formal tools. And note well, this kind of duality between an epistemic and a non-epistemic, more traditionally modal interpretation is not privy to *should*. It is something we find with many modal verbs, and it seems to be some sort of general pattern.

Missing from the established tool kit provided by the ‘classical’ intentional semantics that formal semantics had bequeathed upon it by Montague are methods that allow for representational form and not just on intensional values (such a propositions, properties and so on. Our own work has been driven in good part by the hope that form-related approach to meaning and interpretation that has been one of the hallmarks of DRT from its inception, may also lead us to those form-based tools and concepts that we need to develop better accounts of the semantics of propositional attitudes on the one hand and of evidentiality-related phenomena on the other.

So much for the interlude.

6.7.6 English gerundival perfects

The third form of non-finite perfects that are found in English are gerundival. Examples can be found in (6.88). After what has been discussed about naked and *to*-infinitival perfects there isn’t much that we have to add concerning this last species. So we will be quite brief. Once again our focus will be on questions of temporal control and on the perfect operators involved. As regards the latter, decisive evidence is just as hard to obtain here as in the case of the other two types of non-finite perfects (if not in fact even more difficult), and the little that we believe we have been able to glance from the cases we have looked at gives us no reason to think that the situation is any different here than it is for the other two non-finite perfect forms: +perf(past,e) and +perf(past,s) are both possible PERF-values for gerundival perfects, just as they are for naked and *to*-infinitival perfects, and they also determine the same perfect operators as they do for these other non-finite perfects.

That is pretty much all we have to say about the perfect operators that gerundival perfects are able to express. So what follows will be almost entirely devoted to questions of temporal control. But that will require us to look – again as in our discussions of this matter in relation to naked and *to*-infinitivals – first at non-perfect gerundivals.

In English Grammar we find not only the term ‘gerundive’ but also the term ‘gerund’. Although we are not sure that the use of these terms is entirely clear or consistent, we believe there to be fairly general agreement that the italicised parts of (6.88.a,b,c) are gerundives, whereas the italicised parts of (6.88.d,e) are gerunds. Gerunds fill syntactic positions that are accessible to typical DPs and also have some of the telling morphological properties of

DPs, such as articles ((6.88.d)) or genitival adjuncts ((6.88.e,f)). Gerundives behave more like infinitival clauses, and sometimes seem to alternate with *to*-infinitivals, a possibility illustrated by the pair (6.88.g,h).

- (6.88)a. Fritz regrets *submitting a paper to L&P*.
 b. Fritz recalls *leaving the house at five and returning at seven*.
 c. *Being on his own*, Fritz didn't dare to attack him.
 d. Fritz was waiting for *the changing of the guards*.
 e. *Alan's wanting to leave her* took Maria by surprise.
 f. (*The possibility of*) *Alan's having broken into the house last night* struck us all as very unlikely.

Since there are some syntactic environments that gerundives and gerunds share, it may not always be completely obvious how to distinguish them. But we believe that the distinction is a sharp one nonetheless and that even those cases where simple overt morpho-syntactic criteria do not provide an immediate answer which of the two concretions one is dealing with the underlying syntactic structures are clearly distinct; so these cases must be classified as instances of syntactic ambiguity. For one thing, if we are right, then gerundives that fill semantic argument positions of verbs always play the syntactic part of complements, which are subject to nominal and temporal control. Gerunds occupying the semantically same positions are arguments. Here is no question of nominal control here, and there isn't temporal control – in the specific sense in which we discussed this concept for *to*- and naked infinitives – either. (Although, since gerunds denote eventualities, the question of temporal location does arise. But in this case it gets resolved according to the principles that govern the location of predication times and eventualities that are introduced by non-verbal sentence constituents in general. But this is not temporal control in the specific sense in which we use the notion here.) In some cases, by the way, there is a striking difference in semantic contributions by gerundives and gerunds even when they occur in what may superficially like the same position. For some examples see (6.89).

- (6.89)a. Fritz likes playing the violin.
 b. Fritz likes to play the violin.
 c. Fritz likes Susan's playing the violin.
 d. Fritz likes Susan's playing of the violin.
 e. Fritz likes Susan's playing (of) the violin, but he likes his own playing even better.

As far as content is concerned there appears to be little difference between (6.89.a) and (6.89.b). And as opposed to this the content difference between (6.89.a) and the sentences in (6.89.c-e) is considerable. The most significant contrast is that between (6.89.a) and the second clause of (6.89.e). (6.89.a) (and likewise (6.89.b)) says that playing the violin is akin of activity that Fritz likes to engage in, as a practicing musician. But the second conjunct of (6.89.e) describes Fritz as appreciating his own playing – as something he is listening to while doing it; or perhaps when listening to recordings that have been made of Susan’s playing and his own, and that he is now listening to. The other sentences in (6.89) that involve gerunds, (6.89.c,d) and the first sentence of (6.89.e), are like the second sentence of (6.89.e) in this regard.³⁸

The gerundives in (6.89) occur as complements to the verb *like*. And the same is true of (6.88.a,b). But (6.88.c) is different. Here the gerundive has a ‘free’ occurrence, as a kind of subordinate clause that stands to the main clause in a rhetorical relation that has to be reconstructed from context. Often the relation is that of causal explanation. (6.88.c), where the gerundive is naturally understood as given an explanation of why Fritz didn’t attack the individual referred to by *him*, is a case in point. Other rhetorical relations can be inferred as well, but this too is a topic we need not pursue. In fact, we will set ‘free’ occurrences of gerundives aside, except for noting that they are subject to the same kind of nominal and temporal control as the complement occurrences of gerundives. For both occurrence types nominal control is for subject and temporal control is simultaneity. This is most easy to see when the ‘main verb’ (the main verb of the main clause or the matrix verb) is in the past tense. Here are some examples for complement occurrences.

- (6.90)a. Fritz liked/enjoyed/hated playing the viola.
 b. Johnny liked/enjoyed/hated being on the merry-go-round.

For (6.90.a) think of the following scenario. Fritz is the second violinist of a string quartet. One the occasion in question the quartet was to perform a couple of string trios, but the violist is ill. So Fritz, who has been trained as a violist as well as a violinist, has to substitute. The sentence in (6.90.a) is a comment of what he thought of the event. It seems clear that (6.90.a)

³⁸ There seems to be a further subtle difference between (6.89.c) and (6.89.d). (6.89.c) could be true even in a situation where (6.89.d) is not, for instance, when Susan is Fritz’ daughter. Fritz likes for her to play the violin (rather than her extensive chatting with shady ‘friends’ over the internet) even though she really plays quite badly, so he doesn’t much like *the way* she plays the violin. We note this difference but do not follow upon it, as it is tangential to what we are after.

is a correct description of what he thought if the matrix verb is taken to refer to the time when the concert actually took place. It cannot be used to describe how Fritz felt about his viola playing a significant amount of time after the concert was over (let alone as a report of how he felt in advance of the concert). The only good explanation for this restriction is that the Temporal Control that these matrix verbs exert on this gerundival complements is simultaneity. This assumption also explains, by the way why when the matrix verb is in the present tense and the gerundive complement is an event description, then only a habitual or dispositional reading is possible: simultaneity with the present tense matrix verb entails simultaneity with *n* and therefore internal viewpoint. So the complement must be a state description. So event-to-state coercion is necessary and in English the only possible coercion in such a situation is to generic or habitual description or to the description of a dispositional state. Note also that when the gerundial complement is a state description, then there is no need for coercion to a habitual or dispositional interpretation when the matrix verb is in the present tense. The present tense counterpart to (6.89.b), for instance, i.e. the sentence ‘Johnny likes/enjoys/hates being on the merry-go-round’ can be used in an episodic sense, i.e. as describing what is going on right now, as well as in a generic sense – that of: Johnny likes etc rides on merry-go-rounds.

After these remarks about gerundives in general, little remains to be said about gerundival perfects. They are state descriptions of a kind. Temporal Control is simultaneity, so the result state described by the complement must hold at the location time of the controlling verb and that is it. Illustrating examples are given in (6.91).

- (6.91)a. Fritz regrets *having submitted a paper to L&P*.
 b. Fritz recalls *having left the house at five and to have returned at seven*.
 c. *Having submitted a paper to L&P* Fritz went on holiday.
 d. Fritz regretted *having submitted a paper to L&P*.
 e. Fritz recalled *having left the house at five and to have returned at seven*.

As said in the opening paragraph, there is nothing of substance we have to report on the perfect operators involved in the interpretation of gerundival perfects, except that, as far as we can tell, there are no differences with the operators determined by +perf(past,e) and +perf(past,s) in the case of *to*- and naked infinitival perfects. So that accomplishes the task of this little section, or as much of it that we set out to accomplish.

6.7.7 Infinitival perfects in German

German too has infinitival perfects, but of the three varieties we find in English it has only two, *zu*-infinitives (corresponding to the *to*-infinitives of English) and naked infinitives. The environments for these two types closely correspond to those for their English counterparts as well. Here are some examples.

- (6.92)a. Fritz behauptet, vorbereitet zu sein.
(Engl. 'Fritz claims to be prepared.')
- b. Fritz behauptet, sein Papier eingereicht zu haben.
(Engl. 'Fritz claims to have submitted his paper.')
- c. Fritz behauptet, am Freitag sein Papier eingereicht zu haben.
(Engl. 'Fritz claims to have submitted his paper on Friday.')
- d. Fritz behauptet, hier seit 2005 zu wohnen.
(Engl. 'Fritz claims to have lived here since 2005.')
- e. Fritz behauptet, hier seit 2005 gewohnt zu haben.
(Engl. 'Fritz claims to have lived here (for some time) since 2005.')
- f. Fritz beabsichtigt, am Freitag sein Papier einzureichen.
(Engl. 'Fritz intends to submit his paper on Friday.')
- g. Fritz beabsichtigt, am Freitag sein Papier eingereicht zu haben.
(Engl. 'Fritz intends to have submitted his paper by Friday.')
- h. Fritz beabsichtigt, am Freitag in Paris zu sein.
(Engl. 'Fritz claims to have submitted his paper by Friday.')
- i. Fritz **soll** sein Papier einreichen.
(Engl. 'Fritz should_{de} submit his paper.')
- j. Fritz **soll** am Freitag sein Papier einreichen.
(Engl. 'Fritz should_{de} submit his paper on Friday.')
- k. Fritz **soll** am Freitag sein Papier eingereicht haben.
(Engl. 'Fritz should_{de/ep} have submitted his paper on Friday.')
- l. Fritz **soll** in Paris sein.
(Engl. 'Fritz should_{de/ep} be in Paris.')
- m. Fritz **soll** in Paris gewesen sein.
(Engl. 'Fritz should_{de/ep} have been in Paris.')

- n. Fritz **soll** hier an seinem Arbeitsplatz sein.
(Engl. ‘Fritz should_{de/ep} be here at his place of work.’)
- o. Fritz **soll** morgen um acht an seinem Arbeitsplatz sein.
(Engl. ‘Fritz should_{de/ep} at his place of work tomorrow at eight.’)
- p. Fritz **soll** hier seit 2005 wohnen.
(Engl. ‘Fritz should_{de(?) / ep} have lived here since 2005.’)
- q. Fritz **soll** hier seit 2005 gewohnt haben.
(Engl. ‘Fritz should_{de/ep} have lived here (for some time) since 2005.’)
- r. Fritz **sollte** am Freitag sein Papier einreichen.
(Engl. (i) ‘Fritz should_{de} submit his paper on Friday.’ (ii) At some time in the past it was the case that Fritz should_{de} submit his paper on Friday.)
- s. Fritz **sollte** am Freitag sein Papier eingereicht haben.
(Engl. (i) ‘Fritz should_{de/ep} have submitted his paper on Friday.’ (ii) At some time in the past it was the case that Fritz should_{de/ep} have submitted his paper on Friday.)
- t. Fritz **sollte** in Paris sein.
(Engl. (i) ‘Fritz should_{de/ep} be in Paris.’ (ii) At some time in the past it was the case that Fritz should_{de/ep} be in Paris.)
- u. Fritz **sollte** am Freitag in Paris sein.
(Engl. (i) ‘Fritz should_{de/ep} be in Paris on Friday.’ (ii) At some time in the past it was the case that Fritz should_{de/ep} be in Paris on Friday.)

zu-infinitival complements are the subject of (6.92.a-h) The matrix verbs *behaupten* and *beabsichtigen* correspond to the English verbs *claim* and *intend*, both in their intuitive lexical meaning and in their control properties. The examples show perfect correspondence with their English counterparts except for one (unsurprising) difference: when the complement is meant to describe a state that holds up to and including the TP_{pt} from some earlier time (as denoted for instance by a *seit*-phrase), then German uses a non-perfective infinitive where English uses a perfective one (6.92.d). Here, just as we found for the finite perfects, the use of a perfect in German indicates that there was some part of the period denoted by the *seit*-phrase during which the described state held, with the entire period being a dispreferred option (6.92.e). In other words, once again we see that the German perfect

does not allow for inchoative state-to-event coercion.

German naked infinitives also admit of a range of syntactic environments that closely match those of the English naked infinitives. And once again we only consider cases in which such infinitives are the complements to modal verbs. The modal verbs of German are, unlike their English counterparts, fully-fledged verbs, with the unrestricted inflectional paradigm of the typical German main verb. In particular, they have past as well as present tenses, something that is true for *sollen*, the closest German equivalent of English *should*, as it is for other German modal verbs. Because of the morphological diversity of the modal verbs of German, the over-all pattern of combination of forms of these verbs and forms of naked infinitival complements is more diverse and complex than it is in English, and it is worthwhile to dwell on this extra complexity briefly.

First the parallels with English, which show most clearly when *sollen* is used in the present tense (6.92.i-q). Just as English *should*, *sollen* is ambiguous between a deontic and an epistemic reading. Once again, the only difference with English we can detect is the one that shows up when perfects interact with *seit/since*-phrases (6.92.p,q). But with the past tense of *sollen* there are some new facts to be observed. First, the past tense form *sollte* of *sollen* presents a complication because it functions on the one hand as a genuine past tense (a past tense in the semantic sense of speaking about times in the past of *n*) and on the other hand as a modal with semantically inert tense morphology, which, like *should*, is typically used to make modal claims about the present (i.e. about *n* or about some time which includes *n*). And there is a further complication, which becomes visible when we compare *sollen* with certain other modal verbs, for instance with *können*. *können* has distinct forms for the past tense indicative – third person singular: *konnte*– and for the past tense subjunctive – third person singular: *könnte*. For *sollen* these two forms coincide; there is only the one form *sollte*.

The form *sollte* is thus three-ways ambiguous: between (i) a past tense indicative; (ii) a past tense subjunctive and (iii) a ‘tense-less’ modal. In contrast, *könnte* is two ways ambiguous, between a past tense subjunctive and a ‘tense-less’ modal, while *konnte* is only serves as past tense indicative. (6.93) gives examples of the two morphological interpretations of *könnte*, of the one morphological interpretation of *konnte* and of the three morphological interpretations of *sollte*.

(6.93)a. Fritz könnte jetzt in Paris sein. (Fritz could now be in Paris)

Intended meaning: It is compatible with current information that Fritz is in Paris right now. (*könnte* as tenseless modal, with epistemic meaning.)

- b. Wenn er das Rätsel lösen könnte, wäre ich sehr überrascht. (If he could solve the riddle, I would be very surprised.)
(*könnte* as past tense subjunctive, used in a subjunctive conditional, with non-epistemic meaning³⁹)

- c. Könnte ich das erste Rätsel lösen, so könnte ich auch das zweite lösen. (If I could solve the first riddle, I could also solve the second.)
(*könnte* as past tense subjunctive, used in a subjunctive conditional, with non-epistemic meaning)

- d. Ich könnte morgen um halb zehn vorbeischauen. (I could come by tomorrow at 9.30.)
(*könnte* as past tense subjunctive, used in an elliptic subjunctive conditional, with non-epistemic meaning)

- e. Zu dem Zeitpunkt wussten wir nicht, was wir tun sollten. Fritz konnte in Paris sein aber auch irgendwo sonst. (At that time we didn't know what we should do. Fritz could be in Paris, but also in some other place.)

Intended meaning: It was compatible with our information at the time that Fritz was in Paris, but also that he was in some other place. (*konnte* as past tense indicative, with epistemic meaning.)

- f. Ich wollte es ja tun, aber ich konnte es einfach nicht. (I wanted to do it. But I simply couldn't.)
(*konnte* as past tense indicative, with non-epistemic meaning.)

- g. Fritz sollte jetzt in Paris sein. (Fritz should now be in Paris)
(*sollte* as tense-less modal, with epistemic meaning)

- h. Würde er Dich darum bitten, dann solltest Du ihm die Bitte auf jeden Fall gewähren. (If he were to ask you for this, then I should definitely grant him his request.)
(*sollte* as past tense subjunctive, with non-epistemic meaning)

- i. Wir meinten, die Zeit zum Handeln sei gekommen. Fritz sollte jetzt in Paris sein. (We thought the time to act had arrived. Fritz should now be in Paris.)

³⁹ In contemporary German the main use of past tense subjunctives – of all verbs, non-modal and modal alike – is in subjunctive conditionals; sometimes these conditionals are elliptic, with implicit, not overtly realised antecedents, as in (6.93.d)

(*sollte* as past tense indicative, with epistemic meaning)

- j. Ich hatte ein schlechtes Gewissen. Ich sollte sie anrufen, aber hatte es immer noch nicht gemacht. (I had a bad conscience. I should call her, but I so far I had failed to do so.)

(*sollte* as past tense indicative, with non-epistemic meaning)

The temporal control properties of *soll* and *sollte* have much in common with those of *should*, but there also are some differences. For deontic *soll*, just as for deontic *should*, Temporal Control is future-oriented when the complement is event-describing and when it is the description of a future state (because of containing a future-denoting adverb); Temporal Control is simultaneity when the complement is the description of a state that it does not assert to be in the future. Epistemic *soll*, however, is different from epistemic *should* in that it accepts event descriptions as well as state descriptions and the state descriptions it accepts may be descriptions of necessarily future states (because of the presence of a future-denoting adverb). Moreover, epistemic *soll* is like deontic *soll* and deontic *should* in that it locates the states described by complements that do not assert them to be in the future as holding at *n*. *sollte*, both as an indicative past and as a subjunctive present, is in these respects like *soll*; the only difference is that in the case of indicative past *sollte* the Temporal control relations link the eventuality described by the complement to the past TPpt rather than to *n*.

Implied by this last claim is that the past tense of *sollte* and other German modal verbs should be analysed as involving the feature past₂ and not the feature past₁. This assumption is reasonable given that modal verbs are state verbs. But given what we have said about the options for past₁-analyses and past₂-analyses of past tense sentences. But it is compatible with what we have said, and we venture the conjecture that for past tense modal verbs the past₂-analysis is obligatory. In this regard both the matrix verbs of *to*- and *zu*-infinitives and the modal ‘matrix’ verbs of naked infinitives in German are like the past perfects of both languages.

Since German modal verbs have tense morphology, they give rise to an issue which we could ignore in our discussion of the modal verbs of English: When a German modal verb occurs in a tense other than the simple present there is in principle the option for locating the state it describes by means of a temporal adverb. And since we analyse the combinations of modal verbs and their complements as essentially *bi-clausal*, in the sense that both the modal verb and its complement act as verbally structured eventuality structures, the further question arises whether two different adverbs could not be used

to locate these two eventualities in the same sentence. We could, by the way, also have raised this question in connection with contractions involving a matrix verb and an English *to*- or German *zu*-infinitive. But there the answer seemed to obvious for the question to merit attention: these structures are obviously bi-clausal, so it should be possible for one adverb to locate the eventuality of the matrix clause and another to locate the complement eventuality. The examples in (6.94.a,b), one for English and one for German, confirm the expectation that this should be possible. In these sentences *last week/letzte Woche* locates the time of the intention and *on Friday/am Freitag* the time of the eventuality of being in or going to Paris.

- (6.94)a. Last week Fritz intended to be in/go to Paris on Friday. But in the meantime he has abandoned this plan.
- b. Letzte Woche beabsichtigte Fritz, am Freitag in Paris zu sein/nach Paris zu gehen.
(Engl. see (6.94.a))
- c. Letzte Woche standen wir noch unter hohem Druck. Zu dem Zeitpunkt sollten wir die Arbeit am Freitag fertigstellen. Aber inzwischen wurde klar, dass das einfach nicht möglich war und hat der Alte uns einen Aufschub gewährt.
(Engl. 'Last week air under considerable pressure. At that time we were under the obligation to finish the work by Friday. But in the meantime it became clear that that was simply impossible and the old man gave us some more time.')
- d. Letzte Woche standen wir noch unter hohem Druck. Zu dem Zeitpunkt sollten wir am Freitag in Paris sein. Aber inzwischen wurde klar, dass das einfach nicht möglich war und hat der Alte es uns erlaubt, die Reise zu verschieben.
(Engl. 'Last week air under considerable pressure. At that time we were under the obligation to be in Paris on Friday. But in the meantime it became clear that that was simply impossible and the old man gave us permission to postpone the trip.')
- e. Letzte Woche sollten wir den Abschlussbericht am ersten November einreichen. Jetzt soll er schon am ersten Oktober da seine.
(Engl. 'Last week we were expected to hand in our report on the first of November. Now it has to be there on the first of October.')
- f. (?) Vorgestern haben wir uns noch gefreut. Zu dem Zeitpunkt sollte Fritz am nächsten Tag/am Freitag hier sein. Aber leider ist es dann alles ganz anders gekommen.

(Engl. ‘The day before yesterday things we were still looking forward. At that time Fritz was expected to be here the next day/on Friday.’)

Examples (6.94.c-f) involve the past tense *sollte* of the modal verb *sollen*. Here the results are somewhat mixed. On its deontic interpretation, as in (6.94.c,d,e), it seems possible to have one temporal adverb – *zu dem Zeitpunkt* (‘at that time’) in (6.94.c,d) and *letzte Woche* (‘last week’) in (6.94.e) – that refers to the time when the obligation obtained and another adverb to locates the eventuality described by the complement. (6.94.f) provides a context which forces an epistemic interpretation on *sollte*. Here the relevant sentence (again the second one of the three sentence discourse) with its two adverbs seems quite awkward to us, although perhaps not completely unacceptable. This suggests that combinations of epistemic *sollte* with infinitival complements tend to get mono-clausal analyses, whereas combinations involving deontic *sollte* are more readily analysed bi-clausally. We do not quite know what today about epistemic *sollen* as far as this issue is concerned and must leave this too as a matter for further investigation. But what matters primarily, also in connection with issues that will confront us when we discuss the future tense, is that combinations of non-epistemic *sollen* and infinitival complements do admit of bi-clausal construal.

Our all too brief discussion of *sollen* and *können* was occasioned by a desire to show that our assumption about the morphological syncretism found in *sollte* wasn’t just a convenient figment of our imagination. But apart from showing that *können* has two forms where *sollen* has only one, it also ever so lightly lifted the lid of what seems to be a Pandora’s box of idiosyncrasies of the different modal verbs, in German but also in English. In this essay opening the lid properly is out of the question. But we see this little discussion as an encouragement (to ourselves and perhaps also to interested others) to look more closely into the modal verbs of German, English and other languages more closely, especially from the perspective of Temporal Control.

None of this so far has been specifically about perfects. But as in the preceding sections on infinitival perfects there isn’t much that needs to be said about them other than that complements that take the form of infinitival perfects are one kind of state descriptions. In German, as in English, they interact with the verbs that govern them as complements in nearly all respects as other state describing complements. For illustrations see (6.92.b,c,g,k,s); we leave it to the readers to draw their own conclusions from these. What remains is once more the question what perfect operators are involved in

the analyses of the German perfects that occur in *zu*-infinitival and naked infinitival complements. Once again we assume that interpretation may involve two different PERF values, which we denote as ‘+perf(past,e)_{Ger}’ and ‘+perf(past,s)_{Ger}’, as we did at one earlier point, to distinguish them from the English features ‘+perf(past,e)’ and ‘+perf(past,s)’, which we will denote again as ‘+perf(past,e)_{Eng}’ and ‘+perf(past,s)_{Eng}’ lest the impression arise that the English values are somehow more ‘fundamental’.

As far as we can tell, there is only one difference between the perfect operators determined by +perf(past,e)_{Ger} and +perf(past,s)_{Ger} and those determined by +perf(past,e)_{Eng} and +perf(past,s)_{Eng} and that is the one we also registered when discussing the past perfects of English and German: the operator determined by +perf(past,s)_{Eng} allows for both inchoative state-to-event coercion and state-to-event coercion via closure. For the operator determined by +perf(past,s)_{Ger} only coercion via closure is permitted. As evidence for this difference see the examples in (6.92.d,e) and (6.92.p,q). In short, the operators determined by +perf(past,e)_{Ger} and +perf(past,s)_{Ger} are, to the extent that we can tell, the very same that we conjectured were determined by these features when used in the analysis of German past Perfects.

6.8 Future perfects in English and German

6.8.1 The ‘Future Tense’: Tense or Modality?

The English future tense is formed with the help of the modal verb *will*. In fact, from a morphological point of view future tense forms appear to be indistinguishable from the combinations of modal verbs and naked infinitives that were considered in Section 6.9.4. This fact alone might give pause for thought: Is the future perfect really distinct from other constructions in which an English modal verb combines with a naked infinitival complement? That is a question which has been raised also for reasons that have nothing directly to do with the striking morphological similarities between future tenses and constructions involving other modal verbs than *will*.

But first a small point that sets *will* aside, if not by very much, from the modal verbs we considered in Section 6.9.4. *will* is not completely morphologically inert, but has a simple past, viz. the form *would*. This *would*, which is found in what are standardly described as cases of the ‘past future’, or ‘future of the past’, must be distinguished from the modal verb *would* that is morphologically inert and that functions, just like the modal *should* on which we focussed in Sections 6.9.3 and 6.9.4, semantically as a present tense in single clause sentences. The two *would*'s are exemplified in (6.95.b) and (6.95.c). A ‘plain’ case of the simple future tense, using *will*, is given in (6.95.a).

- (6.95)a. Fritz will submit a paper.
 b. Fritz and Maria were discussing what to do. His mother would arrive the next day.

(6.95.b) expresses an attitude on the part of the speaker at the time of speech. Such uses of *would* are not all that common. Probably they should be seen as ‘reduced conditionals’, i.e. conditionals from which the *if*-clause is missing. But if that is true, then the more common occurrences of this *would* are the ones we find in subjunctive conditionals, such as (6.95.d). These too require evaluation at the utterance time (albeit at worlds other than the utterance world). The *would* of (6.95.c) is different in that it locates the arrival of Fritz’s mother in the future of the past time at which he and Maria were deliberating.

The fact that the ‘future tense auxiliary’ comes in the two forms *will* and *would* is one reason for seeing combinations of these forms with naked infinitives as something different from the combinations involving the modal verbs

of Section 6.9.3. But one might also see this as just one small wrinkle in what is otherwise a striking similarity, which strongly suggests that the constructions with *will* and *would* should be treated in essentially the same way as those with other modal verbs. And what is more, the suggestion that combinations of *will* and *would* and infinitival verb projections should be treated in the same way as the morphologically similar constructions involving other modal verbs has been made also for very different reasons. These are reasons that have to nothing to do with the morphological similarities but with the semantics of constructions with *will* and *would*. It applies to ‘future tenses’ independently of the ways in which they are morphologically realised, and it goes back very far in time, to an era in which linguistic theory as we know it today not only did not yet exist, but probably wasn’t even thought of as a scientific possibility.

Already Aristotle, in his famous Sea Battle Argument, raised the question what should be seen as the semantics of the future tense⁴⁰ and the issue was taken up by a number of other philosophers from antiquity. [references] Aristotle asks whether there really is, or in fact can be, a future tense in the straightforward sense in which

(6.96) the future tense of a proposition-denoting expression ϕ is true at a time t if and only if ϕ is true at some time in the future of t .

For Aristotle, as for many other philosophers from antiquity onwards, this question was directly linked to questions of determinism: It was argued that assuming that our language contains a future tense with the property given in (6.96) constitutes a commitment to the view that the future is determined by the present and past; someone who claims (6.96) thereby claims *ipso facto* that determinism is true.

The question of historical determinism – whether the future is fully determined by the past – is probably one of those philosophical questions that will be with us as long as there are any of us. The debate over this question has changed over time, taking into account on the one hand the successive revolutions in natural science (primarily physics), while on the other hand

⁴⁰ In Aristotle’s own language, Ancient Greek, the ‘future tenses’ are realised synthetically, in the form of future tense suffixes. These forms are called ‘future tenses’ because – this is the general, if somewhat informal definition of the notion ‘simple future tense’ – simple sentences in which the verb has such a form are true if and only if certain conditions are fulfilled in the future of the utterance time. This is further evidence that his concern, and that of other Greek philosophers from antiquity, has nothing to do with formal similarities between future tenses and modal verb constructions.

applying increasingly sophisticated considerations to the analysis of what question or questions are in fact being asked.

One question that has to be asked in this connection is what any of this has to do with the presence or absence of natural language constructions that satisfy the condition in (6.96). We have two reasons for asking this question. First, whether the world in which we live *is* deterministic or isn't is one thing, whether we *take* ourselves to be living in a deterministic or an indeterministic world. An answer to one of these questions need tell us nothing about what the answer should be to the other; and it may be possible to come with an answer to one even if there is no way we have of answering the answer. More concretely, there are, we believe, very strong reasons for attesting us, the members of homo sapiens and the speakers of human languages, with a deep-seated conviction that the world in which we live is *not* deterministic. What the future will be like is something that depends on the decisions that we are going to take ourselves as well as on the decisions taken by countless other human beings, some of whom we may be able to influence to some extent but the vast majority of whom is beyond our control entirely. The world may be indeterministic for other reasons as well. But the deep conviction we have is that our own decisions and actions and those of our fellow human beings *shape* the future, and that some or all of those, and with them the future they *shoppe*, could be different from what they are going to be in fact.

What is important for understanding why human languages are the way they are is what people, qua speakers of their language, think the world is like, which is not necessarily the way it is in the light of the most sophisticated and up-to-date results of modern science— results that are of much more recent date than the principles that define human languages as they came into being and grew over time. In particular, what counts in the context of our present investigation is that our human conception of the world is indeterministic – whether it ultimately really is deterministic or indeterministic, or what science at its most advanced has to tell us about this is neither here nor there.

To do justice to the conception of the world as non-deterministic, and thus of the future as 'open', within the framework in which we have been operating is to adopt intensional models of the kind described in Section 6.9.5 and to capture the openness of the future in terms of the relation \approx . To recall briefly: Each intensional model M is based on a set of possible worlds W and a time structure \mathcal{T} ; for each $w \in W$ M has an extensional model M_w which describes the history of w from the beginning till the end of time

as modeled by \mathcal{T} . Moreover for each world w and time t from \mathcal{T} there is the set of all worlds $w' \in W$ such that $w' \approx_t w$. This set molds the open future from t onwards in the world w . \approx enables us to distinguish between *deterministic* and *non-deterministic* models. An intensional model M is *deterministic with respect to* a world w and time t iff $|\{w' : w' \approx_t w\}| = 1$, and M is *deterministic* iff M is deterministic wrt. all its worlds w and times t . M is *non-deterministic with respect to* w and t iff it is not deterministic wrt. w and t and *fully non-deterministic* if it is non-deterministic wrt. all of its world and times. We take it to be the conception of the typical natural language speaker that intensional models reflecting the structure of actual and possible worlds as they understand it are non-deterministic wrt. most or all of their world time pairs, and to simplify matters without affecting the substance of the discussion that follows we assume that the models are fully non-deterministic.

Whether the intensional model that reflects the logical structure of reality is deterministic or non-deterministic is a matter of ontology. Such ontological questions are to be distinguished sharply from questions concerning the semantics of particular expressions or constructions in human languages. But often there are important connections between ontological and semantics questions. One such connection is that between determinism and the semantics of future tense constructions. Let us call a *future tense* with respect to a model M any sentential operator F with the property that for any sentential complement ϕ to F and any world w and time t from M the question whether $F\phi$ is true in w at t depends exclusively on truth values in M of ϕ at times $t' \succ t$ in worlds w' such that $w' \approx_t w$. And let us call F a *future tense in the strict sense wrt. M* iff the truth value of $F\phi$ in w at t depends only on truth values of ϕ at times $t' \succ t$ in w . Then we have the following obvious connection:

(6.97) If M is deterministic, then any F that is a future tense operator wrt. M is a future tense operator in the strict sense wrt. M .

But when M is non-deterministic, then no such conclusion can be drawn. A future tense operator wrt. M *could* be a future tense operator in the strict sense, but it could also just as well not be. Thus, given our assumption that the models M which reflect human conceptions about determinism are non-deterministic, the question whether a given construction that is a future tense operator wrt. M is in fact a future tense operator in the strict sense will not be settled by ontology alone, but depend on further facts, having to do with the semantics of the given construction.

In particular, what can we say about the English construction that consists of the word *will* and a naked infinitive, as in (6.95.a)? We think there can be little doubt that this construction functions as a future tense operator with respect to any reasonable model M . But does it function as a future tense operator in the strict sense? This too is a question that goes back to antiquity, and again the works of Aristotle might be cited as the earliest extant writings in which the issue is explicitly discussed. But in Aristotle's and many subsequent discussions the linguistic issues aren't distinguished as sharply from the ontological issues as they might be. Separating the two types of questions is vital for a project like the one we are pursuing.

Perhaps the question whether the 'future tenses' of natural languages, such as in particular the *will* + naked infinitive construction of English, are future tenses in the strict sense will never be resolved to the satisfaction of all. But here are our own thoughts on the matter:

There are certain settings in which we use future tense sentences, in which their truth conditions are crucially important and where our intuitions appear to be unusually clear and precise. Arguably the most prominent of these are the settings in which we make bets. I bet you, for a bottle of grappa, that Berlusconi will resign within the week; you, always the pessimist, accept. Thus: I win if the statement on which I have proposed my bet – that Berlusconi will resign within a week from today – turns out to be true; you win if that statement turns out to be false. In order to know who has won we have to wait until the end of the week or to the moment of Berlusconi's resignation, whichever comes first. If the resignation comes first, i.e. if Berlusconi resigns before the end of the week *in our actual world*, then my statement was a true one; if the end of the week comes first, i.e. when Berlusconi does not resign before the end of this week *in our actual world*, then my statement was false.

With future tense statements that are the subject of bets the matter seems to be quite plain: Their truth is determined just by what is going to be the case in our actual future. We may have no way of telling what that future will bring until the time has come – that's what makes bets exciting and what makes them *bets* – but that does not alter the fact that it is the actual, and nothing but the actual future that determines whether the propositions on which we bet are true or false.⁴¹

⁴¹ Suppose for instance that the truth of the statement of our bet – the statement that I bet on and you bet against – were to require that Berlusconi resign before the end of the week not just in the actual world but also in one or more other worlds that stand in the \approx

When a bet is proposed, the proposition that is to be the subject of the bet is typically expressed using a future tense. So betting is one of the situations in which future tense statements play a crucial role and in which the truth conditions we assign to them only involve the actual future – in which, to use the terminology introduced above, the future tense constructions we use behave as future tense operators in the strict sense. But what about other settings in which we use future tense constructions? Are there settings in which we assign a different semantics to these constructions, according to which they are not future operators in the strict sense? That question may be difficult to answer and all we can do here is state our general impression of the state of debate and our own persuasion.

This is what that comes to: (i) We do not know of any argument to show that there are such settings that we find convincing. Some cases of future tense use may *look* like counterexamples to (6.96) at first blush, but fail on closer inspection, because they involve an equivocation between truth conditions and assertability conditions: In order for a speaker to be in a position to assert a sentence about the future, she must have sufficient evidence that it is true. That evidence must be based on what is available to her at the time when she speaks. So the future state of affairs the sentence speaks of must be entailed by evidence pertaining to her present and/or past. But such an entailment means that the state of affairs must not only hold in what will turn out to be the actual future, but also in the possible futures that could have emerged from this same past and present. (ii) In the light of these last considerations we see no reason for the complex and imprecise view that the English ‘future tense’ is sometimes used with a commitment to the truth conditions associated with a future tense operator in the strict sense and in certain other situations with some different commitment. Rather, the evidence that we find persuasive suggests that the truth-conditional commitments associated with this construction are invariably that of a future tense operator in the strict sense. So this is the view of the matter we will adopt.

relation to the actual world at the time when our bet is concluded. Then you could, when Berlusconi has resigned before the week is over, refuse to acknowledge me as the winner, because this fact does not tell us when he has or will have resigned in the non-actualised worlds that also enter into the truth conditions of the subject of our bet. Such an objection would clearly be absurd. Which shows that other worlds than the actual one cannot play any part in the truth conditions of the subject of our bet.

6.8.2 English *will* and *would*: Modal verbs or Future Tense auxiliaries?

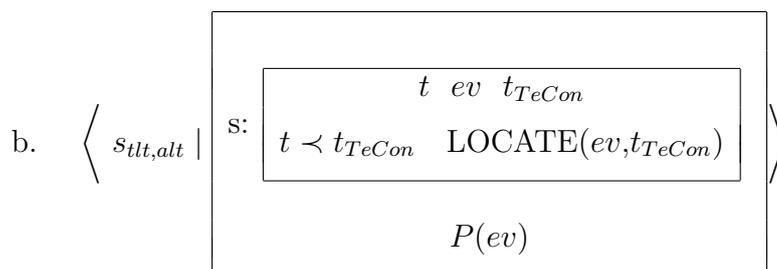
So much about the truth conditions of future tense sentences. But what are we to conclude from this about their syntax? Should we treat them as involving combinations of a certain modal verb with naked infinitives, in analogy with the treatment we have adopted for the constructions of Section 6.9.4? Or should we treat the *will/would* + naked infinitive construction as a genuine *tense*, in the technical sense in which we have been using the term, viz. as a piece of morphology that is introduced into syntactic structure at the level of T and that contributes its TENSE feature value, in which *will* plays the part of an auxiliary, like *have* in the way we are treating the perfect? Let us see what is involved in each of these two options.

On the first option the truth conditions we have decided are associated with the construction – viz. that it behaves semantically as a future tense operator in the strict sense – has to come from the lexical entry of the modal verb *will*. As format for *will*'s entry we adopt the same that we adopted for the lexical entry for *should* in (6.80). One difference with *should*, we have seen, is that *will* has a past tense *would* and when dealing with the lexical entry of *will* this is something we need to keep in mind from the start.

Since we assume that *will* expresses a future tense operator in the strict sense, the semantic part of its entry will be very simple. All that *will* says is that the eventuality property expressed by the naked infinitive following it is instantiated at some time in the future of the location time of the state it describes as modal verb. This information duplicates the information provided by Temporal Control, which also locates the eventuality described by the infinitival complement in the future of the location time of the state described by the modal (but without asserting that such an eventuality is actually going to take place). A lexical entry that represents this information in the format of entry (6.80) for *should* is given in (6.99).⁴²

⁴² As we are considering a treatment of *will* along the lines we adopted for the treatment of *should*, it is proper to mention that *will* and *should* are alike in that they both have an epistemic as well as a non-epistemic use. (An example is given in (6.98.a).) These epistemic uses share the feature that their Temporal Control is simultaneity. Since we decided to treat epistemic and deontic *should* as distinct lexical items, and since we will not in the end treat 'future tense *will/will* as a modal verb, we will say no more about epistemic *will*. *would* too has uses other than that of a past tense *will*, and in fact these are the more prominent ones. Most discussed in the semantic and philosophical literature are a kind of 'conditional epistemic' use, in which *would* either occurs in the consequent of a subjunctive or counterfactual conditional and marks it as such, or else it is used to mark its clause as the consequent of an 'elliptical' conditional, with a tacit antecedent. These

- (6.99)a.
- | | | | |
|-------------|--------|-----|------------|
| <i>will</i> | (modal | nom | naked |
| verb) | | | infinitive |
| s | | x | <i>P</i> |
- Sel. Restr. state prop-
erty
Contr. Prop: $t_{TeCon} \succ t_s$ PRO = x



(Here the expression ‘LOCAT(*ev*,*t*)’ is used as a schematic abbreviation for the two possibilities ‘ $ev' \subseteq t'$ ’ for the case that *ev*’ is an event discourse referent and ‘ $t' \subseteq ev'$ ’ for the case that *ev*’ is a discourse referent for a state.)

Unlike *should*, we noted *will*’s tense morphology is not completely inert; it has a past tense in the form of *would*. This means that the T-node of a clause containing the lexical item *will* can have either the value *pres* or some past value. In the second case, we have two candidates for the relevant feature value, *past*₁ or *past*₂. Little reflection is needed, however, to see that for past tense *would* the value should always be *past*₂. Not only is *will*, in its presumed capacity of a modal verb, a state describer, the uses of *would* as past tense of *will* typically bear the hallmarks of a perspectival shift. (6.95.b) is a case in point.

‘conditional epistemic’ uses are semantically present tense, and they also have simultaneity as their Temporal Control feature. Examples can be found in (6.98.b-e). These uses of *would* we will set aside as well.

- (6.98) a. Fritz will be in Paris right now.
 b. If I were to submerge this into sulfuric acid and it was a real pearl, then it would dissolve.
 c. If I had submerged this into sulfuric acid, it would have dissolved.
 d. I would submit a paper, if I could find the time.
 e. I would submit a paper. But there are so many other things I have to do.

The circumstance that the *will* of (6.99) has a past as well as a present tense also has an additional implication. On the view we are exploring, according to which constructions with *will* are genuine modal verb constructions in which the infinitive has the status of an embedded clause, it should in principle be possible to use adverbs for the temporal location of the states introduced by its past tense occurrences, much as we saw this was possible for the ‘full paradigm’ modal verbs of German. And in fact, not only that, if the structures we are talking about are genuinely bi-clausal, then it ought to be possible to have them accompanied by two temporal adverbs, one to locate the modal verb and one to locate the eventuality escrowed by the complement clause. (See Section 6.9.7.) Since uses of *would* as past tense of *will* tend to occur in contexts in which a past perspective has already been introduced, with a time at which that perspective is situated, we would expect the temporal adverbs that are found with past tense *would* to be rather restricted. But one would expect it to be possible to combine *would* + naked infinitive constructions with adverbs like *now* or *at that time*. Indeed, such temporal adverbs can be used to modify simple past descriptions of states, as in (6.100.a-c).

- (6.100)a. It had been a busy time. But now there was no business that needed his immediate attention.
- b. It had been a hard week. But now Fritz could relax and he was happy to spend some time with his dog and in his garden.
- c. Fritz went to church that morning. At that time he was a practicing catholic.
- d. For weeks Fritz had been unable to make up his mind. But now he knew what to do. On Friday he would go to Paris.
- e. (?) For weeks Fritz had been unable to make up his mind. But now he would go to Paris.
- f. # Fritz went to church on the following Sunday. That morning he would go to Paris
- g. * For weeks Fritz had been unable to make up his mind. But that morning he would go to Paris on Friday.
- h. (??) John was looking forward to the Saturday ahead. He would have submitted his paper by then and *now* he would be able to relax for a couple of days at last.

(6.100.a-c) illustrate once more a by now familiar point: *now* in (6.100.a,b) and *at that time* in (6.100.c) can both be understood as referring to a past

time (given by the first sentence) and also to the time of the state described by the clause. (In the light of our earlier assumptions we would have to say that (6.100.a,b) involve the past feature past_2 and (6.100.c) the feature past_1 , but this is a matter we need not dwell on here.) Note that in (6.100.b) this is possible for a state description involving modal *could* and for the ‘matrix verb’ *be happy*. (6.100.d) does also seem to be acceptable, but only on an apparently coerced interpretation of its second sentence, on which it says that at the time denoted by *now* Fritz had resolved to go to Paris. (Putting contrastive stress on *would* improves the sentence when spoken.) This is a kind of non-conditional modal interpretation of *would* that hasn’t been mentioned so far, and that it seems to us is only possible in special contextual settings. A simple, epistemically neutral interpretational of *would* as past tense of *will* does not seem possible here. (6.100.e) is well-formed, but only on an interpretation according to which Fritz is going to Paris that very morning. And, in keeping with this, (6.100.f) is totally unacceptable: there is no way of interpreting *on Friday* as giving the time of going to Paris and *that morning* as locating a state contributed by *would*.

(6.100.f) is a clear proof that *would* + naked infinitive constructions cannot be construed as bi-clausal in the way that German combinations of modal verbs and infinitival complements apparently can be – and the evidence it provides can be reproduced at will with similar examples. But equally importantly, (6.100.d) and (6.100.e) shows that an adverb cannot modify a state introduced by *would*. Between them these observations seem to us to show that the combination of *will/would* + infinitive is *not* a modal verb construction (let alone a genuinely bi-clausal one), but that *will* and *would* are auxiliaries in a semantically strict sense: they do not introduce states that can be distinguished from those introduced by the expressions to which they are auxiliaries. We shall therefore analyse such combinations of *will/would* and bare infinitives as analytic forms for expressing the simple future and past future tenses.

When future tense sentences are analysed in this way, we need new values for TENSE, for the simple future expressed by *will* and for the past future expressed by *would*. First, the case of *will*. Here we face the same question that we had to confront in connection with the simple past: Do we need just one value, or two values, which differ in that the first locates the TPpt at n and places the input eventuality in the future of the TPpt, and one which places the TPpt in the future of n and the TPpt to locate the input eventuality. A decisive issue in this connection – here just as in relation to the simple past tense (see Section 6.1) – is whether it is possible to use the

adverb *now* in a simple future sentence to denote a time in the future of *n*. (Sandstrom 1993) shows that at least for English such uses are possible (and to the extent that we can tell, examples like hers, in which the counterpart of *now* refers to a some time in the future, can be found for many languages other than English. We take this as sufficient evidence that English has a TENSE feature value ‘fut₂’, which requires the TPpt to be in the future of *n* and locates the input eventuality as holding at this TPpt.

In addition, we need a counterpart to the past tense value ‘past₁’, which places the TPpt at *n* and the described eventuality in the future of *n*. We refer to this value as ‘fut₁’. Given our assumptions over-all, ‘fut₁’ is needed for one thing to account for future tense sentences with event-describing inputs to Tense. (fut₂ admits, like past₂, only state descriptions as inputs.) Moreover, examples showing that fut₁ may also be required for certain occurrences of future tense sentences with state describing inputs to Tense can be constructed along the same lines as those of Section 6.1, which we presented in order to support the claim that past₁ is needed also in the analysis of certain past tense state clauses that describe sentences.⁴³

The story for the past future is different. We already noted, in relation to (6.99.e-g), that *now* cannot be used to denote the past time from which the eventuality described by a past future clause is presented as future. But it also doesn’t seem quite possible to use *now* to refer to the time of the eventuality itself – not even when that eventuality is a state. Example (6.99.h) is a case in point. It might have been thought that this is a natural environment for *now*, as providing a kind of contrasting reference to the Saturday that is in the future of the time at which the protagonist is contemplating his future. But apparently it is not. And when this one isn’t, what is?

We may conclude from this that in the case of the past future the TPpt cannot coincide with the eventuality time. (For if it did, then we would

⁴³ Examples involving future tense sentences with indexical adverbs like *now* often look more artificial, and are harder to judge, than corresponding past tense examples. In fact, it was because we had failed to find satisfactory examples of uses of *maintenant* (the French equivalent of *now*) in which it refers to a future time that (Kamp and Rohrer 1983) concluded that there were only two options for the location of the TPpt – at *n* and preceding *n* – instead of the three possibilities – at *n*, preceding *n* and following *n* – that we are assuming here. But when we learned of Sandstrom’s examples, those convinced us that the third possibility exists as well. And that has helped us to convince ourselves that certain other examples which are needed to demonstrate the full range of possible interpretations for future tense sentences can be found as well, even if some of them are awkward and it may be hard to come up with natural contexts for their use.

expect there to be room for *now* as denoting the TPpt and thereby locating the described eventuality.) But since both *n* and the past time from which the eventuality is projected as future are conceptually distinct from the eventuality time itself, the fact that *now* cannot be used to denote either of these times cannot help us to determine which of them might play the part of TPpt. There are independent reasons, however, why it seems natural to assume that it is the time in the past of *n* that plays this part. The mechanisms for determining the pst time involved in the interpretation of a past future are quite similar to those that are involved in determining the TPpt of past perfects and of simple pasts involving the feature *past*₂ (as in sentences like ‘he had been under great stress. but now the worst was over and on friday they would go on holiday.’) So we will assume that with past futures the TPpt is in the past of *n* and that the introduction of this time in the interpretation of a past future involves the same TPpt presupposition that also becomes part of the interpretation through the processing of the feature *past*₂ and the features +perf(past,e) and +perf(past,s).

Summarising: We treat future-oriented *will* and *would* as future tense auxiliaries, which are part of the morphological realisation of TENSE features corresponding to what is normally referred to as the simple future tense and the past future tense (or ‘future of the past’). The morphological simple future corresponds to a pair of feature values, *fut*₁ and *fut*₂. The first of these locates the TPpt at *n* and the described eventuality in the future of the TPpt. The second locates the TPpt in the future of *n* and the described eventuality at the TPpt. The future of the past has just one feature corresponding to it, which we call ‘pafut’. *pafut* locates the TPpt in the past of *n*, with a presupposition whose resolution identifies it with time given by context, and locates the described eventuality in the future of this TPpt. (So *pafut* treats the future of the past as a past shift of *fut*₁.) These feature values will also be part of the analysis of the future perfect and past future perfect which will be proposed in the next section.

Analysing the past future in the way we have proposed constitutes a departure from everything that has been proposed about the semantics of tense up to this point in this essay. In fact, this is the only direct descendant in our system of Reichenbach’s theory of tense, in which each tense form has an interpretation involving two relations, one between speech time and Reference time and one between Reference time and Event time. While all proposals we have made so far involve a TPpt (corresponding in the sense here relevant to Reichenbach’s reference time), the tenses themselves never did more than one of two things: either (i) locate the TPpt at *n* and situate the described

eventuality at the TPpt, or (ii) they introduce a TPpt and situate it relation to n and locate the described eventuality at the TPpt. Our proposal for the past future deviates from this in that it situates the TPpt in the past of n and the described eventuality in the future of the TPpt, just as Reichenbach had it.

Whence this one remnant of the Reichenbachian 2-dimensional analysis? The reason is not hard to find. We were able to reformulate, and thereby eliminate Reichenbach's 2-dimensional analysis of the Past Perfect by treating the perfect as an aspectual operator. A similar elimination of his 2-dimensional analysis of the past future would require the adoption of a corresponding aspect operator that looks forward rather than backward – that of a 'prospective state operator'. In order to do justice to the options of sentence formation in English, the locus of this operator would be within the structure of an English finite clause and would have to be between the projection level of the Perfect and that of Tense.

There are some phenomena that lend some plausibility to prospective state operators. English and other languages have locutions that can be used instead of the regular morphological future (expressed in contemporary English with the help of *will*) and that are quite often preferred to it, especially for events in the near future and/or those to which the speaker has already committed herself. English has the progressive for such purposes (as in: 'I am leaving in a few minutes') and the locution 'I am going to'. These alternatives to the regular future subtly differ from it, and from each other, in connotations, and the best way to account for those differences may, for all we can tell, involve the adoption of a projection level for prospective state, with different feature values for the different operators expressed by these various constructions. But this is the topic of another study. And so long as we do not go into this in greater detail the present account of the future seems the best we can do. The fact that it leaves us with a genuinely 2-dimensional analysis of the past future may serve as a flag that arguably there is much further work to be done here.

One further remark before we turn to the future perfects of English. Note that when *will* and *would* are analysed as part of the future tense morphology, then there is no difficulty with accounting for the possibility of sentence-initial (as well as sentence-final) temporal adverbs to locate the eventuality described by the infinitive that follows the future tense auxiliary. As shown by the examples in (6.101) this is true both for clauses with *will* and for clauses with *would*. Following the analysis we have adopted for temporal adverbs so

far we can analyse clause-initial adverbs as left- and clause-final adverbs as right-adjoined to TP and the desired interpretation falls out without further ado. (On a modal verb analysis it would not have been immediately clear how in particular the clause-initial adverbs can ‘reach’ the eventualities of which it is intuitively clear that they are located by them.)

- (6.101)a. Tomorrow Maria will be in Paris.
- b. Maria will be in Paris tomorrow.
 - c. Kissinger went to bed early in his suite at the Cairo Hilton. Tomorrow he would be in Jerusalem, and the day after that in Amman.
 - d. Kissinger went to bed early in his suite at the Cairo Hilton. He would be in Jerusalem tomorrow, and in Amman the day after that.

Here a brief overview of what we have been arguing in this section. We contemplated two possible analyses of ‘future-oriented’ *will* and its past tense form *would*: (i) as modal verbs that take infinitival complements – on a par with such adverbs as *should* or *can* and their German counterparts – and (ii) as auxiliaries that are an integral part of ‘analytic’ tense morphology and do not make any contribution to the semantics independently from the contribution made by tense. The first option is attractive in that it treats the formal similarities between *will*, *would* and the other modal verbs of English as more than a mere morphosyntactic idiosyncrasy. But unfortunately this option isn’t really tenable because it implies that combinations of *will/would* and the infinitival constructions that follow them as bi-clausal, in which *will* and *would* contribute a state of their own, as distinct from the eventuality contributed by the infinitival phrase that follows. The behaviour of temporal adverbs in clauses with *will* or *would* speaks against such an analysis, and favours the second option instead. So it is this option that we adopted.

Having decided to treat future-oriented *will* and *would* as future tense auxiliaries, we then went on to explore what operations are involved in their interpretation, including interactions with various temporal adverbs. Following the practice established in earlier chapters, we encode these operations via values of the feature TENSE which decorate the T-nodes of the syntactic structures of simple future and past future sentences. The upshot of our all too brief explorations of these issues led us to the conclusion that the simple future is ambiguous in the sense of being compatible with two different values of TENSE, whereas the past future uniquely determines a single feature.

In the next section we will see how these features (with the operations they determine) combine with feature values of PERF determined by the Perf nodes of future perfects and past future perfects.

6.10.3 English future perfects

At long last we come to the primary concern of Section 6.10, the semantics of the future perfect and the past future perfect. Since we are committed to an analysis on which future perfects are combinations of future tenses with perfect complements – and nothing speaks against such an analysis in the case of future perfects any more than in the case of other perfects – there is little that needs to be added at this point to what we have established about non-future perfects. All that remains is to determine whether the PERF-values involved are like those we were led to assume for past and infinitival perfects, focussing once again on the question of formal vs. target(-like) result states and state-to-event coercion. We claim, once more on the basis of much less evidence than one might have wanted, that in all relevant respects these feature values and the operations they dictate are as for the other non-present perfects we have been looking at in this chapter.

Some examples relevant to these assumptions are listed in (6.102).

- (6.102)a. I already know: Sunday ten days from now I will be utterly exhausted. I will have left for Moscow on the previous Tuesday, will have continued for Beijing on Thursday and will have made my way back home on Saturday.
- b. In less than a month you will have been in Australia and I will have been in New Zealand.
- c. Next year we will have been married for thirty years.
- d. Don't worry. Next week Sunday we will be sitting here again. You will have submitted your paper. I will have returned from my trip to Afghanistan. And then the time will have come to spend a few truly carefree days together.
- e. Fritz and Mary arrived on the second. Ella would join them on the fifth. At that time/By then she would have taken her exams.
- f. Fritz and Mary arrived on the second. Ella would join them on the fifth. She would have taken her exams then and would have been informed of the results the preceding/following Friday.

- g. (??) In three weeks' time, on Sunday the 23-d, we would be sitting here again. Mary would have sent off her book and I would just have come back from my trip to Afghanistan. So *now* we would both have accomplished the tasks that had kept us worried and on our toes for so long and we would be free at last to spend a few truly carefree days together.
- h. Don't worry. Next week Sunday we will be sitting here again. You will have submitted your paper. I will have returned from my trip to Afghanistan. And *now* the time will have come to spend a few truly carefree days together.

(6.102.a), (6.102.b) and (6.102.c) show that future perfects are like the other kinds of perfects in that the input to the perfect operator can be an event description ((6.102.a), but also a state description ((6.102.b,c)). We assume, as we have in connection with non-future perfects, that state-describing inputs involve state-to-event coercion. (6.102.b) shows that state-to event coercion can be via closure and (6.102.c) that it can be inchoative. This too is as we would have expected in the light of what our earlier conclusions about non-future perfects of English.

(6.102.a) also indicates that the result state to which *tt* is moved by the perfect operator need not be a target or target-like state: the last of the three conjuncts of the last full sentence of (6.102.a) indicates that the target state of the event description in the first conjunct no longer obtains at the future time of the eventualities described by the three conjuncts.

Between them (6.102.a) and (6.102.d) show that a temporal adverb can either modify the eventuality described by the input to the perfect operator (*on the previous Tuesday*, *on Thursday* and *on Saturday* in (6.102.a)) or the time of the result state (*then* in (6.102.d)). However, future perfects are like other perfects in that they too give rise to Klein's puzzle: as the reader will have no difficulty verifying, simultaneous adverbial location of both the eventuality described by the input to the perfect and the result state is prohibited. (Sentences like 'At that time Fritz will have submitted his paper on Friday' are clearly no good.) We can deal with these facts in the same way in which we have dealt with Klein's Past Perfect Puzzle, viz. by adopting the principle that future perfects are like past and infinitival perfects in that their analysis involves either one or the other of the two PERF values +perf(past,e) and +perf(past,s).

(6.102.e) and (6.102.f) indicate that what has just been claimed for future perfects applies to past future perfects as well. But there is one apparent

difference between present and past futures that we discussed in the last section and that should also have its repercussions for present and past future perfects. We noted in Section 6.10.2 that adverbs such as *now* cannot be used to refer to the time preceding *n* from which the described eventuality is presented as future. The account we offered of this is that the eventuality is in the future of this past time, and that there is no corresponding state holding at that time that *now* that could be *now*'s temporal location target. For simple futures the matter was assumed to be different. *now* can be used to refer to the future time at which the state described by a stative future tense clause is said to hold, although sentences or discourses in which this is the case must be constructed quite carefully if the use of *now* doesn't sound awkward or contrived. To do justice to this possibility we adopted a second feature compatible with the future tense, fut_2 , which situates the TPpt in the future of *n* and locates the described eventuality (necessarily a state) at the TPpt. The situation, we noted in the last section, is somewhat different for the past future. We observed that *now* cannot be used to refer to the time preceding *n* that is involved in past tense *would* – such combinations require a reinterpretation of *would* to some kind of modal interpretation. This fact is captured by our assumptions about the feature pafut that is triggered by past futures, which keeps the TPpt at *n*.

These assumptions lead to similar conclusions about the compatibility of *now* with future perfects and past future perfects. Not only can't *now* refer too the past time involved in the interpretation of a past future perfect clause, as we saw in the last section, (6.102.g) indicates that it cannot (or only under considerable duress, and even then only marginally) be used to refer to the future time of the described result state. Our formal account prohibits such interpretations (for any kind of state description, not just for the descriptions of result states presented by perfect complements), so to the extent that such uses of *now* are possible at all, some further story needs to be told why that should be so. On the other hand, (6.102.h), in which *now* is meant to refer to the future time of the described result state, seems rather forced also, and, as far as we can tell, hardly less so than the *now* of (6.102.g). But as our account is stated, this use of *now* is licenced by it. Here, then, there is an apparent tension between our theoretical proposals and the facts (such as these present themselves to us). We suspect that this is one point where the theoretical repertoire of which we have availed ourselves here reaches its limits. Presumably a richer set of analytic tools is needed at this point than the present essay provides.

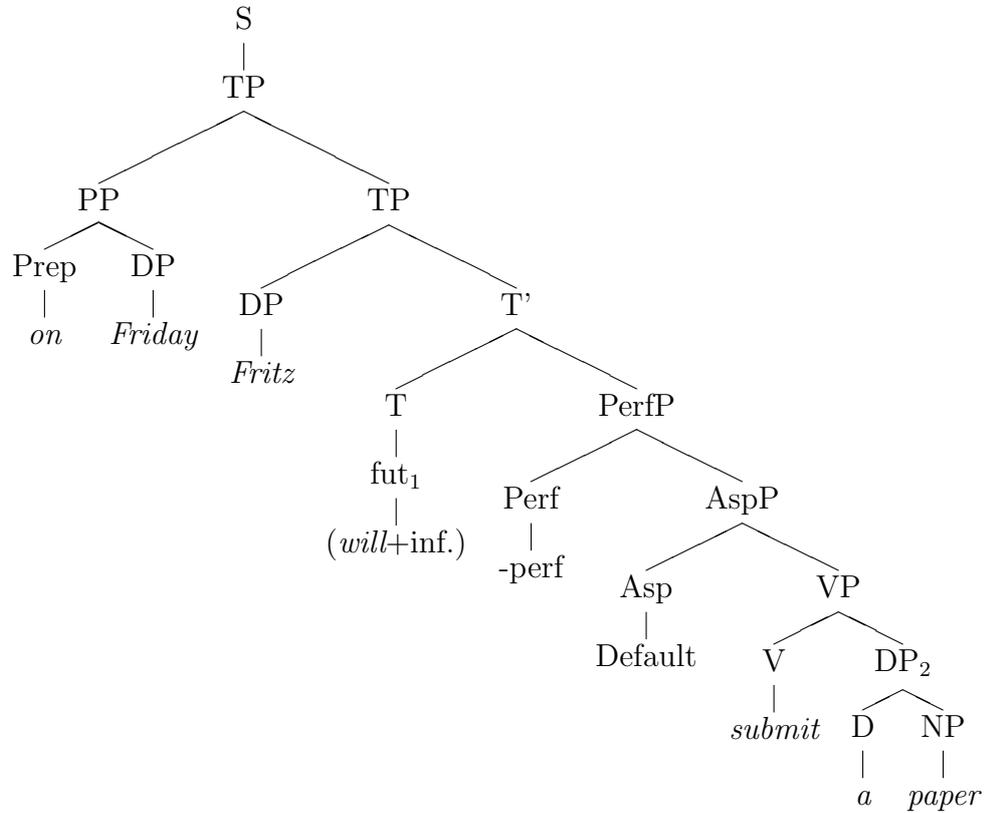
6.8.3 Representation constructions for some future tense sentences

We have provided all the pieces needed to build semantic representations for the types of future and past future sentences considered in the last two sections. So it would be possible to simply leave it to the reader to apply these to some sentences and sentence sequences of his choice. But it may be helpful to see for a few examples how the constructions actually go and in particular how the new features make their contributions. We will look at constructions for the sentences in (6.103).

- (6.103)a. On Friday Fritz will submit a paper.
- b. On Friday Fritz will have submitted a paper.
 - c. On Friday Fritz will join us. Then he will have submitted a paper.
 - d. On Friday Fritz will join us. On Thursday he will have submitted a paper.
 - e. Fritz was looking forward to the coming weekend. Then he would have taken his exam (and on Sunday he wouldn't even think about it any more).
 - f. Fritz was looking forward to the coming weekend. On Friday he would have taken his exam.

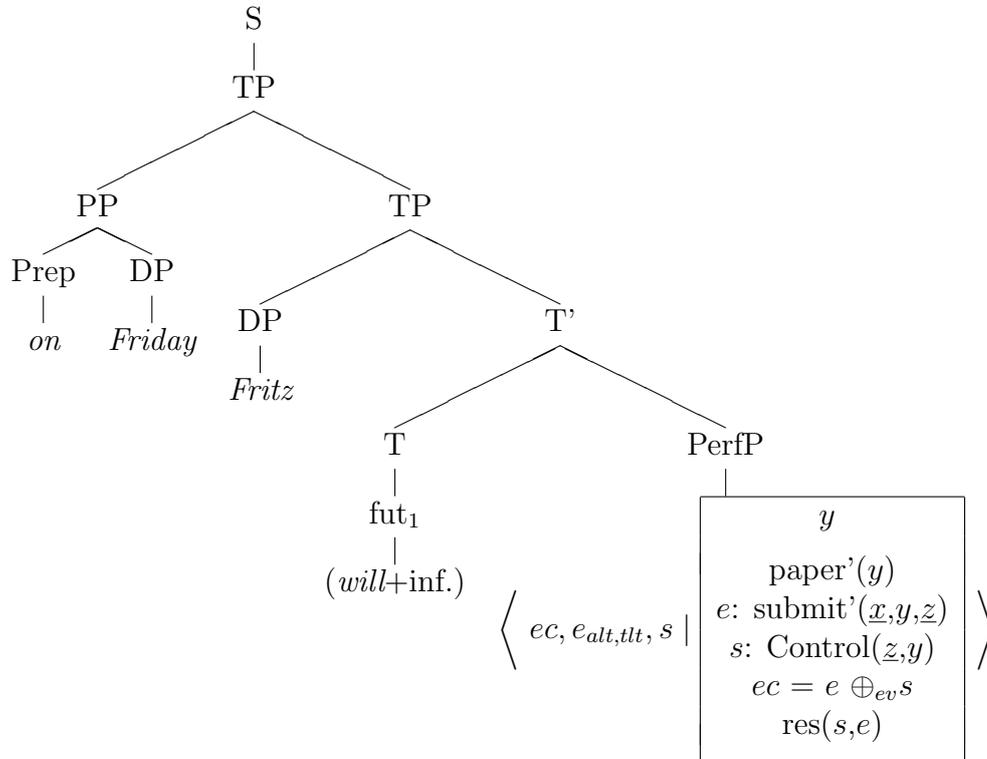
The first sentence, (6.103.a), does not involve the perfect. But it is useful as a warm-up, (6.104) gives its syntactic structure.

(6.104)



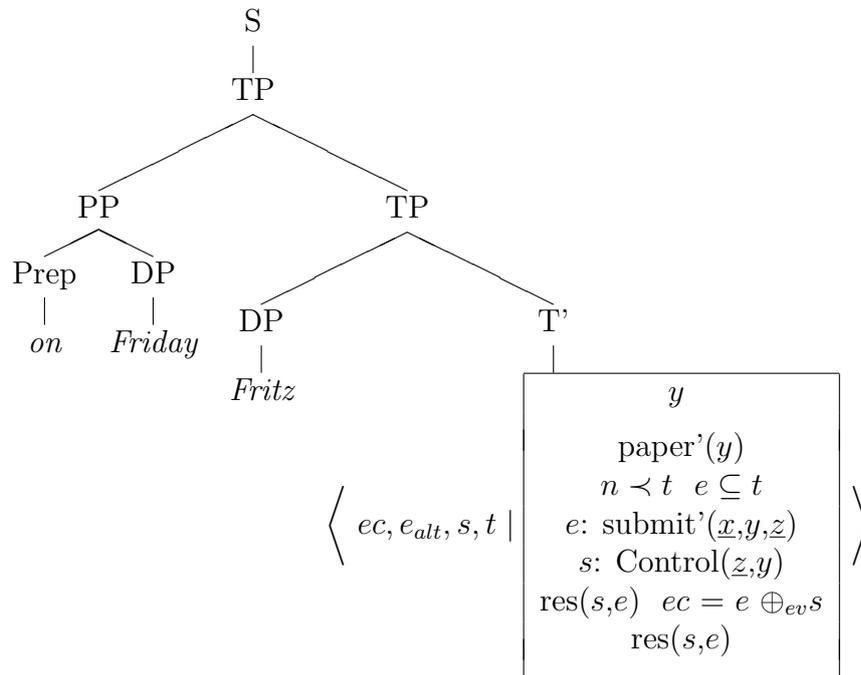
(6.105) gives the stage where the PerfP representation has been constructed. (The part of the construction that leads up to this point is just as we have seen before.)

(6.105)



The TENSE value fut_1 introduces a location time t , which it places in the future of the TP_{pt}. The TP_{pt} comes with a TP_{pt} presupposition, which in this case is resolved to n . (In this sense the tense represented by fut_1 is a ‘simple tense’ in the terminology of Section 6.1.) Resolving this presupposition on the fly, we arrive at the following representation for the T’ node.

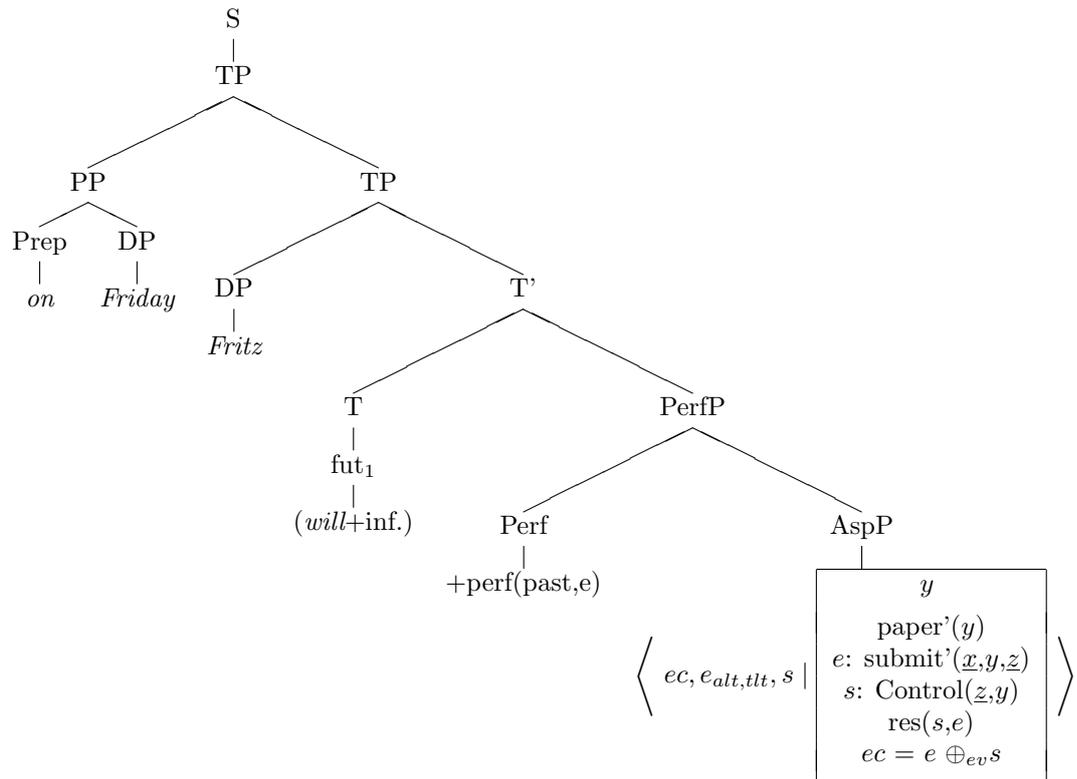
(6.106)



The next step deals with the subject DP *Fritz* and is of no interest to us. But the step after this one deals with the combination of the lower TP representation and the representation of the PP *on Friday*. We simplify the treatment of *on Friday* in the same way as we did with *at seven* in Section 6.2. (See the interlude on such calendar-related PPs in that section.) (6.107) gives the stage at which lower TP and PP have their semantic representations, with the representation of the PP simplified as indicated in Section 6.2.

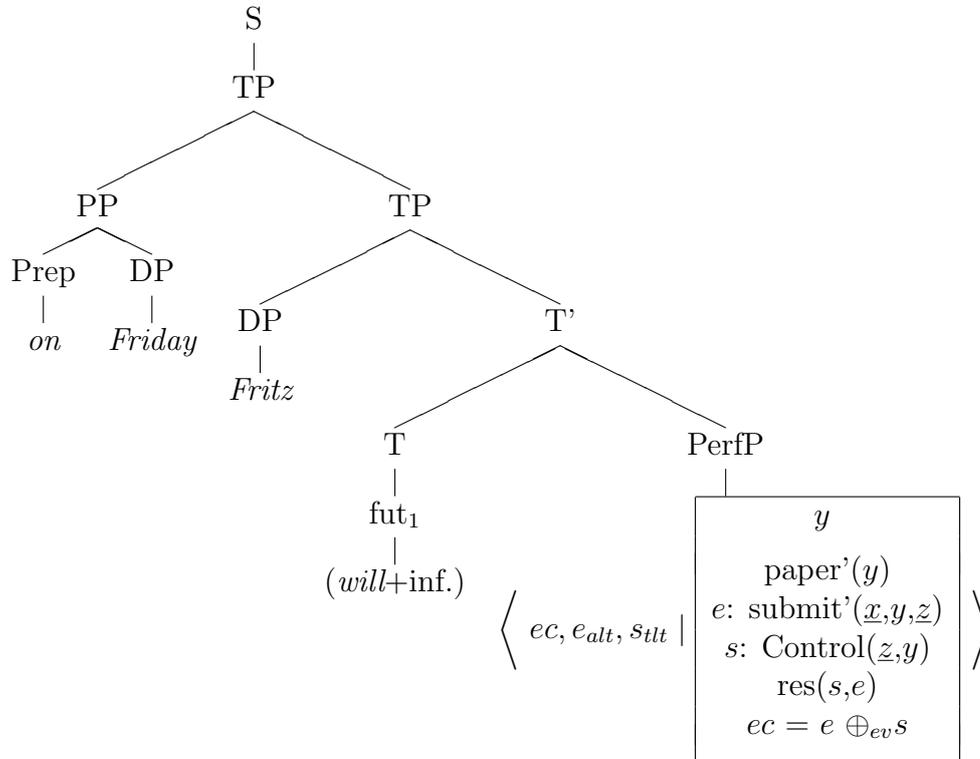
and the second by analysing it as involving $+perf(past,s)$. We show the construction of the representations for these two readings, in the order in which they have just been mentioned, picking up the construction in both cases at the point where the representation for the complement to Perf has been constructed. (6.110) gives the starting point for the first construction.

(6.110)



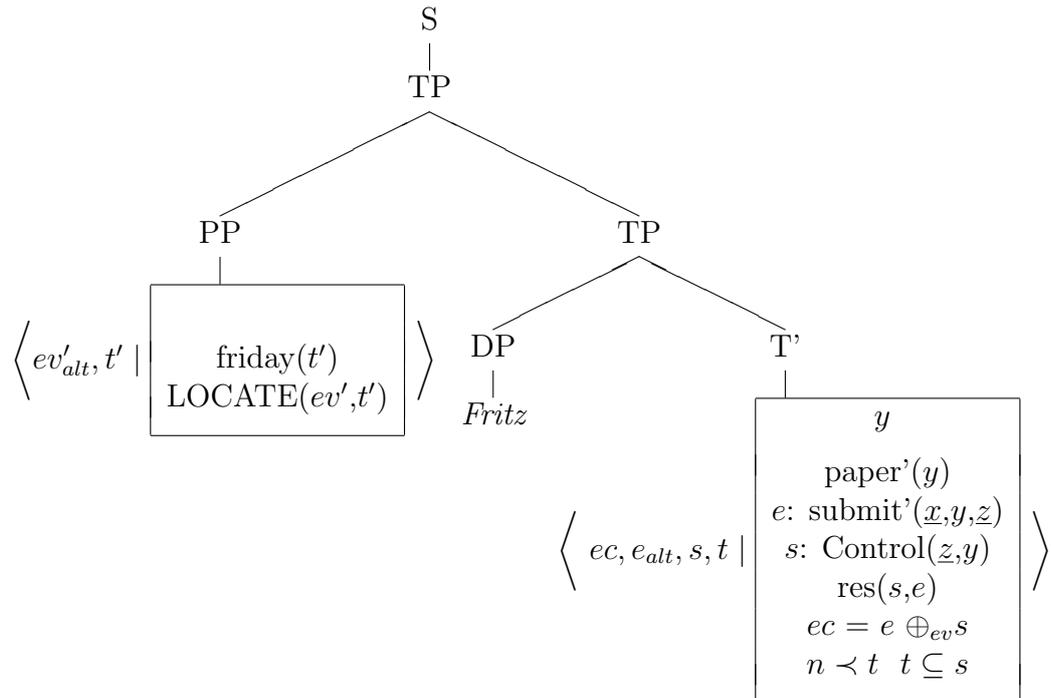
The PERF value $+perf(past,e)$ has the effect of shifting tlt to the target state s while leaving alt at the event e . The result of carrying out the operations it dictates is shown in (6.111).

(6.111)

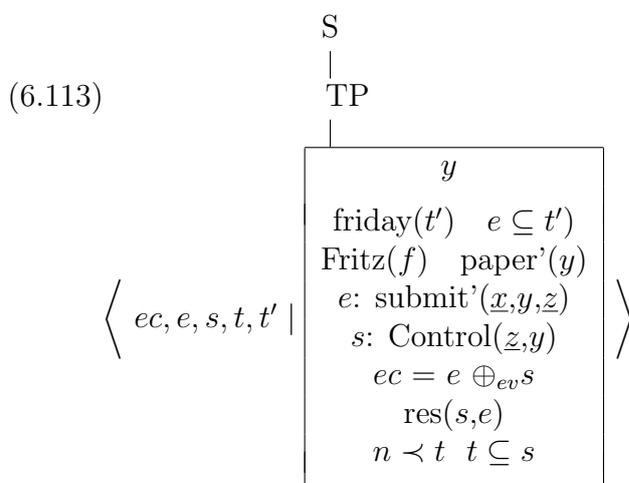


The next step puts into effect the operations determined by the TENSE value fut_1 . This is as in the last example, except that it is now the result state s that gets situated in the future of n . (6.112) gives the result while also showing our simplified semantics of *on Friday*.

(6.112)



The combination of the T' representation with the subject DP *Fritz* is once again of no direct interest and it is executed in conjunction with the next operation, which combines the lower TP representation with that of *on Friday*. This leads to the same result as we got in the semantic representation construction for (6.103.a) since once again it is the event e that is *alt*-marked. The result, the upper TP representation, is shown in (6.113). We see no reason to also display the final sentence DRS that can be obtained from this representation. Not that in the absence of more information about the denotation of *on Friday* all that (6.103.b) tells us about the submission event is that it will have occurred on some Friday. This Friday could either be in the future or in the past and it could even be the Friday on which the represented utterance is made.



The second interpretation of (6.103.b) requires the PERF value $+\text{perf}(\text{past}, s)$. This has the effect that both $_{ut}$ and $_{alt}$ are shifted to the result state s . When the lower TP representation obtained in this way is combined with *on Friday*, then it is s that gets situated as holding at the relevant Friday t' (or, in our simplified account, as holding at some Friday or other).

Note well that for these examples in m,ames no different whether the future tense is analysed as involving fut_1 or as involving fut_2 . The distinction between fut_1 and fut_2 only matters concretely in connection with the possibility of future denotations of *now*. But of course there is a difference between the two feature values in that fut_2 comes with a non-trivial TP_{pt} presupposition, which in the context-free setting of our discussions will have to be accommodated. It is only because of this accommodation that the choice between fut_1 and fut_2 is immaterial to the outcome.

For the next two examples of (6.103), (6.103.c,d) which we repeat here, we won't display actual constructions. But in the light of the constructions that have been shown so far, the few things we want to say about them should be easy enough to understand without the explicit display of diagrams.

(6.103.c) On Friday Fritz will join us. Then he will have submitted a paper.

(6.103.d) On Friday Fritz will join us. On Thursday he will have submitted a paper.

In (6.103.c) *then* in the second sentence is hard to interpret in any other way than as anaphoric to the future event of Fritz joining the speaker on the

relevant Friday spoken of in the first sentence. This makes it very difficult to interpret *then* at the same time as locating the submission event that the second sentence speaks about, for in that case the second sentence would have to be construed as involving an even later perspective point from which the submission is presented as having taken place earlier. To obtain the interpretation that is readily available for (6.103.c) we must analyse its perfect as involving the feature value +perf(past,s).

(6.103.d) illustrates the same point, but with different formal implications. Once again, there appears to be a compelling pressure to interpret the future time spoken of in the first sentence as the time for the result state involved in the interpretation of the second. This will be possible only if the adverb *on Thursday* is interpreted as locating the submission event. (For otherwise we would get into the contradiction that the time of the result state is included both within Thursday and within Friday.) In order to get the interpretation we want for (6.103.d) we must therefore analyse it as involving the value +perf(past,e).

note ell that there is nothing in our theory which rules out the intuitively unavailable interpretations of (6.103.c) and (6.103.d) categorically. There appears to be a strong tendency to make use of a discourse-salient future time as the one at which the result state of a future perfect holds, as if all future perfects came with location presuppositions of the kind that our theory only explicitly acknowledges in connection with the location of TPpts. If (6.103.c) and (6.103.d) are analysed using the feature value fut₂, then there is a way of arguing that when a future time is made salient in the way it is by the first sentence of (6.103.c) and (6.103.d), then it must be used in the resolution of the future TPpt. But nothing in what we have been saying *requires* that fut₂ be used rather than fut₁. As things stand, there is a need for analysing a future perfect with the help of fut₂ only in the presence of an occurrence of *now* that is being interpreted as referring to the future result state of the future perfect. Something is missing from the account of future perfects as we have given it. Recall also the qualifying remarks at the end of Section 6.10.4.⁴⁴

We conclude with a closer look at the past future perfects in (6.103.e,f), also repeated.

⁴⁴ Of course it would be possible to build presuppositions for the location of the future eventuality times that are introduced by our future TENSE feature values into the instructions that those values determine. But without a better motivation than we are able to give this would just be a hack – at best a hint in the direction of a better theory.

(6.103.e) Fritz was looking forward to the coming weekend. Then he would have taken his exam (and on Sunday he wouldn't even think about it any more).

(6.103.f) Fritz was looking forward to the coming weekend. On Friday he would have taken his exam.

The first sentence that these two bits of discourse share introduces two times, the past time at which Fritz was looking forward to the weekend ahead of him and the time of the weekend situated in the future of that time. That the past time is exploited in resolving the TP_{pt} presupposition that is introduced by the feature value *pafut* – the only one that is compatible with the past future perfect according to our assumptions – is plausible and it seems plausible that this will act as an overriding constraint in discourses like (6.103.e,f). But with regard to the later time introduced by *the weekend* we encounter the same problem that we also ran into in connection with (6.103.c,d): It seems more or less impossible to interpret *then* in (6.103.e) other than as specifying the time of the result state and *on Friday* in (6.103.f) other than as specifying the time of Fritz taking the exam. And once more this is something for which we have lack the formal means to account for.

This is as far as we can push the topic of future perfects in English. In the next section we have a quick look at the future perfects of German.

6.8.4 Future Perfects in German

After having expostulated about the perfect and non-perfect future tenses of English for what must have exceeded any reasonable person's endurance, we will be brief about the future tenses of German. We can be because what there is to be said about the German future tenses is not much different from what there is to be said about the future tenses of English, and that has been said already. In particular, when German future tenses are treated as genuine future tenses, then nearly everything we have said about English transfers to German, including the semantic properties of future perfects. (To show that German future perfects are like English future perfects (and therewith also like German and English past and infinitival perfects) we can use examples that are by and large copies of those we presented to support our claims about the future perfects of English. (6.114) gives a selection of such examples. But we won't spell out the conclusions they suggest in the way we have tried to do in relation to their English counterparts. We would do little more than repeat ourselves.

- (6.114)a. Fritz wird sein Papier einreichen.
(Fritz will submit a paper.)
- b. Sonntag nächste Woche wird Fritz sein Papier eingereicht haben.
(Sunday next week Fritz will have submitted his paper.)
- c. Fritz und Maria redeten darüber, was zu tun sei. Am nächsten Tag würde seine Mutter eintreffen.
(Fritz and Maria were discussing what to do. His mother would arrive the next day.)
- d. Ich weiß jetzt schon: Sonntag in drei Wochen werde ich total erschöpft sein. Am Dienstag zuvor werde ich nach Moskau gereist sein, am Donnerstag werde ich die Reise Richtung Beijing fortgesetzt haben und am Samstag werde ich von dort wieder ganz nach Hause gereist sein.

(I already know: Sunday three weeks from now I will be utterly exhausted. I will have left for Moscow on the previous Tuesday, will have continued for Beijing on Thursday, and will have made my way back home on Saturday.)
- e. Fritz und Maria trafen am Zweiten ein. Ella würde am fünften dazu stoßen. Zu dem Zeitpunkt würde sie ihre Examen gemacht haben.
(Fritz and Maria arrived on the second. Ella would join them on the fifth. By then she would have taken her exams.)
- f. Am zweiten würde Ella ihre Examen gemacht haben.
(On the second Ella would have taken her exams.)

Among the questions that can (and must) be asked about the forms that German uses to talk about the future there is in particular the one that figured as assumption in the last paragraph: does German have a genuine future tense? Here too the answer – that is does have one – can be given on the strength of the same considerations we used to argue for the existence of a genuine future tense in English, involving adverbial modifications in bi- and mono-clausal constructions. (This is one of the arguments we won't repeat.) But there is one asymmetry between German and English connected with this argument to which we think it is worth drawing attention. German future tense morphology is, like the future tense morphology of English, 'analytic' in that it involves the combination of an auxiliary and an infinitival supplement. In fact, the auxiliaries of the two languages – *will/would* in English and *wird/würde* in German – are perfect matches in that each has

just two tense forms – *will* and *wird* function as present tenses and *would* and *würde* as simple past tenses. (N.B. these are the German forms for 3-d person singular. Other person-number combinations come with different inflectional suffixes, but that is irrelevant to the point.) This similarity is all the more striking when we set *will/would* and *wird/würde* side by side with what we argued the closest competitors when discussing *will/would*, viz. the modal verbs. English modal verbs, we saw, are typically inflectionally inert: *should*, *ought to* *might* function semantically as present tense. In contemporary English there is arguably one other modal verb besides *will* that has a past as well as a present tense, viz. *can/could*. But in English that appears to be the extent to which there are tense distinctions for modal verbs. In German, on the other hand, the modal verbs are morphologically very different. German modal verbs, such as *können*, *mögen* or *dürfen* are morphologically like main verbs, with a full inflectional paradigm including simple past, present and past perfect, and so on; and that makes them very different from the tense-morphologically defective future auxiliary *word* with its past tense form *würde*, but nothing more. For this reason there is even less of a temptation to analyse the German constructions with *wird/würde* as combinations of a modal verb and an infinitival complement. But anyone who might be tempted by such an analysis nevertheless should be persuaded otherwise by the arguments from adverbial modification that we have given for English.⁴⁵

One last observation on the variety of forms and uses of *werden*. Besides those mentioned in the last paragraph and the footnote attached to it, *wird/würde* also has an epistemic use, just as *will/would* in English. In German, this use is restricted to the two forms *wird* and *würde*. Some examples are given in (??).

⁴⁵ The extant forms of the German future auxiliary are all also inflectional forms of the verb *werden*, with meaning ‘become’. This verb functions as a copula (on a par with *seine* (‘be’) and *bleiben* (‘stay’, ‘remain’)). The historical connections between the copula *werden* and the future auxiliary are a topic of investigation in its own right and even dilettantes like us find it hard to resist the temptation to think in this connection of the future tense as a form of becoming of a future state of affairs: ‘Fritz wird krank sein’ (‘Fritz will be ill’) is a somewhat different way of saying what can be also more or less described with the words ‘Fritz wird krank’ (‘Fritz becomes ill’). (In addition, German *werden* also plays the part of passive auxiliary, as in ‘Fritz wird/wurde bewundert/geschlagen’ (Fritz is/was admired/beaten’), and here too a historical semantic connection is easy enough to think up.) But the details of the historical development of these different forms and uses of what presumably was once a single unified lexical item should be left to the experts. And in any case, a story about these historical developments would make an odd figure in the present study, even if we were in a position to tell it.

- (6.115)a. In der Nähe vom Gipfel wird es jetzt schneien.
(It will be snowing near the top right now.)
- b. Aufgrund von dem, was wir jetzt wissen, alles was wir sagen können, ist folgendes: In diesem Augenblick wird sich der Orkan Mathilda irgendwo zwischen fünfhundert und eintausend Meilen östlich von Bermuda befinden. Morgen wird er sich der amerikanischen Ostküste um drei bis fünfhundert Meilen genähert haben.

(From what we know at this point all that we can say right now is this:

Right now Hurricane Mathilda will be somewhere between five hundred and a thousand miles east of Bermuda. Tomorrow she will be between three hundred and five hundred miles nearer to the American East Coast.)

This is an indication that there is a systematic connection between future and epistemic uses of the future tense. Further confirmation of this is provided by languages with synthetic future tenses such as French, in which the future tense form can also be used epistemically, with the simple future functioning as a present tense and the past future as a simple past tense epistemic modal. This correlation is apparently quite general and productive in a way that the connections in the last paragraph, which are specific to German, are not. Here too it is tempting to speculate: The epistemic use of the future tense involves some kind of metonymy, in which what is future is not the state of affairs described in the sentence, but the obtaining of direct evidence for it in a prospective quest for such evidence (as opposed to the indirect evidence on which the prospective claim is based). This is yet another topic that it would make no sense to pursue in this study of the perfect.

The formal conclusions that this section should lead are, as indicated not freely different from those reached for English future tenses in general and future perfects in particular. We list then here without further argument.

(i) Interpretation of German future tense sentences is based on the features fut_1 and fut_2 for the '1present' future tense and pafut for past futures.

(ii) Present and past future perfects involve the PERF feature values $+\text{perf}(\text{past},e)$ and $+\text{perf}(\text{past},s)$.

The only difference between German and English in the domain of future perfects is once again that when the input to a future perfect is a state

description, then German only allows for state-to-event coercion via closure; inchoative coercion is not among the options. In this regard too the German future perfects do not differ from its past and infinitival perfects. But a qualification does seem called for here. It is not as easy to find direct evidence for this difference between German and English in the context of future perfects as it is for present, past and infinitival perfects. (6.116) illustrates the difficulty.

- (6.116)a. Nächtes Jahr wird gefeiert. Dann sind wir seit 25 Jahren verheiratet.
 (Next year there will have a celebration. Then we will have been married for 25 years.)
- b. (?) Nächtes Jahr wird gefeiert. Dann sind wir seit 25 Jahren verheiratet gewesen.
 (Next year there will have a celebration. We will have been married then for 25 years.)

The natural way of saying what is intended by both (6.116.a) and (6.116.b) – that we will have been married for a period of time that reaches up to the time of the projected celebration next year and started 25 years earlier – is (6.116.a). This is an indication that what is true for other kinds of German perfects is true for its future perfects as well: perfects of state descriptions do not allow for inchoative state-to-event coercion.

This ends our brief discussion of the future perfect in German and with that the much longer discussion of future tenses in German and English. One more observation to conclude Section 6.10, which has been devoted to this topic. Although the point of the Section has been to explore future perfects, as the one remaining type of perfects on our list, most of the discussion has been about talk about the future in general. The more general discussion was needed to determine whether future perfects deserve to be considered as a category in their own right, in addition to the present, past and infinitival perfects dealt with in what came before, or nothing but a special environment for the naked infinitival perfects that had been explored in Section 6.9. Had we been led to conclude that future tense constructions are really constructions involving modal verb with infinitival clauses as complements, then the so-called future perfects would just have been another environment for infinitival perfects, presumably with the semantic properties that we had already found for them. As it was, we found reasons for concluding that what are usually described as future tenses really are future tenses by the

criteria we have adopted. But as far as the semantics of the perfects themselves is concerned that conclusion turned out to make hardly any difference: the Perf features involved in future perfects are the same as those involved in the infinitival perfects. (The only difference was our tentative conclusion that ‘present’ future perfects are compatible with the two features fut_1 and fut_2 whereas the past future perfect is incompatible only with the single feature $pafut$.)

The question whether future tenses are future tenses in the sense of our criteria is one of the two main issues that have been raised in Section 6.10 and we want to stress once more that the two main issues are crucially distinct. The issue we discussed first is a purely semantic issue: what are the truth conditions of sentences that involve the standard means for expressing reference to the future? Are such statements just about the actual future as it will unfold itself in time, or is it also about other continuations of the world as it is at the utterance time (or, more generally, at the time from which the information is projected as future)? The second question was the one referred to in the last paragraph. That is not a question about the truth conditions of sentences about the future as such, but more specifically about the syntax-semantics interface: Are the morpho-syntactic constructions that are standardly used in English and German to be considered realisations of *tenses* or should they be analysed as combinations of modal verbs and their infinitival complements? Our answer to this second question was just repeated: The constructions in question are genuine expressions of tense, like the synthetically realised Simple Past of English and German and the synthetically realised future tenses of the Romance languages. And our answer to the first question: The semantic operator expressed by the future-referring constructions in question is a ‘future tense in the strict sense’, with truth conditional impact that depends exclusively on the actual future of the world of evaluation.

Some may be unconvinced that these are the right answers. But also important, and this is a point on which we are emphatic, is that they are answers to distinct questions, and that the answers to these questions (whatever they may be) are independent of each other. Whether natural languages give us simple, grammaticised means of talking about the actual future, and about the actual future only, is one thing; whether those means function like tenses in the technical sense of operators with their own clause-internal projection levels or more like matrix verbs with complements that have the status of independent clauses, is another one. Each combination of possible answers to the two questions is a logical possibility. (For instance, it would have

been perfectly conceivable that we might have arrived at the conclusion that the constructions in questions are future tenses (in the technical sense just described once more two in the penultimate paragraph) and that their semantics was not that of a future tense operator in the strict sense. In fact, this is how one could perhaps describe Aristotle's position. It seems fairly clear that he did not think that talk about the future could be analysed as restricted to the actual future. But the language that he spoke and in which he wrote, ancient Greek, has a synthetic future tense, for which a bi-clausal analysis that has initial plausibility for analytic tense forms is far less suggestive.)

This concludes our survey of the non-present forms of perfects. The remainder of the essay will be concerned with (a) the interaction between perfects and temporal adverbs and (b) the interaction between perfects and forms of quantification.

Chapter 7

Extended Nows

Prominent among the different accounts of the Present Perfect is the Extended Now Theory (McCoard 1978). According to this theory a Present Perfect always involves an explicit or implicit reference to an interval that starts somewhere in the past and reaches up to and includes the speech time. This approach has been generalized in two directions: (a) the theory is applied not only to the present perfect but to perfects in general, and in particular to past perfects. Such theories are referred to as 'Perfect Time Span' accounts, a term that tries to shun the unwanted inference that the intervals involved must always involve the time of speech (Iatridou et al. 2001). In our framework this generalisation can be articulated in terms of Temporal Perspective points: the intervals involved must always reach to the TP_{pt} from some time preceding it; the Present Perfect is the special case in which the TP_{pt} coincides with *n*. An even further generalisation is that of (Rothstein 2008), which applies the P(erfect) T(ime) S(pan) approach to a comparative study of the perfects of English, German and Swedish, accounting for the differences between the perfects of these three languages in terms of the behaviour of the TPSs that they invoke and the way they interact with them semantically.

Today no semantic account of the perfect that presents itself as something other than a version of the PTS approach is credible unless it is accompanied by an explanation of how it relates to the PTS approach – whether or not the account really is as different from PTS approach as it may appear to be and, if the differences are genuine, what it has to offer that the PTS approach the advantages are that it takes itself to be offering. A good deal of what is still to come in this essay is geared towards this remaining task. But there is still a lot that must be discussed before a serious comparison is possible, as some of the data that have been offered by proponents of PTS accounts haven't even

yet been touched upon. Crucial in this connection is the interaction between perfects and certain ‘durational’ adverbials, especially PPs with the temporal preposition *since*. Another very important factor, we will see, and one of which we think that it has often been misjudged, or negligently ignored, is the interaction between perfects and various forms of quantification. To look into these and other interactions more closely will not only be a needed preparation to a serious comparison between PTS theories and the approach of this paper, but also useful in their own right. And they too will take up their time and space.

As a first step in this general direction we introduce and discuss a notion of ‘Extended Now’ which we think is naturally reflected by its name, but which differs somewhat from the ‘Extended Now’s of the ‘Extended Now’ and PTS accounts of the perfect that are familiar to us.¹ It should become clear presently that this is not just a case of bickering over terminology; we need the notion we are about to introduce as a starting point for what we think is right about the PTS approach and what is misleading or capable of improvement.

A general feature of the way in which we use language to exchange information: linguistic communication – from the moment a speaker resolves to communicate some piece of information to an audience or addressee to the processing of her utterance by those for whom it is intended – is that it takes time. That is so even in face-to-face communication between two discourse participants, where the time that it takes for the sounds produced by the speaker to reach the audience is negligible. For it takes time to produce an utterance: it must be generated by the speaker who wants to get her message across, it must be realised by her as a series of spoken words that are produced in a sequence, and these words must not only be caught by the recipient, they also must be parsed and interpreted by him. Just because of these simple and incontrovertible facts of physics and human cognition there cannot be such a thing as a true ‘instant of speech’; the speech time cannot fail to have a certain temporal extension.

But that is not all. In a dialogue – a verbal exchange between two discourse participants – it is the duration of the entire discourse that typically counts as the ‘utterance time’, in the technical sense in which that notion is relevant

¹ The most often used term to refer to Extended Now theories is as ‘XN’ theories. Perhaps the choice of ‘X’ instead of the first letter ‘E’ of ‘extended’ is motivated by a desire to minimise association with the intuitive meaning of the phrase ‘extended Now’.

to semantics: It functions as the utterance time for each of the utterances of which the dialogue is made up: for each of them time is divided into the part that comes before the dialogue, the part that comes after it and the dialogue time itself. And that means – for this is how we typically communicate in language! – that for the information that can be conveyed by a single clause there are only three options: either it is entirely about the past (i.e. about the time preceding the discourse), or it is entirely about the future, or it is about the ‘present’ that is constituted by the discourse time. And in this third case – this is the crucial point – there is a further constraint: the information must be ‘about the entire discourse time’: it must be about a condition that holds throughout the discourse time. In our framework, in which a clause that describes a condition as holding over a certain period of time is treated as a description of a state whose duration includes that period, this means that clauses which ‘are about the present’ must be descriptions of states that last throughout the discourse time.² In this and the following chapters we will often speak of the discourse time – the time that matters to the interpretation of the tensed clauses produced in the course of the discourse – as the ‘(discourse) now’. It is important to keep in mind that in general this time is *not* identical with the referent of the adverb *now* when it occurs in one of those clauses. *now* is often used to denote a time that includes the ‘now’ of the discourse properly.³

In tensed languages like English or German the three options that single clauses have to make with regard to the temporal location of the information they convey is morphologically marked: in the first case the clause is marked as past tense, in the second it is marked as future tense and in the third it is marked as present tense. It more or less follows from what we have just

² As suggested in an earlier paper (Reyle et al. 2007), we can see this provision – that what isn’t wholly in the past or wholly in the future of the dialogue time must hold throughout it – as a sort of insurance against the possibility that the truth value of the message conveyed by an utterance that is made as part of the dialogue could depend on where in the course of the dialogue it is made. (But see footnote 4 below for a qualification of this.) Another way of putting the point is in terms of the distinction between real time and discourse time of (Kamp 1979): When we convert the structure of eventualities that are introduced by a discourse into an instant structure (by applying the so-called Russell-Wiener method), then there will be one instant in this structure that will play the part of the utterance time n . This means that if the utterances which constitute the discourse are all true of the real world, then there will be a verifying embedding of the discourse representation (with the instant structure it generates) into the real world in which n is mapped to a time that includes the dialogue time.

³ As noted earlier, there are also instances in which *now* is used to refer to times distinct from the discourse ‘now’ (in other words, times that are disjoint from the actual utterance time). But here we are only concerned with uses in which *now* refers to a time that includes the time of speech.

said about the third option that whereas past and future tense can be used with both perfective and imperfective viewpoint aspect, the present tense is only compatible with the latter: When what is spoken of is presumed to be going on as one is speaking, then of necessity one is describing their content from the viewpoint of someone who is looking at the states or processes she is describing ‘from the inside’. So the viewpoint aspect of these utterances must be the internal, or imperfective viewpoint.

This constraint on the normal use of the present tense has its formal reflections in many languages, and its manifestations are especially prominent in English: With event verbs imperfective viewpoint requires the progressive; hence the familiar constraint on ordinary uses of the present tense of such verbs: ‘John eats an apple’ is infelicitous in most ordinary situations; the right form is ‘John is eating an apple’.

As a default, then, it is understood by the participants of a discourse that the ‘utterance time’ – in the abstract sense of the time that is represented as ‘n’ in our semantic representations – includes the actual duration of the discourse.⁴ But the ‘utterance time’ can be understood to be even longer than

⁴ The tripartite division imposed by a given discourse situation is not absolute. By way of example we mention one kind of exception. In the middle of a discourse one of the discourse participants may say something like ‘But you just said that Mary is living in Paris these days.’ and by saying this she may be taking her interlocutor to task for what she takes to be an inconsistency between his last utterance (which seems to her to entail that Mary is currently living somewhere other than Paris) and the earlier one that her criticism is referring to. Here the speaker is using the past tense to talk about an event that happened within the discourse time. This is evidently a violation of the tripartite division principle. In general it is possible to ‘switch gears’ in this way in the middle of discourse, making a part of the discourse *event* into the topic of what one is saying. Since such topic changes are easy to recognise, gear switches of this sort, which involve a change from the global ‘utterance time’ to a more local one, which includes one’s own utterance but excludes the utterance one is referring, are unproblematic, and so is the subsequent switching back to the global ‘utterance time’.

We might also mention in this connection discourse types in which the tripartite division principle isn’t operative at all. The classical, often discussed example of this are live reports of sports events, where each utterance the reporter makes defines its own utterance times, so that the utterance times advance in step with the successive utterances. Notoriously, in this type of discourse, English event verbs can be, and typically are used in the simple present. (‘Jones passes the ball to Chalmers. Chalmers dribbles. He manages to shake off Ferdinando. He shoots. A mighty kick! GOALL!’) There are other possibilities as well in English for using simple presents of event verbs (for instance, with perception verbs, as in ‘I see a sailboat over there.’)

We will ignore all such complications here and proceed as if the tripartite division principle holds without exception.

that⁵. Sometimes this is implicit in the topics that are being discussed. But it is also possible to indicate the intended ‘utterance time’ in the utterance one is making, through the use of temporal adverbs such as *this morning*, *this week*, *this year*, *these days*, *nowadays* and so on. The sentences in (7.1) are examples in which such adverbs co-occur with the present tense. (In each case an English sentence comes first and its German translation below it.)

- (7.1) a. Today Fritz is ill.
Heute ist Fritz krank.
- b. This morning Fritz is tidying up his study.
Heute morgen räumt Fritz sein Arbeitszimmer auf.
- c. This year we live/are living in Boston.
Dieses Jahr wohnen wir in Boston.
- d. Nowadays not very many people smoke.
Heutzutage gibt es nicht viele, die rauchen.

Many of these adverbs denote more or less precise intervals. But there are also inherently vague ones, such as *nowadays*. *nowadays* implies that the amount of time it indicates is of a magnitude greater than that of a single day. But the intended period can be much larger than that, and from the word itself there is no way of telling how much. But there is one property that all the sentences in (7.1) have in common. Each of them makes a statement about what is the case throughout the interval denoted by its temporal adverb. This, we take it, is true generally of sentences in which an adverb that demotes a time which includes the utterance in which it occurs is combined with a present tense of the verb.⁶

⁵ The term ‘utterance time’ may be felt to be unnatural and misleading here. In the literature one often finds such terms as ‘specious present’ or ‘extended present’. In fact, we will switch to the second term shortly. However, this does not change the fundamental principle that it is this time that is represented by *n* (with the exceptions, of course, that were mentioned in 4)

⁶ The one example in (7.1) for which this claim may seem problematic is (7.1.b). Surely the truth of this sentence doesn’t require that Fritz be directly involved in moving about his study or going through the drawers of his desk from the start of ‘this morning’ to its end. However, (7.1.b) nevertheless states a property of the denoted morning as a whole: this is a morning at which Fritz is tidying up his study. It remains true, though, that in the light of such examples the phrase ‘true throughout (the denoted interval)’ is unduly strong. A more appropriate expression would be something like ‘true of (the interval as a whole)’. A precise analysis of this notion of an eventuality description being true of an interval is an old problem in the semantics of tense and aspect, for which to our knowledge no satisfactory solution has been given yet. Part of the answer may be

The notion of an *extended now* as we propose the term is the one that is implicit in the discussion above. First, we introduce the notion of the *now of* a given utterance U. The *now of* U is that interval of time that is understood as playing the part of conceptual ‘present, and thus to separate the conceptual ‘past’ from the conceptual ‘future’. A lower limit for the *now of* U is the duration of U itself.⁷ But, as we have seen, often the intended ‘now of’ an utterance U is longer than this. And as illustrated by the examples in (7.1), sometimes a temporal adverb in the uttered sentence makes this explicit. In such cases, where the *now of* U is implied or explicitly conveyed to substantially longer than is required by the constraints on verbal communication themselves, we refer to it as an *extended now*; and when this is made explicit by an adverb like those in (7.1) we refer to this adverb occurrence as a *now extender*.

According to this terminology the notion of an *extended now* is tied closely to the use of the present tense: A non-perfect present tense utterance is true only when an eventuality of the type it describes – in our set-up the description must be imperfective, so the eventuality must be a state – holds throughout (or ‘of’, in the elusive sense of ‘of’, see 6) ‘its now’; and when that ‘now’ is an *extended now*, then the described state must be true throughout (or ‘of’) this *extended interval*. Formally this amounts to a change in the processing rules for the simple present (in both English and German): Rather than stipulating that the state *s* described by a present tense sentence must include *n*, we now stipulate that *s* must include the *extended now* t_{xn} . ‘ t_{xn} ’ is a discourse referent that comes with the condition ‘ $n \subseteq t_{xn}$ ’ and that can be further specified by adverbials in the sentence or by information from the extra-sentential context. In the next section this modification will become of crucial importance.

⁷ Above we only spoke explicitly of the duration of an utterance in face-to-face exchanges. In such cases, we said, we should identify the duration of an utterance with the time it takes from its generation by the speaker to its interpretation by the recipient. For other modes of verbal communication this way of identifying the duration of utterances is more problematic. Think for instance about the sentences we write in letters, which may take considerable time to reach their destination, or proclamations that addressed to a large and open-ended audience and that may take varying amounts of time to come to attention of the different people for whom they are meant. In such cases it seems more natural to identify the utterance time with the time that it takes to *produce* an utterance. But the problem what to say about the use of tenses in such utterances in view of the delays there may be between production and reception (or for that matter the problem of choosing the ‘right’ tense when producing such utterances) remains. We will abstract from this complication.

We have just introduced the term *now extender* as applying to occurrences of adverbials, in utterances of sentences whose verbs are in the simple present tense. But we can extend this term also to adverbs as expression types: An adverb (as type) is a *now extender* iff some of its occurrences are now extenders qua occurrences. We need to proceed in this indirect way because not all occurrences of now extenders in the type sense are now extenders in the occurrence sense. This is because such adverbs can also combine with tense forms other than the simple present. In fact, the very first sentences of this paper are examples of this. On the one hand *today* is clearly a now extender qua type. But on the other hand, in sentence (1.1.a) it occurs in conjunction with the present perfect. Likewise for *heute* in (1.1.b). And the present perfect is by no means the only tense form besides the non-prefect presents that can occur in combination with *today* or *heute*. The sentences in (7.2) show a variety of other forms with which they can co-occur as well.

- (7.2) a. Today Fritz will drop by.
Heute wird Fritz uns besuchen.
- b. Today Fritz will have submitted his paper. Heute (noch) wird Fritz seine Arbeit eingereicht haben.
- c. Today Fritz submitted his paper. Heute reichte Fritz seine Arbeit ein.
- d. Today Fritz has submitted his paper. Heute hat Fritz seine Arbeit eingereicht.
- e. At noon everyone was despondent. Today we had started work in such good spirits. But by eleven we were all at loggerheads with each other again.
Um zwölf waren wir alle deprimiert. Heute hatten wir die Arbeit mit so viel Optimismus. Aber schon um elf hatten sich alle wieder mit allen überworfen.
- f. At noon we were in good spirits. Today we would have submitted the paper on which we had been working relentlessly for the last six months. we had started work in such good spirits.
Um zwölf waren wir alle voller Zuversicht. Heute würden wir die Arbeit eingereicht haben, an der wir die letzten sechs Monate so schonungslos gearbeitet hatten.

These examples show that essentially any tense form is compatible with both *today* and *heute*. Moreover, the English and German sentences that form the

pairs of (7.2) have the same truth conditions, showing that their respective tense forms are not only compatible with these adverbs but also that they interact with them in parallel ways. And this isn't just true for *today* and *heute* but also for the other now extenders in (7.1) (apart from *nowadays/heutzutage*, which seems to only accept present generics).

This remarkably close correspondence might feed the expectation that this similarity between English and German – that corresponding adverbials from the two languages can combine with the same tense forms – holds without remainder. But that isn't quite true. English and German part company when it comes to adverbial expressions that act as now extenders in one direction. The adverbials on which the two languages are divided are phrases governed by *since* and by its close German counterpart *seit*. *since*-phrases and *seit*-phrases share the property that they denote intervals that reach from a point indicated by the expression governed by the preposition up to the TP_{pt} for the clause of which the phrase is a constituent. (So, in particular, when the TP_{pt} coincides with *n*, then the *since/seit*-phrase denotes from some time in the past of *n* up to *n*.) Because of this semantic phrases *seit* is usually a good translation of *since* and conversely. But there is nevertheless one difference between *since* and *seit* that is of crucial importance for what will follow. Put in the terminology introduced in this section: *seit*-phrases are now extenders, *since*-phrases are not. This is just a more fancy, or at any rate a different, way of saying that sentences like (7.3.a) are grammatical sentences of German whereas their literal translations, such as (7.3.b) for (7.3.a), are not grammatical sentences of English. The English equivalent of (7.3.a) is not the ungrammatical (7.3.b), but a sentence in which the simple present of (7.3.a) is replaced by the English present perfect, as in (7.3.c).⁸

⁸ A superficially similar distinction can be observed with the mirror image expressions of *since*- and *seit*-phrases, viz. PPs with the presuppositions *until* and *bis*. 'Wir sind hier bis Ende nächster Woche.' is perfectly natural, but its literal translation 'We are here until the end of next of next week.' is rather marked. Rather, English has to use the simple future tense in such constructions, as in 'We will be here until the end of next of next week.' It is not clear to us, however, that this difference is of the same making as that between *since* and *seit*. The reason: There is a general difference between the simple presents of English and German in that the latter freely admits prospective readings (as in 'Morgen komme ich zu Dir.', literally 'Tomorrow I come to you.'), while English admits such interpretations only under special conditions (the so-called 'time table use', as in 'The train arrives at ten to five.', where ten to five is in the future of the utterance time). And in fact, 'We are here until the end of next of next week.' is perhaps not all that bad, provided only one can attach a time table interpretation to its present tense, in the some such sense as 'We are booked to stay here until the end of next week.'. These observations tend in the direction of the conclusion that neither the *until*-phrases of English and the *bis*-phrases of German are now extenders in our sense. That the latter combine more easily

- (7.3) a. Seit letzter Woche ist Fritz krank.
 b. Since last week Fritz is ill.
 c. Since last week Fritz has been ill.

Summary of the section: We began by noting a very general (and presumably universal) property of verbal communication about what is the case at present. Only internal viewpoint, i.e. imperfective perspective is possible for such communications. Moreover, such communicative acts presuppose an interval that spans the time it takes to produce the utterance (and in direct conversation its reception as well) and that is usually a good deal longer. For these intervals, which are presupposed in the use of the present tense and which confine what can be said by employing this tense (in its standard, present-oriented use) to conditions that hold of them in their entirety, we introduced the term of ‘nows of’ the present tense utterances in question, and we refer to them as ‘extended nows’ when they extend beyond the duration of the utterance in either or both directions. We then noted that English and German (and many languages besides) have adverbial expressions that can be used to denote extended nows. For the two languages of direct concern in this paper there is close to a meaning preserving one-to-one correspondence between their now extenders, and the two languages are also very close to each other that their respective now extenders are compatible with the same, full ranges of different tense forms. But the correspondence between English and German is not perfect. One difference is the behaviour of *since*-phrases in English as compared with *seit*-phrases in German. This difference will play an important role in what is to come.

with simple present forms than the former is simply an effect of the differences between the German and English simple presents that obtain in general.

Chapter 8

Durational Adverbs

since- and *seit*-phrases, we said in our concluding remarks to the last section, have played a central part in arguing for and against different theories of the perfect, and more specifically for and against different theories of the perfects of English and German. Furthermore, *since*- and *seit*-phrases are often described as *durational* adverbials, because their denotations are always intervals, reaching from one time, given by the phrase or clause governed by *since* or *seit* to another time, which as we will argue later, is always the TPpt. (Thus, the use of *since*- and *seit*-phrases is subject to a presuppositional constraint on the phrase/clause governed by *since/seit*: it must denote a time preceding the TPpt. We will expand this point when we come to *since* and *seit* in Section 8.?.)

But *since*- and *seit*-phrases are not the only durational temporal adverbials. Another variety are phrases with the temporal preposition *for*, as in *for two hours*, *for the last ten minutes* and so on, and its German equivalents *zwei Stunden*, *zwei Stunden lang* or *die letzten zwei Stunden*. *for*-phrases too have played a role of some importance in discussions pertaining to the perfect, though they have been more prominent in relation to aspectual distinctions.

It is the *for*-phrases and their German counterparts that we will have a look at first. A trade mark of these phrases is that their nominal constituents – in English, the phrases governed by *for* – are *temporal measure phrases*. These phrases are quite different from the time-denoting phrases that were, or were part of, the temporal adverbials considered up to now, such as *today*, *yesterday*, *Wednesday*, *the first of January* and so on. So we start with a brief resumé of the form and denotational semantics of measure phrases, and of temporal measure phrases as a special subcategory of these.

8.1 Measure Phrases

Some temporal *for*-adverbials consist of the preposition *for* and DPs of a special sort, which we will refer to as (*temporal*) *Measure Phrases*. The lexical heads of temporal Measure phrases are nouns, and we will refer these as (*nominal*) *measure predicates*. Individual languages have more or less fixed lists of such predicates, many of them reflecting our habits of keeping time in terms of the movements of sun, moon and earth, or other, culturally fixed conventions such as the division of the day into 24 hours, the hour into 60 minutes, the year into twelve months or bundling of seven consecutive days into a week. Among the temporal measure predicates of English we find *second*, *minute*, *hour*, *month* as well as the astronomically based *day*, *week* and *year*, and the same is true of scores of languages that reflect the same cultural background. Furthermore the need for compact reference to very short and very long periods of time within the context of science and technology has added predicates like *nano-second* or *light year* to this core vocabulary. What all these nouns have in common is that they can be used not only as lexical heads of phrases that denote particular periods of time – as we find in *the last day before Christmas*, *the first three hours of each morning* etc. – but also as heads of phrases denoting *quantities* of time.

The notion of a quantity of time is directly connected with the possibility of measuring time. Our physical world being what it is, we have been able to develop ways of measuring periods of time, periods that reach from one ‘tick’ of some mechanical or differently functioning ‘clock’ to some other ‘tick’ of it. And this then also gives us ways of measuring the durations of things that happen in time, such as events and processes.

The basic principle of measuring time is counting ‘ticks’. The number of ticks of a clock between any two given ticks can be counted and that number gives us, at least in first approximation, the size of the temporal interval that contains that number of ticks: if one interval contains more ticks of a given clock than another, then that indicates that the first interval is longer than the second; if there are twice as many ticks in the first interval as there are in the second, then that means that the first is approximately twice as long as the second, and so on. And that in this way we get at an intrinsic property of temporal intervals, and not with the particular clock whose ticks we are counting, rests on the fact that the vast variety of physical processes that we can use as clocks, or of which the clocks we build make use, are *mutually periodical*. Two clocks *c1* and *c2* are *mutually periodical* when the following is the case: For any number *N* (no matter how large) there is a number *M*

such that if t_1 and t_2 are ticks of c_1 separated by N intermittent ticks, then the total number of ticks of c_2 between t_1 and t_2 is between $M-1$ and $M+1$ (and a parallel condition holds with the roles of c_1 and c_2 reversed). A vast number of periodical physical processes, including the rotation of the earth around its axle, the rotation of the earth and the other planets around the sun, the vibrations of molecules within the grids of crystalline materials and so on and so forth, are mutual periodical. So the results we obtain when we use any of these processes as clocks will be the same, except for some fixed constant, which relates the numbers of ticks of different clocks for the same periods. (For our clocks c_1 and c_2 this is the limit r of the ratio M/N when N goes to infinity.)

Our physical world has just one set of mutually periodical processes – there are also periodical processes that are not mutually periodical with any of the processes in this class, but these do not form an alternative class of mutually periodical processes of their own, offering an alternative way of measuring amounts of time with results that are inconsistent with those produced by using any of the processes in the first group. Moreover, there are all kinds of non-periodical processes whose systematic properties can be captured using the metric that is imposed by measurement using any of the clocks in our one large class of mutually periodical clocks. Historically the perhaps most famous of these is that a body on which no external forces are at work will move over equal distances in equal times: this is true when we use one of our ‘licensed’ clocks to measure the different periods of time which the body needs to travel the different parts of its path of motion, while using one of the established ways to measure the lengths of the distances covered during those periods.¹

In the world in which we live and in which the measure predicates of our language have their ‘true’ extensions, the extension E_P of each measure predicate P will consist of temporal intervals U_P that are all ‘of the same duration’ in the sense that the number of ticks performed by any proper clock between the beginning and end of any such interval U_P is approximately the same as it is for all other intervals in E_P . In particular, there will be a unique

¹ Formally, what this comes to can be described as follows: Time can be described as a *linearly ordered medium* $\mathcal{T} = \langle T, \prec \rangle$, consisting of a set T of temporal instants and a strict linear order \prec of T , which is order-isomorphic to the structure \mathcal{R} of the real numbers. In addition, the set \mathcal{I} of all intervals (t_1, t_2) of \mathcal{T} (with $t_1 \prec t_2$) forms an additive structure $\langle \mathcal{I}, + \rangle$ in which $+$ is an idempotent, commutative and associative operation with the property that whenever $t_1 \prec t_2 \prec t_3$, then $(t_1, t_2) + (t_2, t_3) = (t_1, t_3)$; and this structure is homomorphic to the additive structure of the positive part of \mathcal{R} .

homomorphisms that assigns to all members of E_P the number 1. This homomorphism can be said to ‘measure time in terms of the *unit defined by the predicate P*’. For an example consider the measure predicate *second*. The true extension of the noun *second* consists of all and only those temporal intervals whose duration is exactly one second. The homomorphism defined by P will assign to all these intervals the real number 1 and to every other interval the real number the amount of time it lasts as number of seconds. As indicated above, there is an obvious relation between the homomorphisms \Downarrow_{P_1} and \Downarrow_{P_2} defined by two measure predicates P_1 and P_2 : a fixed ratio r between the values that \Downarrow_{P_1} and \Downarrow_{P_2} take on the same intervals; for any interval (t_1, t_2) , $\Downarrow_{P_1}((t_1, t_2)) = r \cdot \Downarrow_{P_2}((t_1, t_2))$. For instance, when P_1 is the predicate *second* and P_2 the predicate *minute*, then $r = 60$.

As noted in the opening paragraph of this section, measure predicates can occur as lexical heads of two types of phrases, DPs that denote particular times, such as *the last hour they were together*, or *Measure Phrases* like *two hours* in a sentence like ‘the meeting lasted (for) two hours’. It is *Measure Phrases*, and the use of measure predicates as their nominal heads, that will be of immediate interest in what follows in this section.

When a measure predicate is the nominal head of a *Measure Phrase* it is typically preceded by a *Cardinal Adjectival Phrase*. Cardinal APs can consist of a single *cardinal expressions* in the narrow sense of this term: the simple and complex words *one, two, three, .. thirteen, ..twenty three, .. a hundred and twenty three, ..seven million five hundred seventy nine thousand eight hundred sixty one* and so on, and also numerical terms from various notation systems, such as *1, 2, 3, .., 13,.., 7.579.861, .., I, XXIII* etc.². But besides these Cardinal APs that denote particular cardinalities there are also those that impose some constraint on the cardinality of the sets falling under the NP in which the Cardinal AP is a constituent, such as *many, few, several, some, .., at most one, at least two, between five and seven, approximately*

² It isn’t quite clear whether the canonical terms that English makes available for the larger numbers (those for twenty and up) are to be considered single words or compound phrases. This doesn’t seem to us a particularly interesting question, and for those who do not see that the distinction between ‘words’ and multi-word phrases has any true linguistic significance at all it simply won’t be a meaningful question at all. What is important is that the canonical English terms we use to denote natural numbers form a system with its own morpho-semantic structure, which makes it possible to write a ‘grammar’ for it, which specifies for all but a finite number of the terms belonging to it how they can be formed and how their form determines their denotation. Whether the more complex terms are to be considered single words or complex multi-word phrases is then a question of at best secondary importance.

250, roughly five dozen, at least twenty and perhaps even as many as thirty – there is no obvious upper bound to the morphological complexity of such expressions. Furthermore, complex arithmetical terms can be used also as Cardinal APs (though speakers may be reluctant to do this unless there is a special reason for doing this rather than to ‘work out’ the complex term to obtain a canonical number term). An example: ‘This program has now been running for a whole week, that is seven times twenty four times sixty times sixty seconds, and it still hasn’t come up with an answer.’³

As noted earlier in this section, measure predicates can occur as lexical heads of two types of phrases, (i) DPs that denote particular times such as *the last hour they were together*, as in ‘She confessed that to him only during the last hour they were together.’ and (ii) Measure Phrases like *two hours* in sentences like *The meeting lasted (for) two hours.* or *the two hours it took me to read this book* in ‘The two hours it took me to read this book were a complete waste of time.’ Since it is the Measure Phrases that are of direct importance for what will follow in subsequent sections, it is on these that we will focus in what remains of the present section. The noun that acts as lexical head of a Measure Phrase is usually preceded by a Cardinal AP. That Measure Phrases can have the form of definite descriptions, as in the last example, suggests that those which are without an overt determiner should be analysed as indefinites. This assumption is also supported by the fact that singular Measure Phrases always have a determiner – you can say ‘It took me one hour’ or ‘It took me an hour”, but not ‘It took me hour.’ The absence of an overt indefinite determiner in plural Measure Phrases is then a special case of the absence of an overt determiner in plural indefinites generally, cf.

³ To repeat once more, this impressionistic overview of various forms that Cardinal APs can take is not meant as an exhaustive overview. Following up on the last footnote: Both for English Cardinal APs in the narrow sense – those which single out some particular cardinality – and for the broader class of such APs that also includes phrases like *at least two* or *several*, which only place some (possibly very weak) constraint on the cardinality of the sets satisfying the NPs of which they are part, a syntax module could and should be written, which identifies the set of English Cardinal APs and specifies for each of the expressions in this set the cardinality constraint it expresses by virtue of their morpho-syntactic structure and the lexical semantics of the expressions which the module treats as primitives. Like many before us we take it for granted that this can be done and leave it as an exercise to those who find such exercises amusing (which includes us, at times when we do not feel in the grip of challenges such as that of getting through the arguments of this essay). Ideally, a grammar module for temporal Measure Phrases, which denote sizes of temporal intervals, should be developed as a special case of Measure Phrases in general, which would also cover expressions like *15 Kilos, two and a half cm, 30 square feet, (a drop of) 20 degrees Celcius* and so on, which specify amounts of other magnitudes than time.

‘Children spilled into the playground’ or ‘Hours went by without anything happening.’

In what follows we will make use of only very simple temporal Measure Phrases in which the Cardinal APs are just simple number words like *two*, *three* and so forth. In view of that we could have spared ourselves our foray into the range of Cardinal APs; if we made that foray anyway, that has been only because we wanted to make it clear in what sense temporal Measure Phrases form a syntactic and semantic category of their own, that is distinct from other adverb or adverb-like expressions that have to do with time, and that it is important to be fully aware of this difference.

8.1.1 Measure Phrases as constituents of *for-* and *in-*Adverbials

Important for us are the semantic contributions that Measure Phrases can make to the sentences in which they are found. Awareness of this importance goes back to the early days of the Theory of Tense and Aspect as it is understood today, and specifically to Vendler’s characterization of his four aspectual classes Accomplishment, Achievement, Activity and State. Among the tests that Vendler formulates to identify a verb as belonging to one of the other of these classes is the so-called ‘*in an hour-for an hour*’ test: In simple clauses with simple tenses – in particular: the simple past – Accomplishment and Achievement verbs can be combined felicitously with phrases of the form ‘*in + Measure Phrase*, but Activity and State verbs cannot. Conversely, verbs of the latter two kinds go felicitously together with phrases of the form ‘*in + Measure Phrase*, while that is not true for phrases of the former two kinds. In the terms discussed in Section 3 of this essay, *in an hour*-adverbials go with those verbs whose lexical semantics takes the form of an inhomogeneous event description and not with those whose lexical semantics takes the form of a homogeneous event description, and *for an hour*-adverbials go with those verbs whose lexical semantics takes the form of a homogeneous event description and not with those whose lexical semantics takes the form of an inhomogeneous event description.

Here, repeating some of the points that have already been made in previous sections, some examples that illustrate these claims.

- (8.1) a. ✓ He was ill for three weeks.
 b. ✓ We walked for two hours.

- c. # He played the minuet for two hours.
- d. # He played the minuet for less than a minute.
- e. * He arrived for two hours.
- f. * She wrote the paper for two days.
- g. ?? He died for two hours.
- h. ✓ She wrote the paper in two days.
- i. ✓ He died in an hour.
- j. # He arrived in an hour.
- k. # He was ill in three weeks.
- l. # She walked in two hours.

On closer inspection the facts illustrated by these examples are more complicated than is suggested by the simple statement above (which reiterates what can be found in many writings on Aktionsart from the sixties onwards, including introductions to the subject that are still in use). (8.1.a) and (8.1.b) are surely acceptable; they can be used felicitously in natural, easily conceivable contexts, something corpus searches will readily confirm. But for (8.1.c) - (8.1.f) grammaticality assessment isn't nearly as straightforward. (8.1.c) is felicitous on an iterative reading, according to which the sentence says that the minuet was played over and over again during the indicated period of time. On the face of it this may look like a counterexample to the familiar principle, going back to ((Vendler 1967b)), that *for*-adverbials require homogeneous eventuality descriptions as inputs, for *play the minuet* seems a perfect example of an inhomogeneous description. But as argued – perceptively and for a considerable variety of cases – in ((Moens and Steedman 1988a)), this would be too hasty a conclusion. Rather, the fact that we only seem to get an iterative reading for the sentence is a confirmation of the principle: because the adverbial *for two hours* insists upon homogeneous input, the inhomogeneous description *play the minuet* needs to be coerced into a homogeneous one; coercion into an iterative interpretation is one of the options that are available as a matter of grammar, and in this particular instance we think of an iterative interpretation as coherent so long as we think that minuets take a lot less than two hours, which is pretty much the way the world is.

The matter is different in this last respect for (8.1.d); it is rare (if not unheard of) for a minuet to take less than a minute, and if we assume that this is not so for the minuet in question, then that rules out an iterative interpretation. So a legitimate interpretation of (8.1.d) must involve a different kind of coercion from an inhomogeneous to a homogeneous description.

The interpretation. So a legitimate interpretation of (8.1.d) must involve a different kind of inhomogeneous-to-homogeneous coercion that is compatible with these assumptions about the world, and the only coercion of this kind that seems possible is that which turns an accomplishment description into one of the corresponding preparatory process or activity. In English this transition is normally made explicit through the use of the progressive, and for some speakers (8.1.d) is unacceptable or at least suboptimal, in contrast with (8.1.c).

We have marked (8.1.e), in which the input to *for two hours* is an achievement description, with a star, since this sentence does not seem to have a coherent interpretation at all, not even an iterative one. This doesn't just seem to be a matter of real world possibility. Surely a scenario consisting of a succession of arrivals of the same person in the same place over a period two hours is somewhat bizarre. But that scenario is clearly the one described by the sentence 'He kept arriving for two hours.', and while a statement of this latter form would also strike us as somewhat odd – precisely because the scenario it describes is such an odd one – it is not in any sense ill-formed, or of dubious grammaticality, something that many native speakers seem to feel about (8.1.e). So (8.1.e) does seem to confirm Vendler's constraint on the use of *for*-adverbials; but it can appear this way only because in this case there is no coercion that would lead the interpretation out of the impasse caused by the violation of this principle.

A similar case is (8.1.f), which also seems unsalvageable. It is easy enough to think of the state of affairs that someone unfamiliar with the strictures of English grammar might want to describe with the help of this sentence: the writing went for two days, and then presumably it was done. But English doesn't allow for this. Coercing an accomplishment phrase into a description of its preparatory process is typically possible only when the transition is overtly marked by the progressive form. (Or, putting the same point in somewhat different terms, it is only the Progressive, manifested by the use of the progressive form, which is capable of triggering this transition.

An intriguing example is (8.1.g). *die* is often cited as a prototypical example of the class of achievement verbs. It is often useful in discussions of such verbs because it is something that – at least according to those who typically engage in such discussions – you can only do once. So iterative interpretations just aren't on for this verb. On the other hand it is an achievement verb that is quite happily used in the progressive, and progressive uses of the verb make good examples of the Imperfective Paradox: It seem quite possi-

ble to say things like ‘When I left the room he was dying, but amazingly he rallied and now he is fine again.’ But (8.1.g) is in the simple past and not in the past progressive; yet, if it means anything at all, it is that the process of dying is in progress. As far as we can tell, English speakers appear to be split on the question whether (8.1.g) is acceptable at all. But it appears that those for whom it is acceptable can only understand it as describing a process of dying that did lead to the actual death – no illustrations here of the Imperfective Paradox, which are provided by the corresponding sentence in the progressive form.

According to Vendler *in*-adverbials are subject to the opposite constraint; they do not go with atelic, homogeneous descriptions. In fact, the most straightforward use of an *in*-adverbial is with an accomplishment phrase like that in (8.1.h): writing the paper happened within a period of two days.⁴

But *in*-adverbials are like *for*-adverbials in that they often combine with eventuality descriptions that do not satisfy their basic constraint. Our first two examples of this in (8.1) are (8.1.i) and (8.1.j). Here the eventuality descriptions are achievements rather than accomplishments. The first, (8.1.i), is a perfect illustration of the kind of coërcion that ((Moens and Steedman 1988a)) describe as coërcion from ‘culmination’ to ‘culminated process’ (i.e. from achievement phrase to accomplishment phrase in the older Vendler terminology): the process that leads to the point-like event of the subject dying is incorporated into the eventuality complex (or ‘nucleus’) that the phrase is taken to describe as a result off the coërcion. So what (8.1.i) is understood to convey is that the dying as a whole, from the moment that process got properly under way till the ensuing death, took (no more than) two hours.

(8.1.j), which also involves an achievement description, is nevertheless different from (8.1.i); or at least it is for the scenario’s that most naturally come to mind. (8.1.j) is something that is quite naturally said by someone who was expecting the subject’s arrival and had to wait for (no more than) two hours for this to happen. So here it the ‘preparatory process’ that the coërcion includes as parti of the described eventuality complex is not a process that the subject had to engage in in order to bring the culmination – the arrival –

⁴ There is an additional effect, which we take to be of pragmatic origin, that the writing did not take considerably less than two days. This is an implicature that can quite easily be suspended, as for instance in a sentence like ‘Everyone who writes their paper within two days will get an extra bonus because of that. (But do not think you can pass just by handing in your paper early.)’.

about, but rather a period that separates that culmination from some earlier, independently identifiable time.

But *in*-adverbials are not only found in the company of relic event descriptions. In (8.1.k) and (8.1.l) an *in*-adverbial occurs together with a state and an activity description, respectively. The type of coercion involved in these examples is the one we already encountered in connection with English perfects of state descriptions, viz. the inchoative coercion which turns the description of a state or activity into the description of the event that marks its onset.

So much for the uses of *for*- and *in*-adverbials. What remains to be addressed is what these phrases exactly denote and how the measure phrases they contain contribute to those denotations. These questions will be addressed in the next two subsections.

8.2 The syntactic contexts of Measure Phrases and their semantics

There are quite a few syntactic configurations in which measure phrases can occur. A list (not guaranteed to be exhaustive) of such configurations is given in (8.2).

- (8.2) a. Two hours are a long time/are enough for this task.
 b. I have set aside two hours for this task.
 c. The task took me two hours.
 d. Two hours went by (before/until she appeared).
 e. It was two hours before/until she appeared.
 f. The task took me two hours longer than last week.
 g. The task took me two hours too long.
 h. The task took me longer than/as long as two hours.
 i. He arrived two hours later/earlier than announced.
 j. He arrived two hours later/earlier.
 k. He arrived two hours after/before she did.
 l. He arrived two minutes after three o'clock.
 m. He arrived at ten past five/ten after five.

- n. He finally arrived after two hours.
- o. We walked for two hours.
- p. The sheriff jailed Robin Hood for three years.

In the first four examples of this list the measure phrase *two hours* plays the syntactic part of an argument phrase to some verbal predicate, such as *be a long time/enough*, *set aside*, *take*, *go by*. ((8.2.e) should probably also be classified as an example of this kind, but this construction appears to be idiosyncratic, which makes classification a little more difficult.) Measure phrases can generally occur in such positions, witness sentences like ‘Two square yards (of this material) won’t suffice for a dress of this design.’ or ‘For this recipe you need 150 gram of wheat flour.’ These examples confirm the observation made in the previous section, according to which measure phrases can function as bona fide DPs.

Other occurrences of *two hours* in (8.2) that instantiate options which exist for measure phrases in general are those where they modify comparatives ((8.2.f)) or the comparative particle *too* ((8.2.g)) and also as complements of comparative and equative constructions ((8.2.h)).⁵

The occurrences of *two hours* in (8.2.i-n) are different from those preceding them in that here the temporal measure phrase is part of a temporal locating adverbial: the adverbial as a whole denotes a time and the measure phrase makes its contribution to the determination of that time. These contributions are possible because time is one-dimensional. For instance, it is possible to use the phrase *two hours* as part of the longer phrase *two hours later than announced* in (8.2.i) to refer to a time that is two hours after the time for which the arrival was announced: if *t* is the time announced for the arrival, than the time denoted by *two hours later than announced* is the time *t'* later than *t* such that the duration of the interval (*t, t'*) is two hours. In the phrase *two hours later* the role of *two hours* is similar; the only difference is that here the time *t* has to be recovered from the context. We see much the same in (8.2.k); even if *after* and *before* are not canonical forms of comparative adjectives they nevertheless function in the same way in (8.2.k) as *later* and *earlier* function in (8.2.i,j). (8.2.l,m) can be seen as illustrations of the same point. But they also exemplify some of the idiosyncrasies that are typical

⁵ Note that in (8.2.f) the direct object phrase is *two hours longer than last week* The role of *two hours* here is to modify *longer*, just as does *five inches* in ‘John is five inches taller than Mary. (8.2.g) is like this too; here the object phrase is *two hours too long*, with *two hours* modifying *too*.

of how we use language to refer to the ways that our culture has developed for keeping and thinking of time. *after two hours* in (8.2.n) is an example of a phrase within which the measure phrase constituent acts as complement to the ‘comparative’ *after*. In this respect this construction is like *longer than/as long as two hours* in (8.2.f) But the difference is that determining the denotation of *after two hours* requires the recovery of a time t ; the denotation is then, once again, the time t' such that two hours is the duration of (t, t') . In this latter regard *after two hours* is like *two hours later/earlier* in (8.2.j).

8.3 Measure Phrases in *for*-Adverbials

So far, the examples in (8.2) illustrate the diversity of uses for which temporal measure phrases allow in a language like English. But for the central concerns of this paper these different uses are of not much direct significance. This is different for the occurrences of measure phrases in *for*-adverbials, as shown in (8.2.o) and (8.2.p). In fact, it is only the *for*-phrase in (8.2.o) that really matters in what follows, but it is important that we clearly see the difference between it and the *for*-phrase of (8.2.p). The *for*-phrase of (8.2.o) serves to state the duration of the eventuality described by the relevant projection of the verb. In (8.2.p) that is not so. Here the phrase *for three years* describes the period of time that Robin Hood was meant to remain in jail from the time when the sheriff put him there.⁶ That (8.2.p) has such a reading can be seen as a clear indication of the selectional restrictions of temporal *for*: *for*-adverbials require that their input must be something like imperfective, homogeneous or atelic – a property that is satisfied by the eventuality description provided by *walk* but not by *jail Robin Hood*. This restriction means that a sentence like (8.2.p) would be uninterpretable if it didn’t allow for some form of event-to-state coercion.

That a sentence like (8.2.p) does allow for the kind of coercion it permits doesn’t follow from this, however – in principle the sentence could also have been simply ungrammatical. A comparison with German is instructive in this connection. The German translations of sentences (8.2.o) and (8.2.p)

⁶ There has been much argument over whether (8.2.p) says that it was the intention of the sheriff, or of those on whose orders he acted, that Robin Hood spend three years in jail, or whether the sentence can also be true if Robin remained in jail for three years even though that wasn’t anybody’s intention at the time of his being jailed. The jury still seems to be out on this one.

are those in (8.3.a) and (8.3.b).

- (8.3) a. Wir gingen zwei Stunden (lang).
 b. Der Schulze sperrte Robin Hood für drei Jahre ins Gefängnis.

Note the difference between the translation *zwei Stunden* (or alternatively *zwei Stunden lang*) of *for two hours* in (8.3.a) and the translation *für drei Jahre* of *for three years* in (8.3.b). This indicates that temporal *für* is used exclusively in the prospective sense illustrated by the *for* of (8.2.p), whereas the German equivalents of the *for* in (8.2.o) are (i) a plain measure DP and (ii) a phrase of a form not yet encountered in this discussion, in which a measure phrase modifies the *positive* form of an adjective. (More about these presently.) The fact that the *for*'s of (8.2.o) and (8.2.p) have these quite different counterparts in German could be taken as suggesting that there are really two distinct lexical items that happen to coincide in form, or that there is a single item which is ambiguous in the sense that its contribution varies depending on the input representation on which a *for*-adverbial operates: When the input is homogeneous, then the *for*-adverbial denotes its duration; if the input is telic⁷, then the *for*-adverbial expresses the prospected duration of its target states. But as so often, the question whether the correct way to describe that case as one involving ambiguity – with the context provided by the eventuality description with which a given *for*-adverbial combines which reading of *for* is intended – or as one involving coercion – when the eventuality description is homogeneous, the *for*-adverbial can be applied directly; if not, then coercion to a different interpretation of the *for*-adverbial is activated – is not easy to decide.

The two translations for *for two hours* in (8.3.a) deserve a quick look in their own right. Expressions of the form μ *lang*, where μ is a measure phrase, have no direct equivalents in English. This fact is a special case of a more general phenomenon, viz. that German tolerates the combination of a measure phrases and the positive form of an adjective for more adjectives than English, where this combination is restricted to so-called ‘dimensional’ adjectives, like *tall*, *wide*, *deep*. German allows for the combination also for, for example, the adjective *groß* (Engl. ‘big’), as in *Das Grundstück ist 400 m² groß*. (‘The lot is 400 m².’), or with *schwer* (Engl. ‘heavy’), as in *ein 3000 Kg. schweres Fahrzeug* (literally: ‘a 3000 kg. heavy vehicle’; transl. ‘a vehicle weighing three thousand kilograms.) Why German and English differ

⁷ In using the terms *homogeneous* and *telic* in this sentence, we are running ahead of the argument: We promised to address the question exactly what *for*-adverbials select for but haven’t done so. The matter will be put right presently.

in this regard and exactly how they differ we do not know.

The possibility of translating *for two hours* in (8.3.a) as the DP *zwei Stunden* illustrates another difference between English and German. We already saw that English measure phrases can occur as arguments of verbal predicates (cf. the sentences (8.2.a-d)). But German also permits phrases in configurations illustrated for temporal phrases by (8.3.a) and for spatial measure phrases by a sentence like ‘Wir fahren 10 Kilometer.’ (‘We drove (for) 10 Kilometers’.) Here too English speakers seem to have a preference for the version with *for*, though the version without *for* is generally accepted as well. In German the sentence as it stands is the only short way to say what it says. In this case too we have no insightful way of describing the difference. We note that it exists, but also that the distinction is orthogonal to our concerns.

We still owe an answer to a question that is closer to the concerns of this essay. This is the question what kind of eventuality descriptions English temporal *for*-phrases select for (on the assumption, already made, that occurrences like that in (8.2.p) are treated as cases involving coercion). We noted earlier that this selection restriction is to ‘something like imperfective, homogeneous or atelic’. But which of these is it? Some indication is provided by (8.2.o). The input to *for two hours*, provided by the non-progressive form of the verb *walk*, is, on the treatment we have adopted in Section 4, an event description, and thus, according to the terminology we have accepted, not one that qualifies as imperfective. So the answer cannot be that it is *just* the imperfective inputs in our sense that temporal *for*-adverbials select for. On the other hand, state descriptions – i.e. imperfective descriptions in our terms – are also within the selection range of *for*-adverbials. This is shown by the sentences in (8.4).

- (8.4) a. Fritz was ill for two weeks.
 b. We were walking for two hours.
 c. We had been walking for two hours.

(8.4.a) is a fully unproblematic use of a *for*-adverbial as applying to a state description. (8.4.b) is also accepted by most speakers. If it seems a little unnatural, that is probably because the past progressive suggests on the one hand that one is talking about what is going at some independently established past time while on the other hand the phrase *for two hours* suggests that we are talking about a ‘closed bout’ of walking, the upper bound of which is located in the future of that time. In fact, this sense of discomfort disappears when the tense is made into a perfect, as in (8.4.c). We will have

more to say about sentences like (8.4.c) shortly.

The upshot of our discussion so far is that *for*-adverbials allow on the one hand for homogeneous event descriptions like that of (8.2.o) and on the other for imperfective inputs like those in (8.4.a-c). We can unify these two possibilities by observing that state descriptions are homogeneous by the characterisation of homogeneity given in Section 3. But a proper implementation of the selection restrictions of *for*-adverbials would nevertheless require that homogeneous event descriptions such as that provided by the verb *walk* be marked as homogeneous in the lexicon, and that this information carries over to sentence representations when occurrences of homogeneous event verbs are replaced by their lexical semantics.

The remaining question is then, what happens when the input representation to a *for*-adverbial does not satisfy these selection restrictions. We have seen only one example of this so far, viz. in (8.2.p). Here the intention-related interpretation that speakers get is facilitated by two factors: (i) the subject is an agent, and (ii) the event description that serves as input to the *for*-adverbial *for three years* has a (lexically based) target state. In fact, the conditions that must be in place in order for such an interpretation to be possible are quite restrictive, and we do not pretend to have a clear exactly what is involved in them. The sentences in (8.5) are meant as an indication of some of the difficulties that a precise statement of these conditions would have to cope with.

- (8.5) a. Fritz went to Paris for two weeks.
 b. (?) Fritz arrived in Paris for two weeks.
 c. ?? Fritz drove to Paris for two weeks.
 d. ?? Fritz went to Paris. He arrived for two weeks.

The only difference between (8.5.a) and (8.5.c) is that the first uses the ‘neutral’ motion verb *go*, whereas the verb *drive* in the second sentence includes a specific manner of motion. The result of both event descriptions is that Fritz is in Paris, but apparently by itself isn’t quite good enough for the intention-related interpretation to come off. Even more curious is the difference between (8.5.b) and (8.5.d). (8.5.b) seems (near to?) perfect. But (8.5.d), in which the second sentence is naturally understood as referring to Fritz’s arrival in Paris, as part of the event described in the first sentence, seems hardly compatible with the adverbial *for two weeks* even so.

We leave the selection conditions of the intention-related back-up to the use of temporal *for*-adverbials as an unsolved problem. It is our impression that telicity is one of the prerequisites, but it is only one, and making telicity the trigger for this particular kind of event-to-state coercion as part of the interpretation of *for*-adverbials is a way of sweeping the true complexity of this problem under the rug.

8.4 *for*-Adverbials in combination with Perfects

The sentences in (8.6) all illustrate the first main point of this section: *for*-adverbials in perfect sentences always modify the eventuality description that serves as input to the perfect operator, and not to the result state description that is the operator's output.

- (8.6) a. Fritz has been ill for two weeks.
 b. We had been walking for two hours, when we came to a deserted mill.
 c. I have jailed Robin Hood for three years.

In (8.6.a) it is the state of Fritz being ill that went on for two weeks, not the state that resulted from his having been ill (whatever that could have meant). Likewise, the main clause of (8.6.b) speaks of a two hour bit of walking, and not of some two-hour period following it. And perhaps the most telling case is (8.6.c). Think of this as an utterance made by the sheriff of the story. What it conveys is clearly that the event of putting Robin Hood in jail took place at some time before the utterance time and that the jailing was with the intent that he stay there for the three years to come. Even though the output of the perfect operator would have been a state description and thus in accordance with the selection restriction of *for*-adverbials, *for three years* cannot apply to this result state description, and the only way out is the intention-related interpretation, just as in (8.2.p).⁸

⁸ There is a further aspect of this example that deserves at least a passing notice. (8.6.c) is something that the sheriff might have said shortly after having put Robin Hood in jail, and in the conviction that he is still in there, doing the first bit of his three year stint. If he knew that Robin had already escaped, then (8.6.c) would have been an odd an inappropriate thing to say, or a bit of bluffing to cover up for the fact that the prisoner had turned into a fugitive. And if it was known to everybody that Robin Hood was far away

The evidence provided by the sentences in (8.6) could easily be amplified, but it is conclusive as it stands: sentence-final occurrences of *for*-adverbials in sentences with perfect tense morphology can only be understood as selecting as inputs representations that have not yet been transformed by the perfect operator. Given the assumptions we have been making about the syntax-semantics interface, this means that such *for*-adverbials must intervene between AspP and PerfP. We will assume that they do this by adjoining to AspP, leaving the pros and cons of such a decision to Section 9.

When *for*-adverbials occur in sentence-initial position the facts are more complicated, as illustrated by the sentences in (8.7).

- (8.7) a. For two weeks Fritz has been ill.
 b. ? For two hours we had been walking at a steady pace, when we came to a deserted mill.
 c. For three years (now) I have been jailing Robin Hood. (But the scoundrel keeps escaping.)

In (8.7.a) the only possible interpretation is one according to which two hours is the duration of Fritz's illness. (There is however, a difference between this sentence and (8.6.a). In (8.6.a) the two week period of Fritz being ill may abut the utterance time *n* or it may be fully situated in the past (in the sense that Fritz has recovered before *n*). But only the first of these options seems available for (8.7.a).⁹ It is an interesting question, however, and one the central importance of which we will come to see more clearly as we proceed further, exactly what this assessment of what *for two weeks* precisely does

and safe and sound, then for the sheriff to utter (8.6.c) would have been ridiculous. In other words, (8.6.c) is felicitous only for so long as the target state of the event described as an instance of 'jail Robin Hood' has not been terminated. This observation is reminiscent of what we observed in Section 4 about perfects of event descriptions with associated target state descriptions: It is strange to say 'The sheriff has jailed Robin Hood.' at a time when Robin Hood is no longer in jail. But it seems that the oddity is reinforced in the case of a sentence like (8.6.c). When that sentence is uttered at a time before the mentioned three years are over, and Robin is in jail no longer at that time, then it is, you might say, in double jeopardy: Robin Hood is no longer in jail, so a target state no longer obtains, and the jailer's intention – that he be in there for three years – has thus been thwarted.

⁹ Under special conditions the second interpretation may be available for (8.7.a) too. But for (8.7.a) this interpretation is highly marked and it requires a special intonation when the sentence is spoken, indicating that *for two weeks* plays the part of a contrastive focus. Such cases should probably be seen as involving a special kind of fronting movement, which is due to information-structural forces and to be distinguished sharply from types of movement that are triggered by syntactic factors. Once more we must refer the reader to Section 9.

in this sentence. It modifies, we just said, the state of Fritz being ill. But recall the analysis we proposed in Section 4 for those uses of the perfect of which (8.7.a) is presumably an instance – those according to which applying the perfect to a state description triggers inchoative state-to-event coercion, with the effect that the input and output description of the perfect operation are de facto descriptions of the same state. In the light of that proposal we could, it would seem, just as well describe the contribution of *for two weeks* in (8.7.a) as indicating the duration of the perfect’s output representation. This point is connected with an observation we made when discussing inchoative state-to-event coercion in Section 4, viz. that these coercions seem to require the support of some kind of adverb. [Add this to the discussion in Section 4!]. There we left the question which adverbs enable inchoative coercion and through what kind of link to the perfect operator that (on our view) needs a state-to-event coercion. At this point we cannot do more than remind ourselves that this question is still unsolved, while noting that *for*-adverbials are among the adverbs are among the enablers, and that their position in the sentence has something to do with it. So the upshot of this paragraph is that of adding a more specific instance to a problem that we set aside for further consideration later and that we are setting aside for later once again.

(8.7.b) gets essentially the same interpretation as (8.6.b), but the fronted position of the *for*-adverbial is awkward here, even if the sentence should perhaps not be dismissed as plain ungrammatical. (Why (8.6.b) is awkward, while (8.6.a) is not, we do not know. The reason may be independent of anything that is directly relevant to the interaction between adverbs and perfects.) (8.7.c) presents an interesting addition to the case presented by (8.7.a). Here, an additional coercion is involved, which reinterprets the event description ‘(I) jail Robin Hood’ as the description of an iterative state – that of the subject jailing Robin Hood again and again. If our approach involving inchoative coercion is right, then it is to this state description which will then be made to coincide with the description of its own result state in the way that inchoative coercion does, that *for three years* is applied. On this view *for three years* is involved in the triggering of two coercions: (i) event-to-state coercion that turns the representation provided by the VP into an iterative state description; and (ii) inchoative state-to-event coercion which turns the iterative state description into the description of the ‘initiating event’ of that state (with the effect that the state description itself comes to coincide with the description of the result state of that event). Exactly what mechanisms are responsible for this double coercion is something that we still have to address.

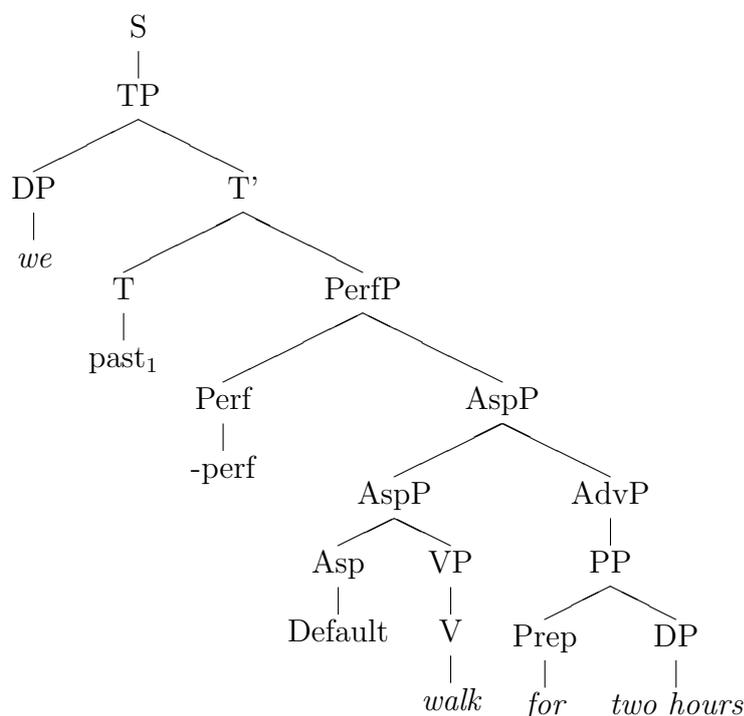
8.5 Representation constructions for some sentences with perfects and *for*-adverbials

In order to keep track of the formal implications of the observations we have made about *for*-adverbials we do well to dig once again into the details of semantic representation construction.

The first matter this requires us to look into is how *for*-adverbials enter into the syntactic structure of the sentences for which we are going to construct semantic representations. As we have said repeatedly, and again in this section, this is really a topic for Section 9, but we cannot wait this long and so will have at least a preliminary discussion of the matter here.

In our first examples of sentences with perfects and *for*-adverbials, those of (8.6), the adverbial is sentence-final. These are also the sentences with readings that unequivocally tell us that what the adverbial operates on is (what would in their absence have been) the input representation to *perf* and not its output representation. One way in which this result can be secured is by assuming that clause-final *for*-adverbials are adjoined to AspP. (Whether that is a viable analysis is a question to which we will return in Section 9.) For sentence (8.6.a), our first target in this section, this leads to the syntactic representation in (8.8).

(8.8)



Should we assume that adjunction to AspP is the only way in which clause-final *for*-adverbials can become part of the clause structure? probably not. One piece of evidence is provided by the sentence in (8.9.a). This sentence has the same semantics as its alternative version in (8.7.c), repeated as (8.9.b), where the adverbial is in clause-initial position.

- (8.9) a. I have been jailing Robin Hood for three years. (But the scoundrel keeps escaping.)
- b. For three years I have been jailing Robin Hood. (But the scoundrel keeps escaping.)
- c. For three years I have been jailing Robin Hood for life. (But the scoundrel keeps escaping.)

One of the readings of (8.9.a) is that of (8.9.b): during the three year period reaching up to and including the utterance time during the speaker has been jailing Robin Hood. And in addition it has a further reading, according to which there has been a past period during which the speaker was repeatedly jailing Robin Hood with the intent that he spend three years in jail. (This second reading is more easily available when a sentence-initial adverb modifies the jailing eventuality, as in (8.9.c), which only has the interpretation that during the three year period leading up to n the speaker has repeatedly

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put Robin Hood in jail with a life sentence; it is arguable that for (8.9.a) this second reading is not fully acceptable, but we do not think it is definitely out.) Given what we have said about the effect of applying *for*-adverbials to event description with target states, the second reading is what we would expect for (8.9.a) if *for three years* is an adjunct to AspP. The other reading, which (8.9.a) shares with (8.9.b), requires a different syntactic configuration, in which the *for*-adverbial is attached in a higher position. We will argue below that this position is the same for the sentence-final adverb of (8.9.a) and for the sentence-initial adverb of (8.9.b). The AspP-adjunct position shown in (8.2) is, we will argue, accessible to clause-final but not to clause-initial adverbs.

For now let us assume that the high attachment option that is available to the adverbs of both (8.9.a) and (8.9.b) is the position that has been assumed in earlier sections for all occurrences of (sentence-initial temporal adverbs, viz. as adjuncts to TP. This gives us two syntactic analyses for (8.6.a) of which (8.7) is one. One of the things to be demonstrated in this section is that in the case of (8.6.a) both of these analyses yield the same semantics, viz. that Fritz went through a bout of illness that lasted for three weeks.

Computing the semantics of (8.6.a) from the structure in (8.8) is the simpler part of this task. But both computations require that we make explicit what semantic contribution is made by the temporal preposition *for*. So we need a lexical entry for *for*.

There are several questions that we must address in deciding on the form and content of this entry. First, we have not so far concerned ourselves with lexical entries for prepositions. One of the sentences for which we have presented representation constructions did contain a preposition – viz. (6.4), which has an occurrence of *at*, as part of the PP *at five*. But there we treated *at five* as an adverb that locates the eventuality presented by its adjunction site at the time which we assumed to be denoted by the DP *five* governed by *at* without going into the details of how this works (see (6.4.a,b)). Since it is the details of the interaction of the perfect with the *for*-adverbial that is the central issue of the representation constructions in this sentence we cannot be that cavalier this time. Part of the story that needs telling is exactly what positive contributions are made by the *for*-adverbial and also what constraints it imposes. And both of these come from the governing preposition.

The basic semantic insight about prepositions in general is that they denote binary relations, between a ‘referential’ and a ‘non-referential’ argument.

The non-referential argument is provided by the DP that is governed by the preposition. The referential argument comes from elsewhere. If we assume, as we have so far, that PPs enter sentences as adjuncts, then the referential argument of a preposition is provided by its adjunction site (more accurately: by the adjunction site of the PP it heads). In the cases relevant to this paper the semantic representation of the adjunction sites are always eventuality descriptions and it is the described eventuality that serves as referential argument for the preposition. The non-referential argument of a temporal preposition can be either a time, as in *at five*, an event, as in *during the war*, or an amount of time, as in *for two weeks*.

The lexical entry for temporal *for* that captures these intuitions should describe the preposition *for* as having a referential argument *e* and a non-referential argument *d*. The selection restrictions require *e* to be an event and *d* an amount of time. The semantics of temporal *for* is to the effect that *d* is the amount of time that takes, or the ‘duration’ of *e*, in the terminology of (Kamp and Reyle 1993). To express this relation in our representation formalism we need a new primitive. We introduce for this purpose a functor symbol ‘Dur’, which denotes the function that maps intervals of time on their temporal ‘sizes’, and eventualities on the sizes of the temporal intervals they occupy. (Note well: Dur should be distinguished from the functor *dur* from (Kamp and Reyle 1993) that maps eventualities on the temporal intervals occupied by them. If *ev* is an eventuality, then Dur(*ev*) comes to the same as Dur(*dur*(*ev*)).)

A format for the lexical entries of prepositions that does justice to these observations while following the pattern of our earlier lexical entries as closely as possible can be obtained by adapting the entry for the intransitive verb *walk* given in (3.9). A first stab at an entry for temporal *for* stated in this format is given in (8.10).

	for (prep. (temp.))	DP(oblique)
(8.10)a.	e	d

b. $\left\langle e \mid \boxed{\text{Dur}(e) = d} \right\rangle$

But (8.10) is not much more than a skeleton that has to be fleshed out with additional specifications that are needed in connection with the representation

construction for (8.6.a) and other sentences with *for*-adverbials. Missing from (8.10) are (i) the selection restrictions imposed by temporal *for*-adverbials and (ii) the back-up strategies that can come into action when these selection restrictions are not met. We have touched on some of this information already in Sections 8.3 and 8.4. But at this point we need to be more precise than we so far have been. And that will require us to back up. The back up is important and extensive enough to deserve its own subsection.

8.5.1 The constraints *for*-adverbials impose and the contributions they make

As we already noted, *for*-adverbials have played a prominent part in the history of the theory of aspect as indicators of Aktionsart: *for*-adverbials go with ‘atelic’ verbs or verb projections (in traditional parlance: states and activities) but not with ‘telic’ verbs or projections (traditionally: accomplishments and achievements), where their counterparts, the temporal *in*-adverbials, go with the ‘telic’ but not with the ‘atelic’ verbs or verb projections. We have used the scare quotes around ‘telic’ and ‘atelic’ here, since it is not immediately clear what the right aspectual opposition is involved here – recall our discussion of the most prominent oppositions – perfective-imperfective, homogeneous-inhomogeneous and telic-atelic – from the tense-and-aspect literature in Section 3.5. We also hedged in talking about ‘verbs or verb projections’, but that hedge is easily removed, provided we independently motivate the attachment points for *for*-adverbials. Once it has been established where the adverbial enters into the structure, it is on the semantic representation of the syntactic structure that it combines with at that point that the adverbial imposes its constraint.

But that leaves the exact nature of this constraint. The following sentences – most of them repeats – indicate what the constraint is and also what can happen when the representation on which it is imposed does not satisfy it outright.

- (8.11)a. We walked for two hours.
 b. Fritz was ill for two weeks.
 c. He knocked for half a minute before gingerly opening the door.
 d. We were walking for two hours.
 e. We had been walking for two hours.

- f. The sheriff jailed Robin Hood for three years.
- g. Fritz went to Paris for two weeks.
- h. (?) Fritz arrived in Paris for two weeks.
- i. ?? Fritz drove to Paris for two weeks.
- j. ?? Fritz went to Paris. He arrived for two weeks.
- k. Fritz has been ill for two weeks.
- l. We had walked/been walking for two hours, when we came to a deserted mill.
- m. I have jailed Robin Hood for three years.
- n. I have been jailing Robin Hood for three years.

As we already noted, the very first of these sentences, (8.11.a), contains an important clue: Given our earlier commitments, the selection constraint a temporal *for*-adverbial imposes on the representation with which it is to combine cannot simply imperfectivity, for that means that this representation should be a state description, which in (8.11.a) it isn't. That is, if we take for *walk* the lexical entry (3.9) in Section 3.4 and assume, as we have done for (8.6.a) in (8.8), a syntactic structure in which *for two hours* is adjoined to AspP, then its constraint applies to the lower AspP representation. In this case that representation is the same as that of the verb, and according to the *walk*-entry that is an event description.

We already noted that *for*-adverbials also accept state descriptions like that in (8.11.b) and that these two options can be 'unified' by adopting that state descriptions (that is 'imperfective descriptions', in our terminology) are classified as a subclass of the homogeneous descriptions. But in order that semantic representation construction functions the way it should, something else is needed as well. We must now recognise 'homogeneity' as a formal feature in its own right. And it is one that cannot be expressed by in our formal system as it stands. Note in this connection that we cannot identify the homogeneousness of lexical event verbs with their not being target state verbs. The non-target state verb *walk* is homogeneous, but the 'semelfactive' verb *knock* is not. That it isn't (at least not in the sense that is relevant in connection with the selection restrictions of temporal *for*-adverbials) is shown by (8.11.c). This sentence can only be understood as saying that repeated knocking went on for 30 seconds. If we assume that the lexical entry of *knock* specifies it as describing events that consist of a single knock, then the combination with *for half a minute* in (8.11.c) involves coercion from

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the AspP representation with which *for half a minute* is trying to combine – the description of a ‘single knock’ event coming straight from *knock*’s lexical entry – into the description of an iteration of such events. (We assume that such iteration descriptions can be analysed as descriptions of ‘iterative states’; for more see Section 10 [on **quantification**].)

The simplest way to fill this gap in our notation is to introduce a new type of feature, with two values, +hom and -hom. The task of this ‘feature’ is to distinguish between homogeneous and non-homogeneous event descriptions. Its role is thus comparable to the distinction between events and states as that distinction functions within the syntax-semantics interface we have been developing as we have proceeded. Since the distinction between +hom and -hom is not associated with any one type of functional head, we cannot treat the homogeneity feature as a feature function in the sense of feature logic, as described in Section 3.6.3. Rather, what is involved is a kind of sortal distinction, between ‘homogeneous’ and ‘inhomogeneous’ events. It is somewhat questionable whether it is right to speak of a ‘sortal’ distinction between token events in this case, since arguably it is only as an instance of a homogeneous or inhomogeneous event description that an event qualifies as ‘homogeneous’ or ‘inhomogeneous’; in other words, it is really the event descriptions or types that the distinction applies. This should be kept in mind in connection with the way in which we will express the distinction formally, viz. by adding the subscripts $+_{hom}$ and $-_{hom}$ to the occurrence of a discourse referent e in the store of representation that functions as a description of e : the distinguishing subscript appears on a discourse referent e that stands for token events; but it is *as the target of the description* that e bears the subscript, and it is really to the description as a whole that the subscripts should be seen to apply.

The discussion above has already fixed the distribution of the subscripts $+_{hom}$ and $-_{hom}$ to a large extent: all telic event descriptions (i.e. descriptions of events with specified target states) get the value -hom, and all state descriptions get the value +hom. (Since *all* state descriptions get the value +hom, there is no need to display this subscript on the state discourse referents of such descriptions. It may be assumed to be there by default anyway.) The as yet undecided cases are atelic event descriptions (i.e. event descriptions without specified target states). Some of these, including in particular the lexical semantic representations of certain non-target state event verbs, such as *walk*, should get the value +hom; but others, including the lexical semantic representation of a verb like *knock*, should not. Exactly which non-target-state event verbs should be treated as homogeneous and which as

inhomogeneous is a question that will have to be decided on an individual basis.¹⁰ It is here that diagnostics such as the ‘*for a hour-in an hour* test’ can be brought into play. Another question is what can happen to $+_{hom}$ and $-_{hom}$ when event descriptions are modified in the course of the computation of semantic representations of higher verb projections. This too is something that would have to be spelled out carefully and in detail. We do not tackle this task here in full. But we will have to return to certain aspects of the issue below.

The second matter about temporal *for*-adverbials that needs to be settled is what happens when the ‘input representation’ to a *for*-adverbial does not match its selection restriction. The examples that we have so far considered show two types of coercion. The second, illustrated by (8.11.c), is coercion of a kind that is reminiscent of other event-to-state coercions we looked at earlier, in connection with the progressive and the perfect: the input representation, and event description with the feature $-_{hom}$, is changed into the description of a state made of iterations of events described by the input representation, and it is to this new representation with which the *for*-adverbial is then combined. The other type of coercion is illustrated by (8.11.f,g) and (8.11.m,n). This is coercion of a sort that is different from all others thus far considered. It does not change the input representation into the description of a different type of eventuality but rather adds a new component to the input representation, which represents the agent’s (or possible somebody else’s) intention that the target state mentioned in the input representation hold for the amount of time specified by the adverbial. (Thus, in (8.11.f) the representation associated with the lower AspP – an event description with specification of a target state that comes from the semantic representation of the target state verb *jail*, and which thus carries the HOM value $-_{hom}$ – gets amplified through addition of a component that the sheriff intend that the state that results from his jailing Robn Hood (i.e. the state of Robin Hood being in jail) last for three years. But the result of this modification is still the description of an event of Robin Hood being jailed by the sheriff.)

One of the effects of these coercion operations is that they transform the input description from one with the value $-_{hom}$ into one in which the adverb is applied to an eventuality description with value $+_{hom}$. For the two cases just discussed this follows from the general stipulation that state descriptions always carry this value. But are these the only two types of coercion that

¹⁰ The lexical verbs that should get $+_{hom}$ are those that are identified as ‘activity verbs’ in Aktionsart classifications like Vendler’s.

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can be triggered by *for*-adverbials? That depends in part on how we define the ‘type’ of the second coercion, which transforms the description of a single knocking event into the description of a state made up of several knocking events. The given coercion is a transformation we said of a description of single knock events into a description of an ‘iterative state’ made up of a sequence of such events. There are other cases of event-to-state coercion triggered by *for*-adverbials that are reminiscent of this case. Some examples are those in (8.12).

- (8.12)a. The neighbours’ daughter played ‘Für Elise’ for two hours last night.
- b. The neighbours’ daughter played the Hammerklavier Sonata for ten minutes this morning.
- c. Fritz smoked for five years.
- d. He attended Opening Night of the Proms for four decades.

In (8.12.a) what went on for two hours may have been repeated events of playing ‘Für Elise’. But it could also have been an endless string of events consisting of fragments of ‘Für Elise’ in a heroic and embittered struggle with the score. And (8.12.b) can, given the length of the piece, only mean that the neighbours’ daughter played some part of it, or perhaps a sequence of some even shorter parts. The natural interpretation of (8.12.c) is that Fritz was a smoker for five years (and not that Fritz was involved in a smoke – of some very long cigar, say – that went on for five years). And (8.12.d) says that Fritz attended 40 Opening Nights, not just one. All four interpretations involve some kind of iteration of the kind of event described by the input representation or a disposition or propensity to perform events of this kind. The distinctions between these respective meaning changes are subtle. But they have had a good deal in both the linguistic and the philosophical literature. [References!] Doing justice to the different cases distinguished would require a matching differentiation between coercion operations here. But this is a difficult task and since it is one that is not directly relevant to what we are primarily after, we leave it.

Can *for*-adverbials trigger other than coercions belonging to this conglomerate of iterative, dispositional and generic transformations of event descriptions and the intention-related event descriptions illustrated by sentences like (8.11.f)? We are not sure, but these are the only ones of which we are aware. Another question is which coercions are triggered by which *for*-adverbials for which input representations. We already that intention-related coercion is

quite restricted, something illustrated by the contrast between (8.11.g) and (8.11.h,i,j). Another interesting case is (8.11.n). This sentence has two interpretations, one according to which the speaker has been jailing Robin Hood for some unspecified time but where each jailing event was with the intention that Robin Hood remain in jail for three years, and one according to which the speaker has been engaged for a period of three years leading up to the utterance time in putting Robin Hood in jail, but where nothing is said about how much time he was supposed to be doing on any of the jailings involved. These are questions about *for*-triggered coercions that we must leave as well.

The effect of combining a *for*-adverbial with its ‘input representation’, – either the one provided directly by the node with which it combines or the one resulting from coercion – is that a certain eventuality is asserted to have the duration specified by the adverbial; and the eventuality of which this duration is predicated will always be an instance of a homogeneous description. And that is a potential problem. For suppose that E is a homogeneous eventuality description and that a *for*-adverbial *for* δ is applied to it as part of the interpretation of a simple sentence, to the effect that there is an instance e of E that lasted for δ amount of time. Which of the possible instances of E could e be? The reason why we raise this question is that, as we defined homogeneity in Section 3, if e is an instance of a homogeneous event description E and e' is a proper part of e, with a shorter duration, then e' will also be an instance of E. And this looks like it may trivialise the truth conditions of sentences with *for*-adverbials. For clearer focus on the problem consider sentence (8.11.a), repeated one more time as (8.13.a).

(8.13)a. We walked for two hours.

b. $\left\langle e \mid \boxed{\text{Dur}(e) = d} \right\rangle$

c. We walked for one hour.

Suppose that the event description in (8.13.b), which is contributed by the lexical entry for *walk* and which will be passed on unchanged to the lower AspP node, is instantiated, in some model M , in some world w , by an event e , that the duration of e in w in M is two hours – i.e. that the duration function dur_M of M maps e onto the quantity of time denoted by *two hours* – and that e precedes some time t_0 . Consider the first half e' of e . That will be an event instantiating (8.13.b), it will be part of w in M and it will have a duration in M in w of one hour and it will also precede t_0 . This consideration seems to be fully general, applying to arbitrary models and worlds:

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any world of any model that has an instance e of (8.13.b) preceding some time t_0 and lasting two hours will also have an event instance e' of (8.13.b) preceding that same time t_0 and lasting one hour.

This generality would seem to suggest that (8.13.a) must logically entail (8.13.c). For suppose that (8.13.a) is uttered in some world w of some model M at some time t_0 and that this utterance is true. Then there must be some event e preceding t_0 which instantiates the event description in (8.13.b) and has the duration of two hours. But then t_0 must also be preceded in w by an instance of (8.13.b) lasting one hour. So an utterance of (8.13.c) in w would be true as well.

The claim that (8.13.a) logically entails (8.13.c) in this sense may have a ring of plausibility to it, but that may be due to a somewhat abstract way in which the claim has been stated and perhaps also to a certain ambivalence in the meaning we associate with the phrases *for two hours* and *for one hour*: we may be prepared to understand these as saying that a certain event or state lasted for *at least* two hours, or *at least* one hour, respectively. We can easily control for this second factor by making explicit that the *at least* options are not intended, viz. by changing to the *for*-adverbials *for exactly two hours/one hour*. And we may eliminate some of the abstractness of the claim by forming a conditional out of its premise and conclusion, as in (8.14.a), and replacing the original claim by the claim whether this conditional is logically valid (i.e. true on purely logical or linguistic grounds).

- (8.14)a. If we walked for exactly two hours, then we walked for exactly one hour.
- b. If we walked for exactly two hours, then we did not walk for exactly one hour.
- c. If we walked for exactly two hours, then we did not also walk for exactly one hour.

Cast in this form the logical validity claim doesn't seem true at all. This becomes dramatically clear when we compare (8.14.a) with (8.14.b) or (8.14.c), in which the consequent of (8.14.a) is negated, while its antecedent has been retained unchanged. (8.14.c) seems contingent, and presumably that is true of as well (8.14.b). But they strongly suggest that the antecedent of (8.14.a) and at the same time its consequent false. So it cannot be a logical truth: there can be an event of some individuals X walking lasting exactly two hours without there being an event of those same individuals walking for one hour.

If these ‘intuitions’ about the sentences in (8.14) can be trusted, then there is something wrong with the ‘cutting-in-half’ argument according to which the existence of an event that instantiates a homogeneous event description lasting an amount of time $2d$ entail the existence of an instance of that same description lasting only d . The intuitive reason why it is wrong is that we do not really think of homogeneous event descriptions as closed under subevent formation in the sense of Definition (3.15.a) (See Section 3.5.1; the definition is repeated below as (8.15).) From the continuum of potential subevents of any given instance of a homogeneous event description E only a few can boast an independently motivated identity, of the sort that is implied by the predications expressed by *for*-adverbials. If that were not so then the claims that we make with the help of such adverbials would be very much weaker than they seem to be; many more such claims would be true than we are willing to acknowledge as true in practice.

In fact, *for*-adverbials carry a strong implication of what kind of independent identifiability they expect of the eventualities they serve to characterise. First and foremost is ‘identification via maximisation’. Let E be a maximal set of overlapping instances of a given homogeneous event description E . Then we may expect E to contain a unique maximal member – an event e_{max} which temporally includes all other members of E . Both the beginning and the end of this event are transition points that involve genuine change. We can characterise these changes as state changes if we assume that with the homogeneous event description E is associated a corresponding ‘progressive state description’ $S(E)$: The beginning of an e_{max} is then marked by a transition from a state that does not satisfy $S(E)$ to one that does, and the end by a transition from a state that does to one that doesn’t.

It is evident that if the interpretation of sentences such as (8.13.a) and (8.13.c) involves walking events that are maximal in this sense, then there is no reason why a conditional like (8.14.a) should be true. It could be true in general only if people who have taken a walk of two hours invariably have also taken a (disjoint) walk of one hour (e.g. because everyone first has to prove that he can get through a one hour walk before being allowed to attempt a two hour one).

But maximisation is not the only way of identifying events that can serve as predication targets for *for*-adverbials. This can be seen from the sentences in (8.11.1). The sentences are repeated here as (8.15.a) and (8.15.b).

(8.15)a. We had walked for two hours, when we came to a deserted mill.

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- b. We had been walking for two hours, when we came to a deserted mill.

The main clause of sentence (8.15.a) describes a walking event of two hours' duration, the end point of which is given by the event that is described in the *when*-clause. There is no implication here that the walking stopped at that point; the speaker and company may have noted the mill, but nevertheless walked straight on, without making any kind of break. Note that this makes the end point of the walking event coincide with the TPpt that is involved in the interpretation of the past perfect of the main clause.

As far as this is concerned there is no difference between (8.15.a) and (8.15.b). The only difference between these two sentences is that (8.15.b), with its progressive tense form presents the AspP adjunct *for two hours* with a state description. We had already observed that state descriptions are among the possible inputs for *for*-adverbials, and proposed to account for this by declaring imperfectivity as entailing homogeneity. Our list in (8.11) contains several sentences in which *for*-adverbials combine with state descriptions, viz. (8.11.b,d,e,l,n). There seems to be a general tendency for such combinations to admit non-maximal instances more easily than when *for*-adverbials combine with event descriptions, especially when the state description incorporates a progressive. Presumably this is because there is some tendency for state descriptions to be temporally located via discourse anaphora. But in general this seems to be a matter of tendency only, and details will become more clearly recognisable only when such sentences are considered as parts of some larger discourse, something which we do not pursue.

A case of special importance for our purposes is that represented by the present perfect sentences (8.11.k) and, on one of its interpretations, (8.11.n). In the semantic representations of these sentences the state that is represented as of two hours duration is one whose upper bound is determined by the utterance time. Such cases, in which the upper bound of the argument of a *for*-adverbial-predication is given by the utterance time are found primarily with states. An explanation of why that is so will be proffered below.

In the examples just considered the beginning of the eventuality that is chosen as argument of the *for*-adverbial-predication is, is naturally thought of as determined by a state change – either change into the obtaining of a 'progressive state' (i.e. a state instantiating the progressive state description S(E), see above, or, in case the input representation is a state description, change into an instance of that description itself. But this need not always

be so. For instance, the second conjunct of (8.16.a) is naturally interpreted as predicating two hours' duration of an event that started at the time when the walkers observed the mill. (The default identification of the end point of this event would again seem to be the actual end of the walking; but again, that is no more than a default.)

- (8.16)a. We had walked for two hours, when we came to a deserted mill, and then walked on for another two hours.
- b. All right, I will wait for you here for (another) two hours.

Furthermore, in a future tense sentence, such as (8.16.b), the starting point of the eventuality that serves as argument is very often the utterance time *n*. This may coincide with the beginning of the relevant state, but it need not. When *another* is included in (8.16.b), that suggests that the waiting has been going on already for some time before *n*.

These observations show that there exist several options for the identification of the beginning and end points of the arguments of *for*-adverbial-predications. Were not trying to give an exhausting account of these possibilities here. Our main concern is to point out that identification is part of what is involved in *for*-adverbial-predication. And that is important because of its implications for the status of the eventuality description that emerges as output representation from the operations involved in such predications. Because of the way in which the argument of the *for*-adverbial-predication gets selected – viz. via independent identification of its beginning and end points – the representation that results as output from these operations, which functions as a description of that very argument, qualifies as a (non-homogeneous) event description. And this is so also when the input description to the *for*-adverbial is the description of a state. That is, the instance identification operations that are triggered as preparation to the formation of the predication condition that a *for*-adverbial contributes should be seen as effecting a change from state to event. Thus the result of applying *for*-adverbials is always perfective, irrespective of whether the input description is perfective or imperfective. This seems to be roughly in accord with the views that have been expressed within the literature about the aspectual status of phrases that contain *for*-adverbials [References? (boundedness in the sense of Iatridou et al.?)].

The view that has emerged from this discussion is that *for*-adverbials impose an identifiability requirement on the events that serve as arguments of the predications they contribute and that the identification of such an event

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takes the form of identifying its beginning and end point (with of course the constraint that these can be seen as beginning and end of an event of the kind described by the input representation). We will formally capture this requirement in the form of a pair of presuppositions, one for the beginning point of the event and one for its end point, which come with the lexical semantics of temporal *for*. These presuppositions are included in the amplified entry for *for* in (8.17).

Let us summarise our conclusions from this section:

- (i) *for*-adverbials select homogeneous eventuality description as inputs.
- (ii) Application of a *for*-adverbial to its input representation adds a predication to the effect that a certain event *e* has the duration which the *for*-adverbial specifies;
- (iii) When the input representation is an event description, then *e* is an instance of this descriptions. When input representation is a state description, then *e* is an instance of an event description that results from subjecting the input representation to a ‘perfectivising state-to-event coercion’.
- (iv) The argument *e* of the predication added by a *for*-adverbial is *bounded* in the sense that the output representation specifically mentions its beginning and end point. Beginning and end point are represented by discourse referents that are the resolution targets of two presuppositions. (It is the addition of explicitly mentioned beginning and end which lends concrete substance to the perfectivisation that is involved when a *for*-adverbial is applied to a state description.)
- (v) These presuppositions are subject to special resolution constraints. Two resolution possibilities have been explicitly identified, viz. (a) change of state and (b) identification as an independently salient time; often this is the TP_{pt} that is needed in any case for the interpretation of the tense of the given sentence or clause.
- (vi) When the input representation does not satisfy the selection restrictions of *for*, then adjustment through coercion into an input representation satisfying the selection restriction is sometimes possible. One possibility is reinterpretation of a description of single events as the description of states consisting of the iteration of such events or of a disposition for them to occur

on suited occasions. A second possibility, which is subject to quite strict limitations, is enriching the input description with the representation of an intention that the target state of the described event last the amount of time specified by the *for*-adverbial.

We will not incorporate all the information listed under (i)-(vi) above into the amplified lexical entry for *for* that now follows in (8.17). (For one thing, we will not include in it proper specifications about the particular ways in which the beginning point and end point presuppositions may be resolved, but follow our earlier practice of attaching subscripts to the presuppositions to indicate that a story is owed about how they may be resolved.) But we do want to incorporate the selection restrictions that are imposed by *for*-adverbials, and thus, ultimately, by *for* itself. And this creates a slight complication for the format of lexical entries for content words we have been making use of so far. For *for*-adverbials come with selection restrictions of two kinds. First, there are selection restrictions associated with the arguments that are displayed in the syntactic part of the entry (and that recur as arguments in the semantic representation that makes up the semantic part of the entry). The lexical entry format we have been using does make provisions for these, in the form of sortal restriction predicates on the arguments displayed in a tier between syntactic part and semantic representation. In the present case these sortal restrictions are: ‘event’ for the referential argument of the preposition and ‘amount of time’ for its non-referential argument. But as we have seen, *for*-adverbials also impose another kind of restriction, viz. on the input representations with which they are meant to combine. These, we have argued, must always be homogeneous eventuality descriptions. Selection restrictions of this second kind have been playing an important part already, viz. as restrictions associated with progressive and perfect operators. But those have been treated as operators that are triggered by the values of feature functions associated with particular functional heads, and no general format for the specification of such operators has thus far been proposed. But we do have an explicit format for lexical entries, so we better adapt it so that it can also express this kind of selection restriction. We propose something very simple: add a further tier in the entry, directly below the selection restrictions on the arguments displayed in the syntactic part, in which the selection restrictions on the input representation are specified. In the present case we do this in the form: ‘Restr. on Input-Repres: homogeneous eventuality representation’.

We also include in the entry for *for* the presuppositions for the beginning and end of the first argument *e* of the predication that *for* contributes. But

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in order to be able to do this two things are needed. First we have to settle a matter on which we have remained somewhat non-committal so far: are the beginning and end of an event to be construed as times or as events? As far as we can see, not a great deal hangs on this decision, but the simpler solution appears to be that according to which the beginning and end of e are construed as times.¹¹ Second, given this decision, we have to decide exactly what the relation is between the beginning or end time of an event e and e itself. Here too there appears to be more than one option, and little to choose between them. We have chosen one of these options without a compelling reason for the choice. We assume that the beginning and end time of e both abut e , the beginning time on the left and the end time on the right. (Given this choice, it might be better to refer to these times as ‘left bound’ and ‘right bound’ of e . But we will stick with the terminology of ‘beginning point of e ’ and ‘end (point) of e ’ nonetheless.) That is all that we will commit ourselves too formally; and since this is all we will need to express formally, the temporal abutment relation $\supset\subset$ is all that we will need by way of symbols to state the relation between e and its beginning and end.¹²

		for (prep. (temp.))	DP (oblique)
		e	d
(8.17)a.	Sel. Restr.	event	amount of time
	Restr.on	homogeneous	eventuality
	Input	description	
	Repres:		

$$\text{b. } \left\langle e \mid \left\langle \left\langle \begin{array}{|c|} \hline t_b \\ \hline \end{array} \right\rangle_{\text{beg.pt}}, \left\langle \begin{array}{|c|} \hline t_e \\ \hline \end{array} \right\rangle_{\text{endpt}} \right\rangle, \left[\begin{array}{l} t_b \supset\subset e \quad e \supset\subset t_e \\ \text{Dur}(e) = d \end{array} \right] \right\rangle$$

¹¹ Otherwise we would have to construct a beginning or end event in those cases where the beginning time or end time is given as TPTp (or, possibly, other time that is salient in the given context).

¹² Intuitively, ‘beginning point of e ’ and ‘end point of e ’ seem to imply that we are dealing with ‘points of time’ i.e. with times that are of ‘minimal duration’ in some sense. One way to make this intuition explicit as by adopting a formal version of the distinction between ‘real time’ and ‘discourse time’ in the spirit of (Kamp 1979); the beginning point and end point of e could then be characterised as instants of the discourse time. But we are wary of introducing this further complication into the formalism we are using here.

As this entry makes explicit, the interpretation of a *for*-adverbial involves finding bounds for the event of which the *for*-adverbial predicates a certain duration. This imposes an additional constraint on what *e* can be: it must be an instance of the relevant homogeneous description for which such bounds can be found (according to a limited set of resolution rules that we have discussed but not incorporated into our formalisation). This point is important, because it entails that the totality of instances of the input description can be larger than the set of instances that satisfy this additional constraint, which has to do with the actual interpretation of utterances and the contexts in which that happens. In fact, the totality of input representation instances may be vastly larger. That is so in particular for input representations that are state descriptions, in view of the principle first introduced in (2.27) (Section 2.2), according to which for an state *s* that instantiates a state description *S* and time *t* included in the duration of *s* there is an instance *s'* of *S* such that *t* is the duration of *s'*. If we assume that time is like the reals, this principle entails that for any state description with instances of non-zero duration the number of instances will be non-denumerable. Only a very small part of those will be identifiable in the sense of boundary identification partly formalised in (8.17). In the actual practice of utterance and discourse interpretation it will typically be a very small finite number. In view of the homogeneity principle (3.15) in Section 3.5.1 the same consideration applies to homogeneous event descriptions. Such descriptions too will have non-denumerably many instances as long as they have at least one instances whose duration is non-zero.

The more general moral here is that the requirement of independent event identification that is intrinsic to the application of *for*-adverbials can have the effect of making only a small number of events accessible as arguments for its predication, even though there is unlimited number of instances of the input representation to which the adverbial is to be applied. This is one place where there is a wide gap between ‘discourse ontology’ and ‘real ontology’ (cf. (Kamp 1979)).

A natural question to ask at this point is whether apart from *for*-adverbials there are other natural language expressions that also require independent event identification of the sort we have explored in this section. Our blank guess is that, probably, yes, there must be others – in English, in German or in other languages – even if none have so far crossed our path.¹³-adverbial pred-

¹³ One expression type that requires independent event identifiability are the temporal *in*-adverbials that are used in conjunction with *for*-adverbials in the famous telicity tests

ications of most of its assertoric power. But it remains true that the modes of event identification are quite different in the two cases. This is clearest for the right bounds of the events at issue. The right bounds of the event arguments of *in*-adverbial predications are given intrinsically, through culmination of the telos of the event description in question. The right bounds of the arguments of *for*-adverbial predications are in general not intrinsic. In many cases they may be identified as the starting time and final time of a maximal instance of the input representation, but sometimes it is necessary to find them elsewhere, and then they are used to cut a smaller segment from some maximal instance of the input description. It is especially identifications of this second sort that feed the impression that *for*-adverbials impose their durations on their arguments.

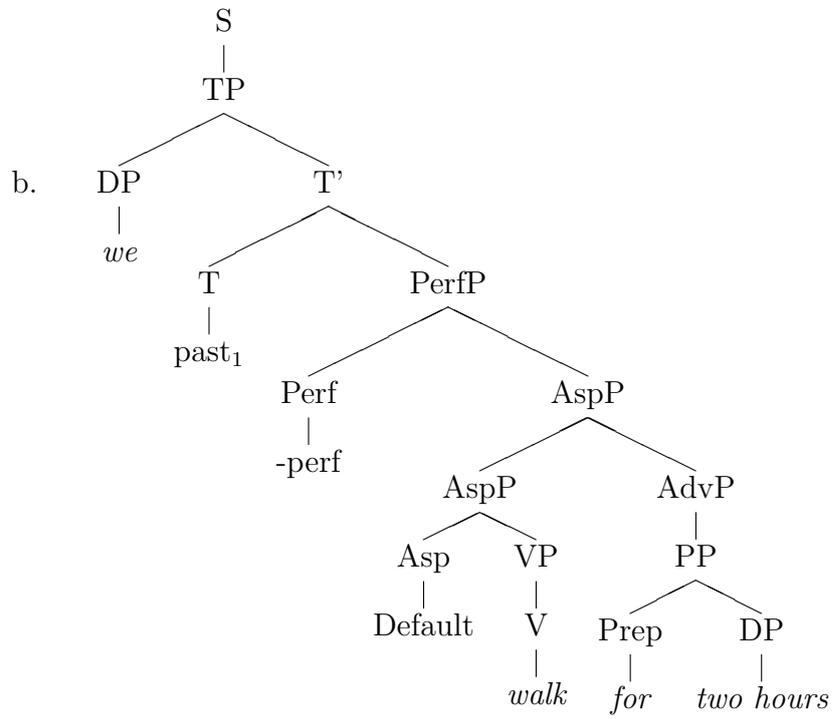
8.5.2 Representation construction for the low attachment parse of *We (have) walked for two hours*

We are now ready to proceed to the semantic representation construction of sentence (8.11.a) from the syntactic analysis given in (8.8). For easier reading the sentence is repeated in (8.18.a) and the syntax tree in (8.18.b)

(8.18)a. We walked for two hours.

for verbs and their projections. But the case of *in*-adverbials is different insofar as they select for inhomogeneous – or, more correctly put, ‘antihomogeneous’ – event descriptions, and the instances of such descriptions are not closed under sub-eventuality formation, but instead satisfy the principle that no event properly included in an instance can be an instance in turn. So the event arguments of *in*-adverbial predications are uniquely identified once any time is known within their duration; and in practice they are also often uniquely identified by temporal intervals within which they are located (so long as these intervals do not become too long).

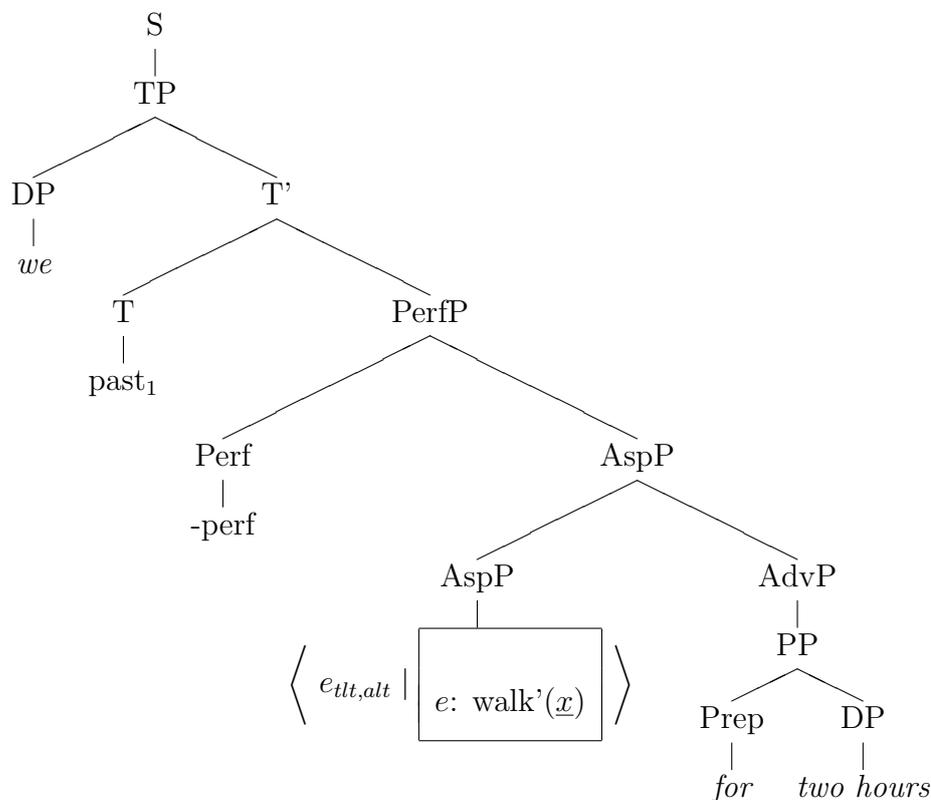
In fact, we have heard it surmised more than once that the crucial difference between the predictions expressed by *in*-adverbials and those expressed by *for*-adverbials is that for an *in*-adverbial predication the argument must be given separately, whereas the predication expressed by a *for*-adverbial ‘imposes’ its bounds on some continuum of possible arguments, thereby as it were ‘creating’, or ‘defining’ its own argument. We have argued in this section that this latter assessment cannot be right – it would deprive *for*



After insertion for the occurrence of *walk* in (8.18.a), the lexical semantics is passed unchanged to the lower AspP node:

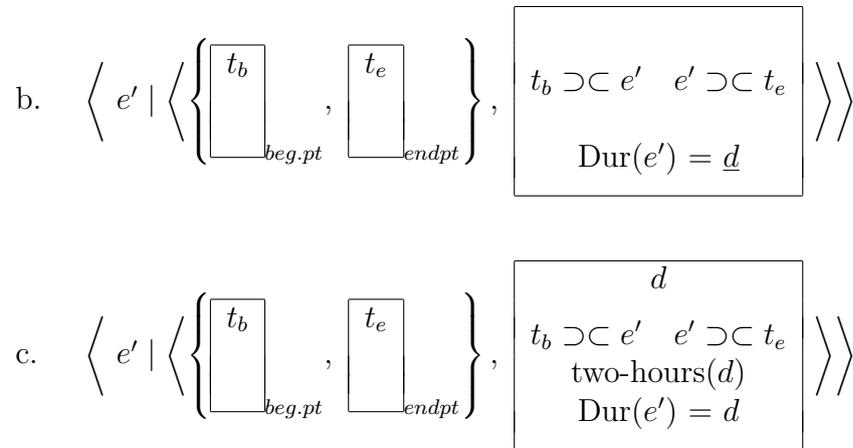
8.5. REPRESENTATION CONSTRUCTIONS FOR SOME SENTENCES WITH PERFECTS AND

(8.19)



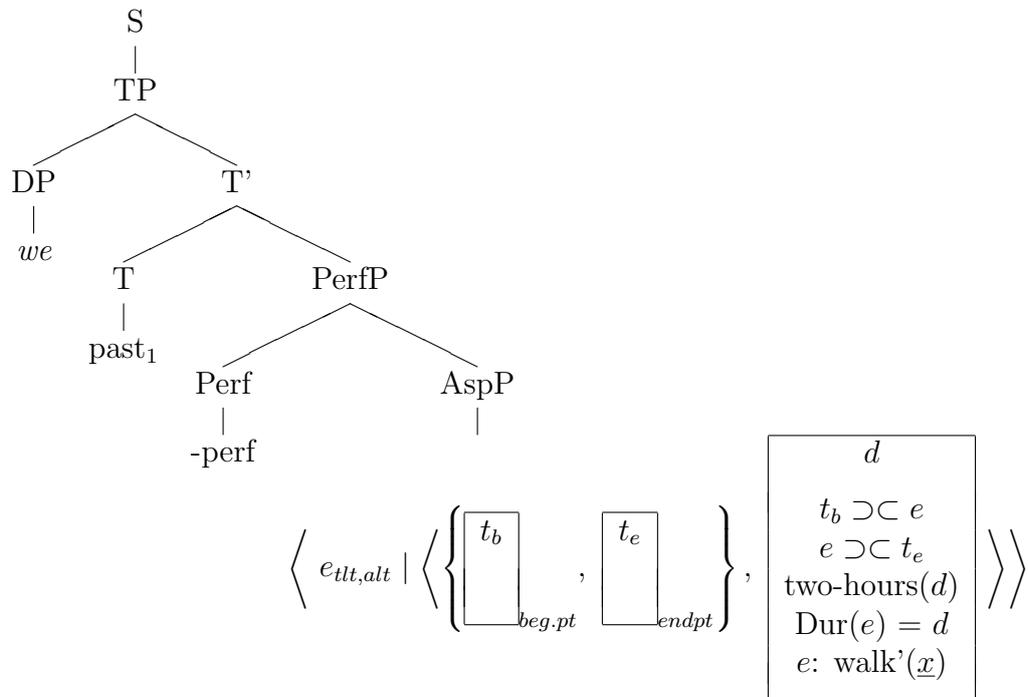
The semantic representation of the PP *for two hours* is obtained by combining the lexical semantics of *for* with that for *two hours*. As semantic representation for the measure phrase *two hours* we will assume the one in (8.20.a). The discourse referent d represents the quantity of two hours, which we represent simply by the stopgap condition ‘two-hours(d)’. (There is of course a good deal of compositionality involved in the way that the content of this phrase arises from the meanings of the unit-of-measurement noun *hour* and the cardinal *two*, but we do not bother about this here. Insertion of the lexical semantics of *for* turns the non-referential argument into a slot and chooses a discourse referent for the referential argument, as in (8.20.b). (8.20.c) is the representation that results from instantiating the slot symbol \underline{d} by the referential argument d of (8.20.a). (Insertion of d for the position \underline{d} relies on the link between this position and the argument phrase *two hours* of *for* that will have been established by the parser.)

(8.20)a. $\langle d \mid \text{two-hours}(d) \rangle$



Combining the representation of the *for*-adverbial with that of its adjunction site involves unification of their referential arguments – which we carry out by replacing the referential argument e' (8.20.c) everywhere by the referential argument e of the lower AspP representation in (8.19) – followed by merge of the two representations.

(8.21)



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The remaining operations are familiar: passing up the AspP representation to PerfP, locating e in the past of n , integrating the subject we ¹⁴ and emptying the store. The result is the structure in (8.22).

$$(8.22) \left\langle \left\{ \begin{array}{c} t_b \\ \text{beg.pt} \end{array} , \begin{array}{c} t_e \\ \text{endpt} \end{array} \right\} , \begin{array}{c} e \ d \ t \ W \\ t < n \ e \subseteq t \ we(W) \\ t_b \supset C e \ e \supset C t_e \\ \text{two-hours}(d) \\ \text{Dur}(e) = d \\ e: \text{walk}'(W) \end{array} \right\rangle$$

One of the ways in which the beginning point and end point presuppositions can be resolved is to identify beginning and end of e with the transition into and out of the progressive state of the subject being in the process of walking. We can express this by saying that e is bound at both ends by a state that consists in the subject W not being in the process of walking. This state can be represented as in (8.23.a). Using this representation the result of resolving the presuppositions in this way can be represented as in (8.23.b).

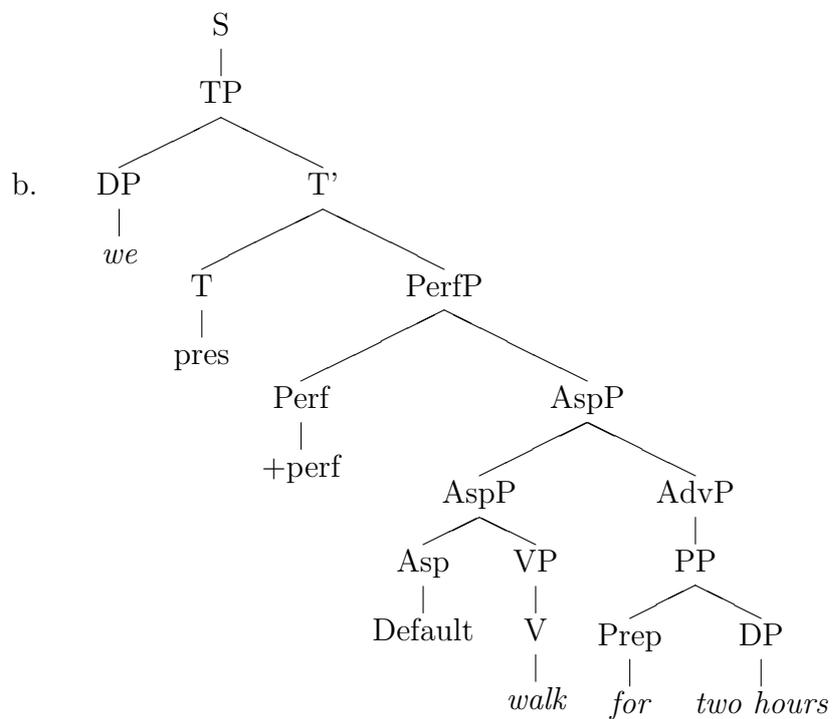
$$(8.23)a. \left\langle s \mid \begin{array}{c} e'' \\ s : \neg e'': \text{walk}'(W) \\ e'' \subseteq s \end{array} \right\rangle$$

$$b. \begin{array}{c} e \ d \ t \ W \ s_b \ s_e \\ t < n \ e \subseteq t \ we(W) \\ t_b \supset C e \ e \supset C t_e \\ \text{two-hours}(d) \ \text{Dur}(e) = d \\ e: \text{walk}'(W) \\ s_b : \neg \begin{array}{c} e'' \\ e'': \text{walk}'(W) \\ e'' \subseteq s_b \end{array} \quad s_e : \neg \begin{array}{c} e'' \\ e'': \text{walk}'(W) \\ e'' \subseteq s_e \end{array} \\ s_b \supset C e \supset C s_e \end{array}$$

¹⁴ We ignore all niceties having to do with the first person plural pronoun we , simply representing its referent by means of the ‘plural discourse referent’ W

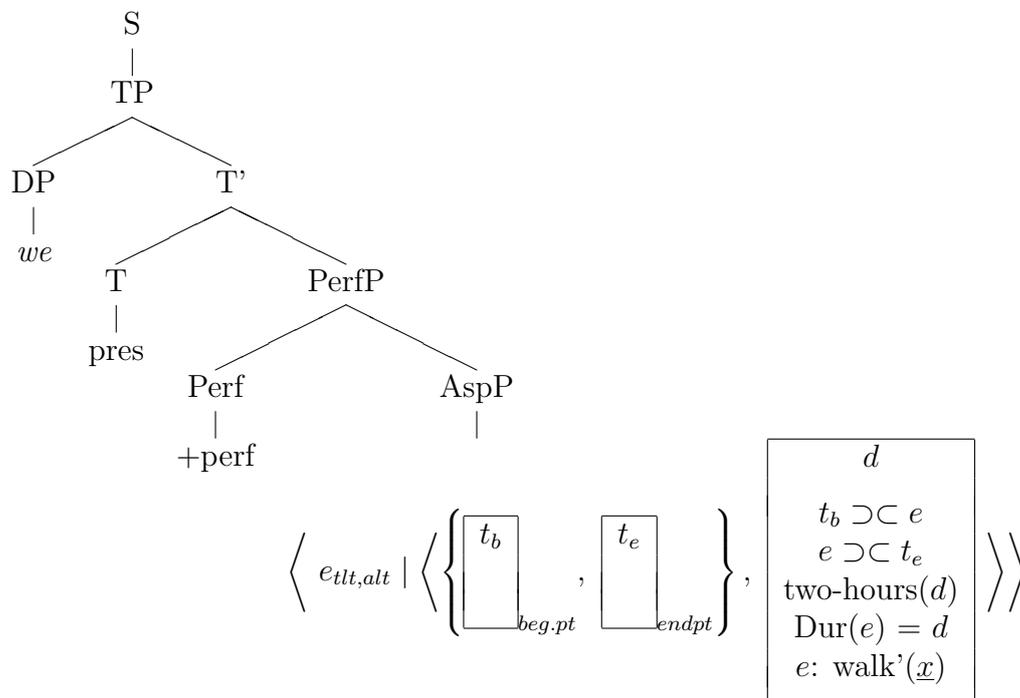
For the sentence in (8.24.a) and its low attachment syntactic analysis in (8.24.b) the representation construction is much like that for (8.18). But it is worth that we see what happens in this case to the higher AspP representation. Up to that point the representation construction is identical to that for (8.18.b). For (8.24.b) this stage in the construction is given in (8.25).

(8.24)a. We have walked for two hours.

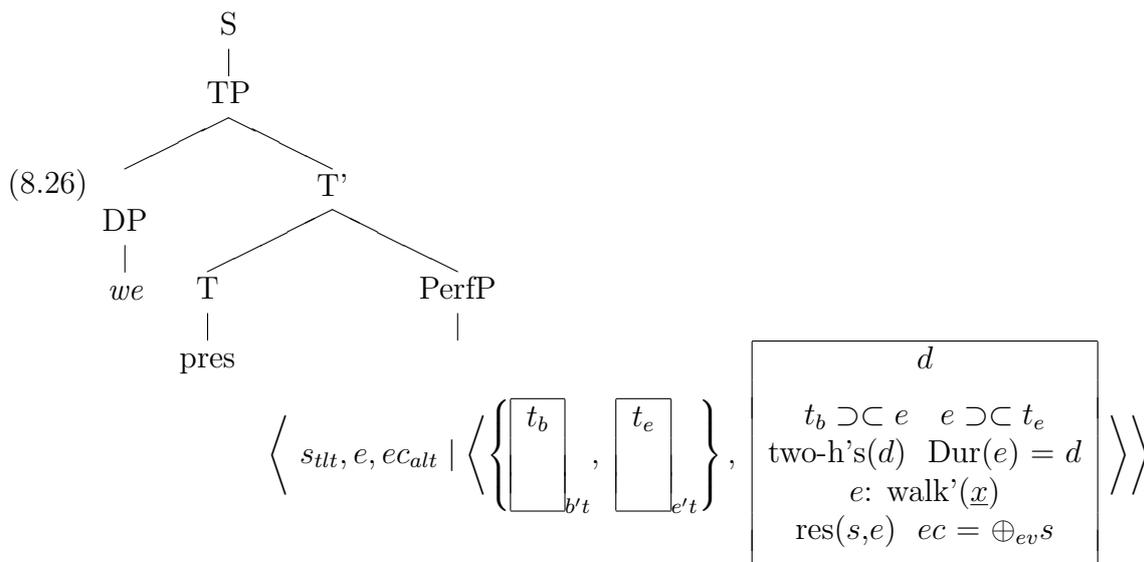


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(8.25)



In (8.25) the AspP representation is the input to the application of +perf. This application has the effect of adding a result state of e – according to what we concluded in Section 4 this ought to be more than just a formal result state, which is why (8.24.a) may sound a little funny without an appropriate context – and shifting *itt* to it. The result is shown in (8.26).



The feature *pres* in (8.26) locates *s* at *n* and the remaining steps are as before (including, we assume, the resolution of the beginning point and end point presuppositions via state change). So we end up with the DRS in (8.27).

$$(8.27) \quad \begin{array}{c} s \ e \ ec \ d \ t \ W \ s_b \ s_e \\ t < n \ e \subseteq t \ we(W) \\ t_b \supset C e \ e \supset C t_e \\ \text{two-hours}(d) \ Dur(e) = d \\ e: \text{walk}'(W) \\ \text{res}(s,e) \ n \subseteq s \\ ec = \oplus_{ev} s \\ \\ s_b : \neg \left[\begin{array}{c} e'' \\ e'': \text{walk}'(W) \\ e'' \subseteq s_b \end{array} \right] \quad s_e : \neg \left[\begin{array}{c} e'' \\ e'': \text{walk}'(W) \\ e'' \subseteq s_e \end{array} \right] \\ \\ s_b \supset C e \supset C s_e \end{array}$$

We note in passing that a semantic representations for (8.28.a) and (8.28.b) can be constructed in what is for all practical purposes ways that very closely resemble the representation constructions for (8.18.a) and (8.24.a). First consider (8.18.a). The only difference with construction for (8.18.a) is that the representation of the adjunction site of *for two hours* is now the description of a ‘progressive’ state. But for the application of a *for*-adverbial there is no significant difference between state descriptions and homogeneous event descriptions. In either case bounds for the event that will serve as argument to the *for*-adverbial predication will have to be found (through resolution of the beginning point and end point presuppositions. In particular, resolution via state change is just as possible in this case as it was for (8.18.a). This time the result of resolving these presuppositions in this way is that the argument of the *for*-adverbial predication – an event that coincides in duration with a maximal instance of the input description *S* – is bounded on both sides by states that do not instantiate *S*.

Much the same applies to (8.28.b). Here too combining the lower AspP representation with that of *for two hours* yields the description of an event, which state-of-change-based resolutions of the beginning and end point presuppositions can then determine as an event that temporally coincide with a maximal instance of the state description *S* assigned to AspP (though other

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ways of resolving the presuppositions may be possible too). In this case it is this event description that serves as input to the perf operator. This means that no state-to-event description is required at this point. And since none is required, no such coercion will take place. This means that, on the present analysis, the only interpretation that emerges is one according to which the mentioned walking episode is located in the past of *n* in its entirety. We will return to this point in the next section.

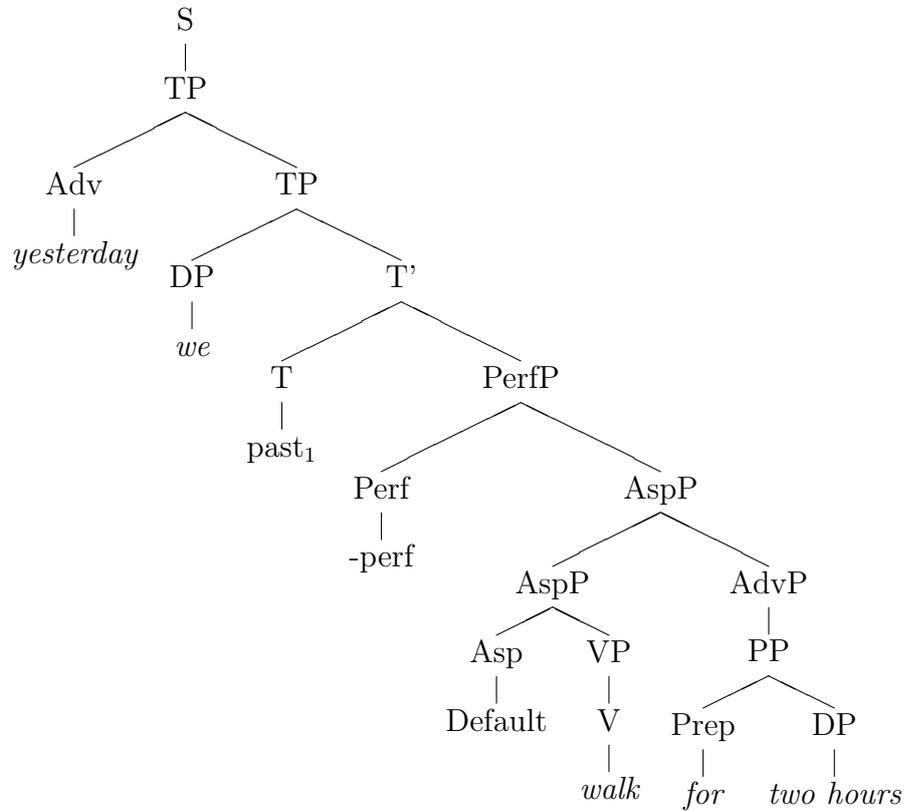
- (8.28)a. We were walking for two hours.
b. We have been walking for two hours.

Our last two examples of representation constructions in this section are for the sentences in (8.29).

- (8.29)a. Yesterday we walked for two hours.
b. * Yesterday we have walked for two hours.
c. Today we have walked for two hours.

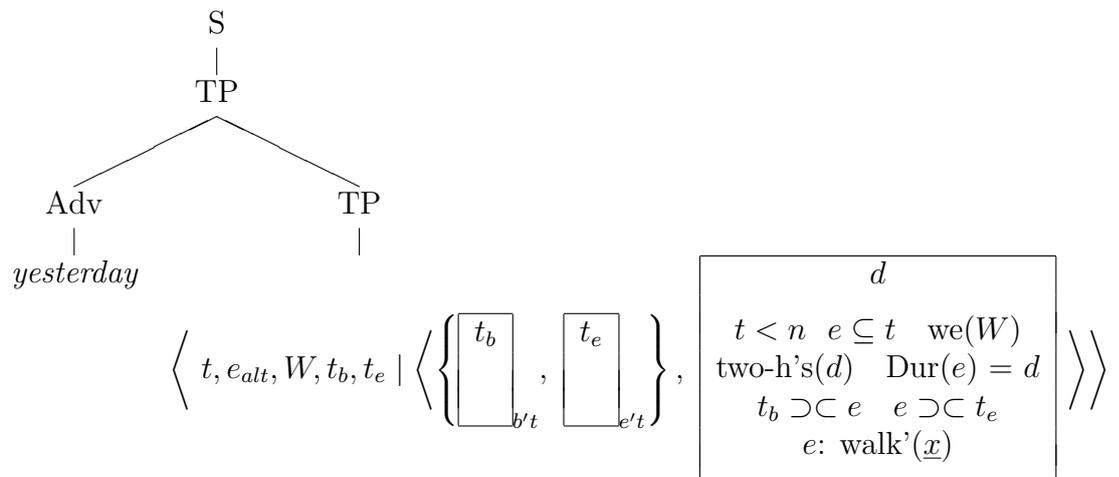
Sentence (8.29.a) differs from our first example in this section, (8.18.a), only in having the additional locating adverb *yesterday* in sentence-initial position. We assume, consistently with our assumptions about sentence-initial temporal adverbs so far, that this adverb is adjoined to TP. In addition we stick for now to the assumption that *for two hours* is adjoined to AspP. Thus the syntactic structure that we adopt as basis for constructing the semantic representation is the one in (8.30).

(8.30)



Up to the lower TP of (8.30) the construction is the same as for (8.8). (8.31) shows the stage at which the lower TP representation has just been established.

(8.31)



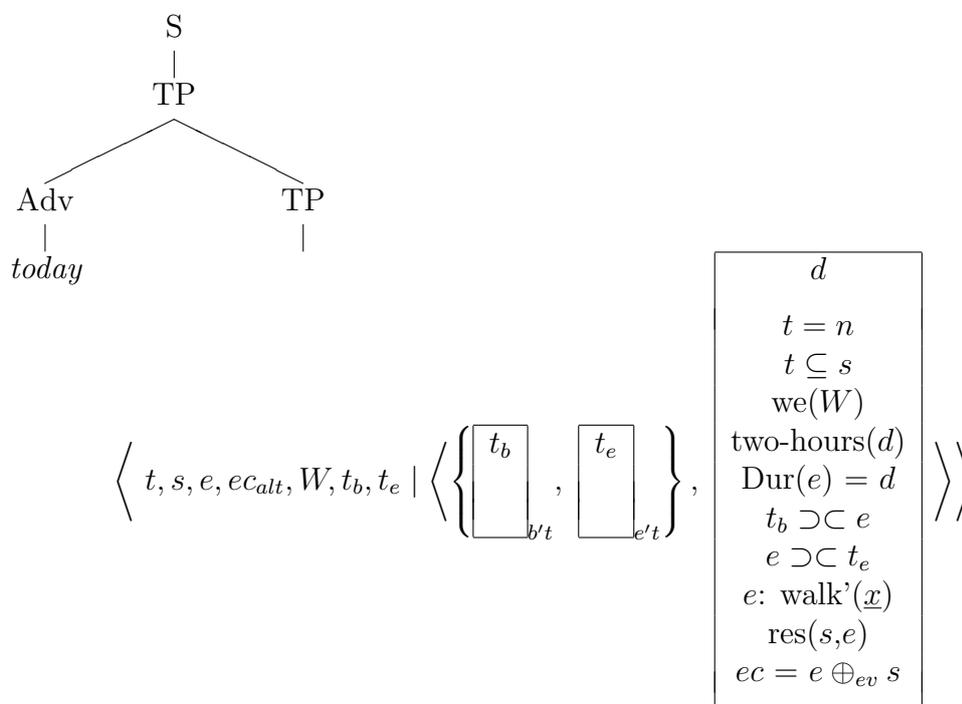
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There is one thing about the lower TP representation in (8.31) that asks for comment. It is something that this representation shares with the TP representation for (8.18.a), but which hasn't become visible so far because we did not separately display the TP representation in our presentation of that construction. It is the presence of the annotation *alt* on the discourse referent *e*. This may seem to be in perfect agreement with the policy we have followed so far: *alt* is retained until it is exploited by a temporal adverb that selects its bearer for its target; and if no such adverb is encountered, then *alt* is retained throughout the representation computation and serves in the end as a reminder that a location constraint may be recovered from the extra-sentential context. But there is one difference between the constructions we are considering in this section and those of earlier sections: the sentences of this section contain AspP adjunctions of some *for*-adverbial. The reason why this is relevant to the presence of *alt* in (8.31) is this. *for*-adverbials are like temporal locating adverbs in that their application target is always the bearer of *alt*. (This does not follow from anything that has been said so far, but it is an assumption the usefulness and the importance of which will soon become apparent.) However, because *for*-adverbial share this principle of target selection with temporal locating adverbs, and because *for*-adverbials and temporal locating adverbs can coexist in the same sentence (as demonstrated by the sentences in (8.29)), we can no longer maintain our earlier policy of eliminating *alt* as soon as it has done service. (8.29.a) is one of the sentences in the representation constructions of which *alt* does double duty, first guiding the interpretation of *for two hours* and then that of *yesterday*.

The importance of keeping *alt* around after it has already been useful in guiding the interpretation of a *for*-adverbial comes into focus more clearly in connection with sentences in which it occurs jointly with a locating adverb and a perfect. In English such combinations are subject to special restrictions: Present perfects are incompatible with adverbs whose denotations are fully in the past of *n*. This is as true for sentences with *for*-adverbials as it is for sentences without them, a fact illustrated by the ungrammaticality of (8.29.b). But when the denotation of the locating adverb includes *n*, then such sentences are grammatical – again, irrespective of whether they also contain a *for*-adverbial or not. An example is (8.29.c). We conclude this section with a few words about the representation construction for that sentence.

The construction of the representation for (8.29.c) coincides up to its lower TP node with that for (8.24.a). (8.32) shows the construction at that stage.

(8.32)



At this point *today* can make its locating contribution according to the same principles that governed its contribution in earlier examples: it selects *ec* as the bearer of *alt* and locates this complex as temporally included within the day of the utterance.

8.5.3 Representation constructions for *for*-adverbials with high attachment

In Section 8.5 we suggested that sentence-final occurrences of *for*-adverbials allow for two syntactic construals and that these can lead to distinct interpretations. The first of the sentences among those that we have discussed for which this possibility of alternative syntactic construals arises was sentence (8.11.a) ('We walked for two hours.'). In the last section we presented the representation construction for this sentence on the low attachment analysis of its *for*-adverbial, which we assume to be adjunction to AspP. Exactly what form high attachment of a sentence-final *for*-adverbial should take we have not yet discussed. We are not quite sure what the answer to this question should be and do not want to exclude the possibility that there is more than one place at which a highly attached sentence-final *for*-adverbial could enter

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into the structure. We will proceed in this section on the assumption, also introduced in Section 8.5, that high attachment takes the form of adjunction to TP and that in this regard high attachment *for*-adverbials are like the sentence-initial locating adverbs of earlier sections: All such high attachment cases are cases of adjunction to TP, but – this is part of the new assumption – such adjunctions can be either from the left or from the right.

Given this assumption it is as well to go through the representation construction of sentences with sentence-initial *for*-adverbials. According to our hypothesis such occurrences can be construed in only one way – viz. as TP adjuncts –, so if it is true that high and low attachment construals of *for*-adverbials can give rise to different interpretations, then we should be able to see this by comparing sentences which differ only in that a *for*-adverbial that occurs sentence-initially in the one occurs in sentence-final position in the other. Some of these pairs are listed in (8.33).

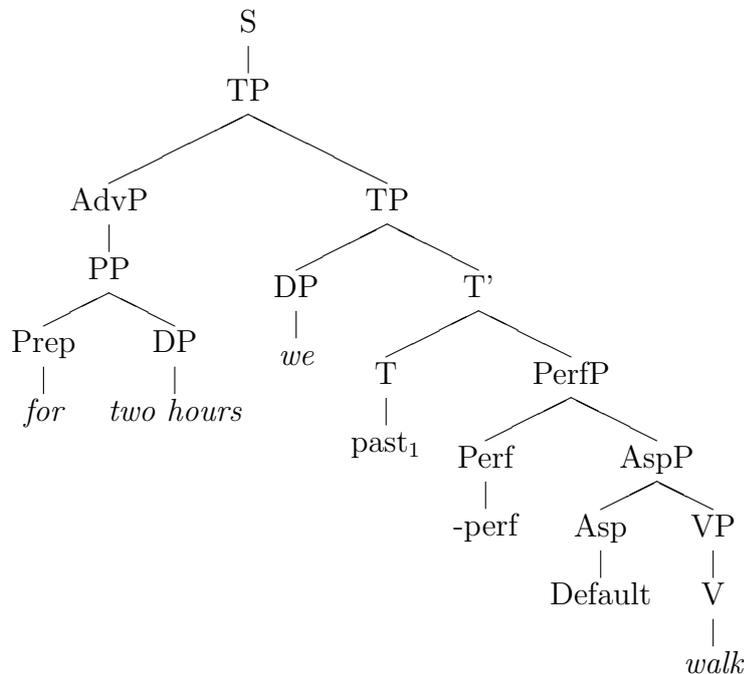
- (8.33)a. (i) We walked for two hours.
(ii) For two hours we walked.
- b. (i) We have walked for two hours.
(ii) ? For two hours we have walked.
- c. (i) We were walking for two hours.
(ii) For two hours we were walking.
- d. (i) We have been walking for two hours.
(ii) For two hours we have been walking.

Our assessment of the sentence pairs (8.33.a-d) is as follows. (1) The (i)-sentences, with sentence-final *for*-adverbial, are more natural than the (ii)-sentences, in which the adverbial is at the front of the sentence. In fact, for us the (ii)-sentences carry a strong flavour of information-structural markedness: the fronted *for*-phrase suggests a contrastive focus or contrastive topic. For instance, (8.33.a.ii) creates a kind of expectation of some continuation, in which something is said about what happened after the two hour bout of walking that the sentence speaks of. (2) Of the eight sentences in (8.33.a.ii) there is only one, viz. (8.33.b.ii), that strikes as being unsalvageable through construction of some context – however outlandish – in which it could be felicitously used. Let us assume that this judgement is indeed correct. Then there are some important conclusions that follow. First, the explanation of why (8.33.b.ii) is unacceptable whereas (8.33.b.i) is not, must have to do with the different positions in which *for two hours* occurs in them; and, second,

apparently we cannot understand the sentence-initial occurrences of *for two hours* in the (ii)-sentences as the result of some fronting movement triggered by information-structural factors from the low attachment position that is available to sentence-final occurrences of *for*-adverbials. (For if such a movement operation is possible for any sentences with *for*-adverbials, it is hard to see what could block it in the case of (8.33.b.ii), where a special information-structural role is just as possible as it is for the other (ii)-sentences in (8.33).) This means that we will have to account for the acceptability and semantics of the good (ii)-sentences in (8.33) on the basis of a high attachment analysis.

To better appreciate this challenge we begin once more with the representation construction of a sentence in which a *for*-adverbial – now time sentence-initial – combines with a simple past. To facilitate comparison with the sentence-final cases discussed in the last we start with the counterpart (8.33.a.ii) to (8.33.a.i), which was the subject of our first construction in Section 8.5.2. (8.34) gives the syntactic structure that we assume for this sentence.

(8.34)

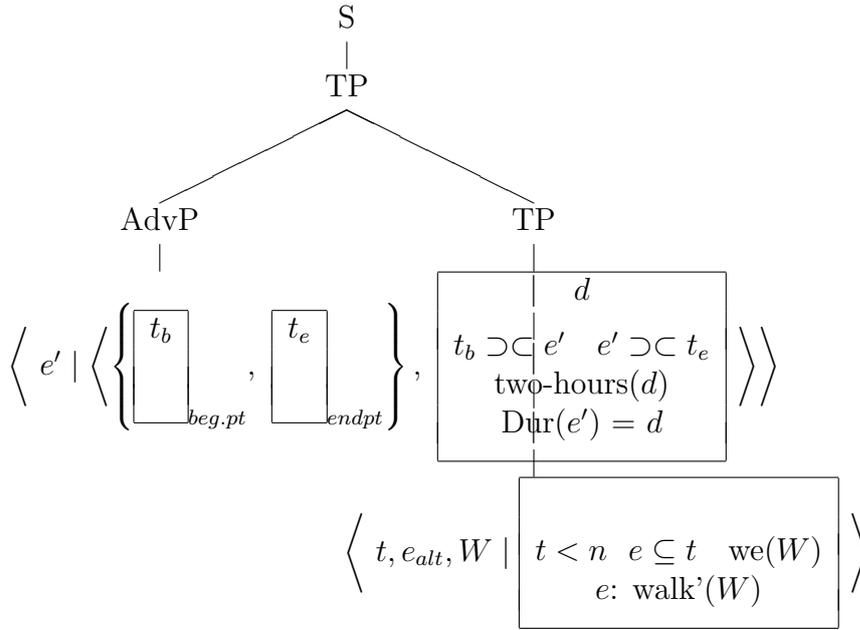


If all is to work out the way it should, then the lower TP representation should be constructed just as it was earlier for TPs of this particular form,

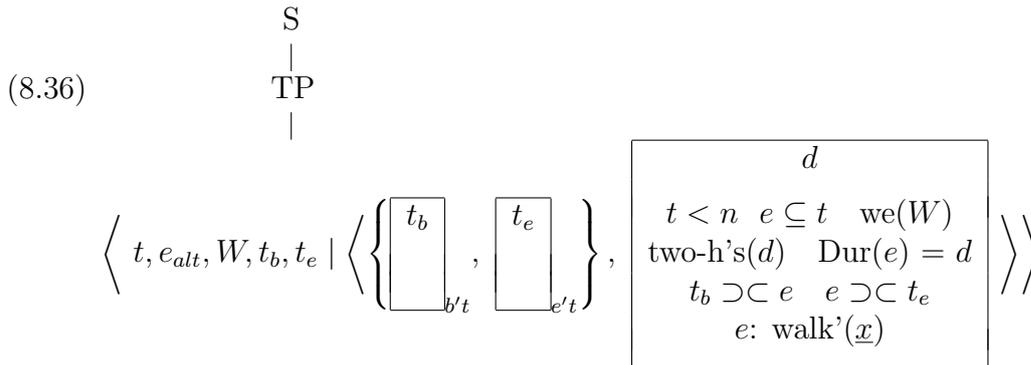
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and the *for*-phrase should then be applicable to this representation. (8.35) gives the construction stage just before this decisive step.

(8.35)



The operations triggered by adjunction – unification of e' with the discourse referent e that is selected by virtue of bearing *alt*, followed by merge of the two representations – now lead to the upper TP representation in (8.36).



The remaining operations are as before and we end up with the same semantics that was obtained earlier for sentence (8.33.a.i). Note well that what makes this possible is that the sentence-initial *for two hours* of (8.33.a.ii) can ‘reach into’ its input representation by selecting that constituent of it

that bears the feature *alt.* It is this feature of our system that will also be instrumental in our account of other sentences with frontal *for*-adverbials.

The representation construction for the past progressive sentence (8.33.c.ii) is much like that for (8.33.a.ii). The only difference is that this time the input representation to the *for*-adverbial is a state description. We have already seen that this makes no significant difference to the way in which the *for*-adverbial operates. Once again the output is a bounded event which spans a period of time during which the input representation is instantiated. The cases that really interest us, however, are the ones with perfects.

We start with (8.33.d.ii), which is an acceptable sentence and for which a coherent interpretation should thus be forthcoming. Before we start on the representation construction for this sentence, first an observation on what the sentence can actually mean. Note that this sentence only has a reading according to which the two hour walking period that it speaks of continues up to the utterance time *n* (and for all we can tell including *n*). (8.33.d.ii) does *not* have a reading that allows this period to be entirely in the past. (In this respect (8.33.d.ii) clearly differs from e.g. (8.33.b.i).) One of the predictions our representation construction principles should yield is that this is the only interpretation that is possible for (8.33.d.ii).

The new formal complication that we are facing in connection with (8.33.d.ii) is that by the time the *for*-adverbial is to make its contribution the perfect operator has already applied. Recall what is involved in applying the perfect operator in this case before us: Since its input representation is a state description, state-to-event coercion must take place prior to application of the +perf operations as such. For English, we saw, there is a choice between two kinds of state-to-event coercion, coercion via closure and inchoative coercion. These coercions differ in that the second results in a state description and the first in the description of a bounded event – ‘bounded’ in the sense of state changes that are among the ways in which the beginning and end point presuppositions can be resolved that are introduced by *for*-adverbials. If it was possible to interpret the perfect of (8.33.d.ii) as involving this kind of coercion, then the walking that the sentence speaks of would be a bounded event *e* situated wholly in the past of *n*, and when the *for*-adverbial would then select this event we would arrive at an interpretation in which there was some two hour bit of walking somewhere in the past of *n*, which is precisely the interpretation we do not want. But given what we have said, it is not hard to see why this interpretation is not forthcoming. The input description to *for two hours* would be the description of a bounded event in this case,

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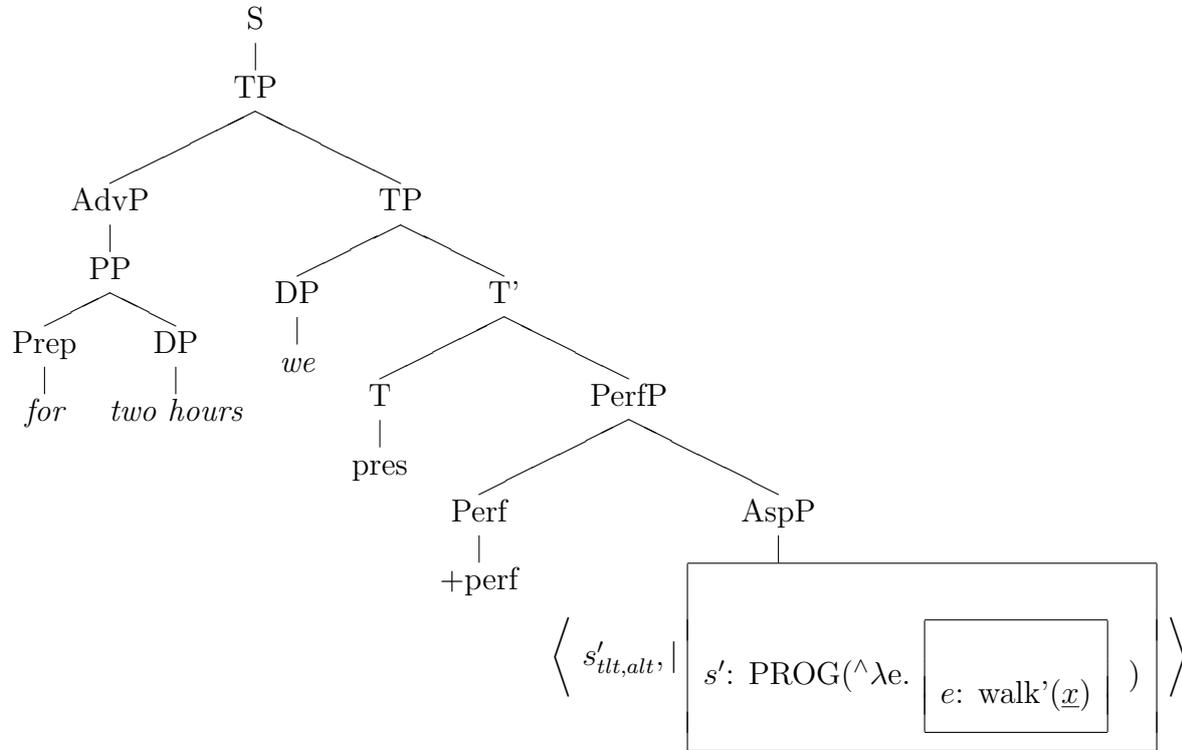
and thus not the kind of description to which *for*-adverbials can apply, and since the description isn't a target state description either, their isn't room either for the intention-related kind coercion we encountered in our Robin Hood examples.

So the only state-to-event coercion that works in this case is the inchoative one. We have seen that this coercion results in an identification of result state with input state, with the attendant effect that *alt* and *tt* are attached to what is de facto the same state. The representation that the perfect delivers as output is thus a state description. This description gets then located at *n* by present tense, but it remains a state description. So it is a state description that now meets the *for*-adverbial *for two hours*. Therefore *for two hours* can apply, and characterise the described state – the carrier of *alt* – as having the duration of two hours.

The difference between (8.33.d.ii) and (8.33.c.ii) is that in the latter sentence the input representation to the perfect operator is an event description. This means that no preparatory state-to-event coercion is necessary and therefore that none is possible. So the input representation to *for two hours* is a bounded event. Again the derivation crashes at this point, and since in this case there is no alternative, no coherent interpretation is possible at all, and the sentence comes out as incoherent.

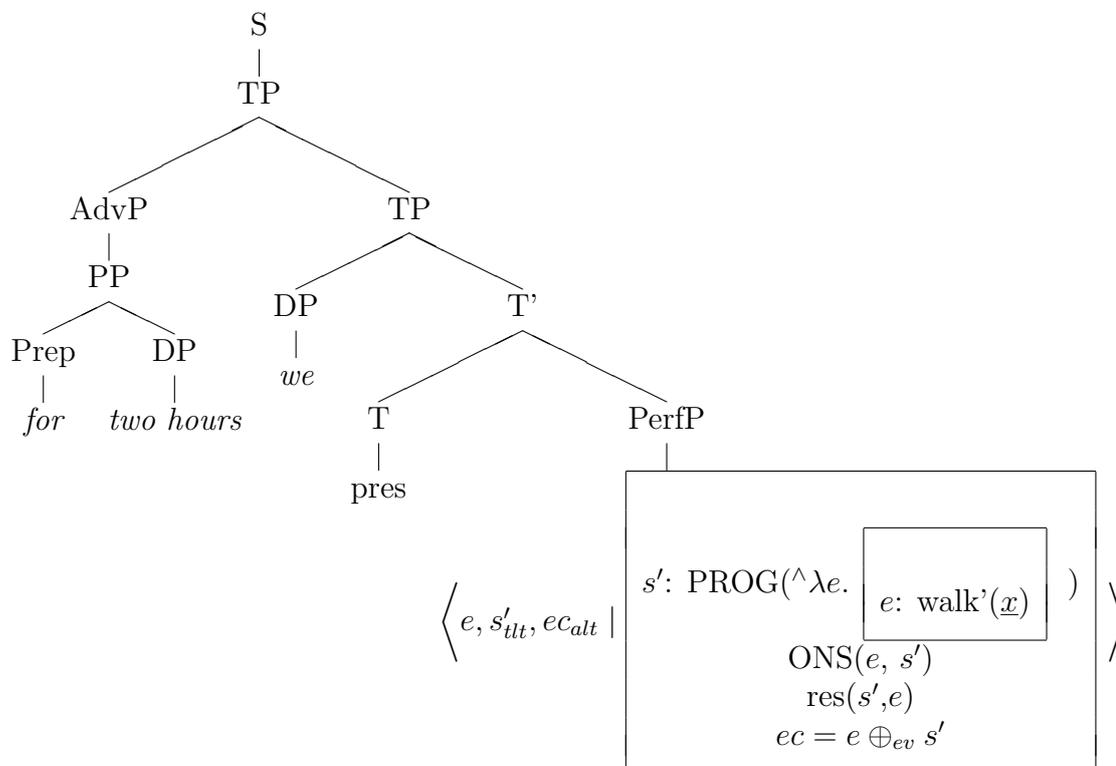
These considerations have got us close to where we want to be. We have accounted for the unacceptability of (8.33.c.ii) and for the fact that (8.33.d.ii) has only one reading. But we aren't quite done yet. What doesn't follow from our considerations is that (8.33.d.ii) ascribes the property of being two hours long to that part of the result state *s'* of the ONSET event *e* accommodated by inchoative coercion which lies in the past of *n*. To see the problem more clearly let us have a closer look at the representation construction for (8.33.d.ii), starting at the point where the AspP representation has been obtained. (Compare (4.36) in Section 4.5.)

(8.37)



If the perfect operator is now applied to the AspP representation in (8.37) in the same way that we made the transition from (4.34.b) to (4.35.b) in Section 4.5, the result we obtain is (8.38).

(8.38)

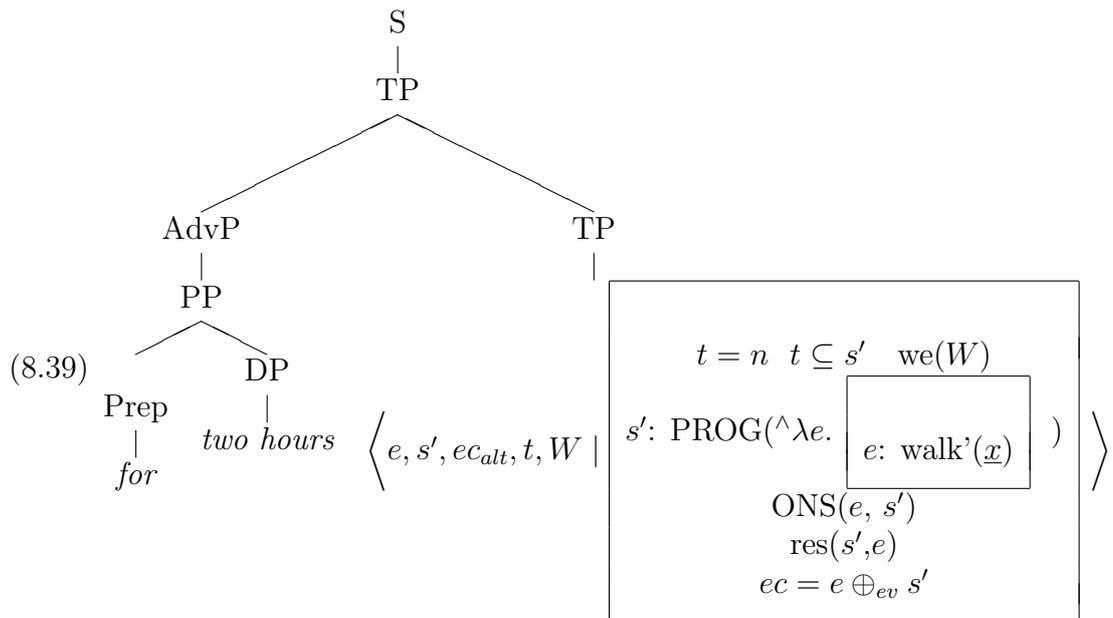


But what is then going to happen when a few steps later the lower TP representation is to be combined with *for two hours*? *for two hours* will treat its input representation as a description of that eventuality in its store which bears *alt*. If we continue the construction from (8.38) in the usual fashion – see (8.39) below – then this bearer will be the discourse referent *ec* from the PerfP representation in (8.38). But can the input representation to *for two hours* in (8.39) be seen as a homogeneous description of *ec*, and thus as one that fits the selection restrictions of a *for*-adverbial? That is not altogether clear, given that the lower bound of *ec* has been fixed as the ONSET *e* of the state *s'*. What is not fixed, however, is the upper bound of *ec*. And it is this lack of specification that is decisive. Intuitively, the applicability of a *for*-adverbial has to do with the possibility that a given eventuality might come to an end sooner or later: If the eventuality comes to an end in a given world *w* at time *t*, then in another world *w'* which coincides with *w* up to *t* (or to some time very shortly before *t*) that same eventuality might have continued for longer. And in yet other worlds *w''*, indistinguishable from *w* up to some time *t'* earlier than *t* but till falling within the occurrence of the eventuality, the eventuality might have stopped then and there. It is

this kind of contingency concerning the upper bound of ec that makes it a suitable argument for a *for*-adverbial predication. Such predications can be understood as concerning the question for how long a certain state or process may go on after it has started, even if the starting point itself is fixed and known.

The upshot of this is that our formulation of the selection restrictions of *for*-adverbials has been a little too strict. All that a *for*-adverbial requires is that its input representations be ‘open-ended’: they should impose no explicit upper bound on the eventualities they describe.

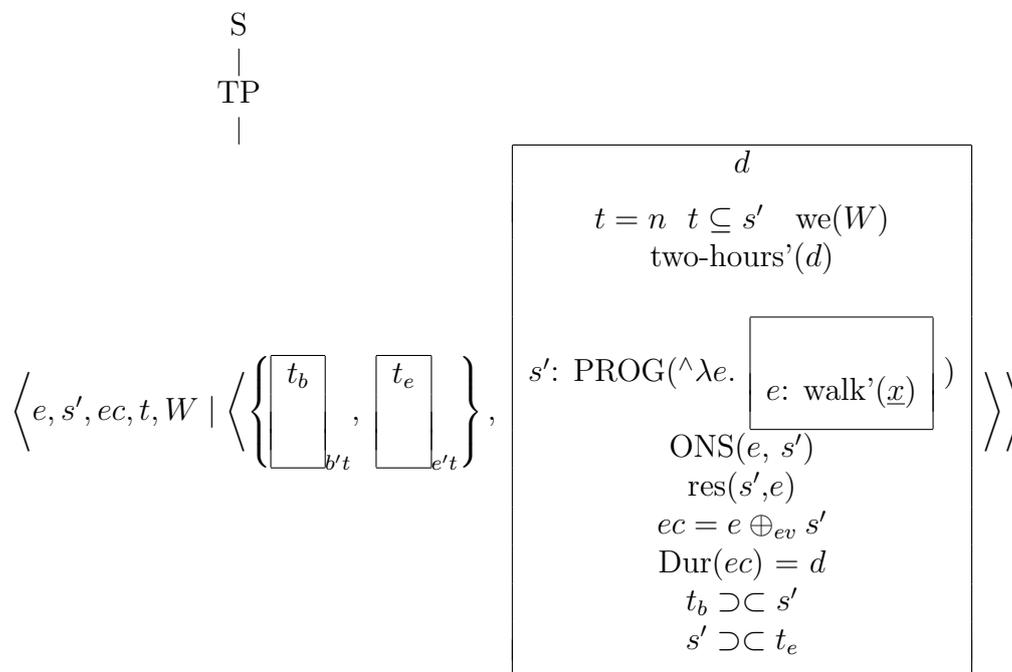
With this correction in place *for two hours* can be seen to be applicable to its input representation in (2.33), which is obtained from (2.32) by performing the by now all too familiar steps of (i) locating the utt -bearing s' as holding at n and (ii) integrating the subject DP *we*.



As we have argued, the TP representation of this structure is an admissible input to the *for*-adverbial *for two hours*. And the result of the application is that *for two hours* takes ec as its predication argument and adds the two bounds t_b and t_e with their presuppositions. The result is the structure in (8.40).

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(8.40)



To convert this structure into a DRS the presuppositions have to be resolved and the discourse referents in the store transferred to the universe of the non-presuppositional DRS. The first of these presuppositions has been de facto resolved already, since the lower bound of *ec* is specified as the ONSET *e* of *s'*. But what about the end point presupposition? Here there is one natural candidate, viz. the utterance time *n*, which has already made its entry into the interpretation as the tense location time for *s'*. And indeed, if we resolve the end point presupposition to *n*, then we do get the result we want, viz. that the *for two hours*-predication applies to that instance of the *ec* description provided by the TP representation of (8.39) that reaches from the ONSET *e* to *n*.

What is not yet accounted for is that *n* is the only admissible resolution for the end point presupposition in (8.40). Why that should be so is a question to which we have no fully satisfactory answer. However, that certain kinds of presuppositions should be resolved according to certain fully deterministic principles when they arise in certain types of context is not unusual.¹⁵

¹⁵ In fact, we have encountered examples of this in the course of this paper. Among them is the principle that when a clause contains a temporal locating adverb, then the eventuality bearing *alt must* be located by it. If there is no locating adverb in the sentence,

Resolving the beginning and endpoint presuppositions in this way and transferring the discourse referents from the store leads to the final representation in (8.41).

$$(8.41) \quad \begin{array}{c} e \quad s' \quad ec \quad t \quad W \quad d \\ t = n \quad t \subseteq s' \quad we(W) \\ \text{two-hours}'(d) \\ s': \text{PROG}(\lambda e. \boxed{e: \text{walk}'(\underline{x})}) \\ \text{ONS}(e, s') \\ \text{res}(s', e) \\ ec = e \oplus_{ev} s' \\ \text{Dur}(ec) = d \\ t_b \supset C s' \quad s' \supset C t_e \end{array}$$

This concludes our discussion of the interaction of perfects and the kinds of *for*-adverbials that we have considered up to this point. Let us summarise our main findings. First we looked at sentence-final occurrences of *for*-adverbials and found that they could be applied independently of the choice of tense so long as their selection restrictions are satisfied. For sentence-initial *for*-adverbials the options are a good deal more limited. In particular we found that their use is restricted when the tense of the clause is the present perfect. In that case a coherent interpretation can be obtained only when the input to the perf operator is a state description and this input is adjusted via inchoative coercion. And the interpretation that results in that case is always that the *for*-adverbial predication applies to a state of the kind described by the input representation to perf which reaches from its onset to the utterance time.

then there remains the option of finding a location for the *alt*-bearing eventuality in the context (and a certain pressure towards finding such a location for it). We have not treated temporal adverb location formally as a case of presupposition, but in spirit that is what it is and we could have opted for such a treatment: the presence of *alt* carries a presuppositional constraint to the effect that a temporal location ought to be found for the eventuality represented by the discourse referent bearing *alt*. Sometimes the resolution of this presuppositional constraint is fixed by the context in which the constraint appears; in other cases it is not.

But the *for*-adverbials considered so far – *for*-adverbials with ‘pure measure arguments’, as we will call them from now on – are not the only ones. The next section will be devoted to another type of *for*-adverbial.

8.6 *for*-Adverbials with Anchored Measure Phrases

In the *for*-adverbials considered up to now the DPs governed by *for* were always *pure* measure phrases – measure phrases like *two hours*, which act like terms whose denotations are amounts of time (and just that, one might be inclined to add). But besides *for*-adverbials with pure measure phrases we also find others in which the *for*-governed DP is what we will call an *anchored measure phrase*. Some examples are given in (??).

- (8.42)a. (i) For the first half hour/the first half of his lecture everyone was paying attention.
 (ii) Everyone was paying attention for the first half hour/the first half of his lecture.
- b. (i) For the second half/the last half hour of his lecture everyone was asleep.
 (ii) Everyone was asleep for the second half/the last half hour of his lecture.
- c. (i) For the first half hour/for the first five miles of that marathon I ran/was running.
 (ii) I ran/was running for the first half hour/for the first five miles of that marathon.
- d. (i) For the last half hour/for the last two miles of that marathon every part of my body hurt/was hurting.
 (ii) Every part of my body hurt/was hurting for the last half hour/for the last two miles of that marathon.
- e. (i) For the first half hour of his lecture everyone has been paying attention. (ii) Everyone has been paying attention for the first half hour of his lecture.
- f. For the last half hour of his lecture everyone has been asleep.
- g. * For the first half hour/for the first five miles of that marathon I have run.

- h. * For the last half hour/for the last two miles of that marathon every part of my body has hurt.
- i. (His lecture was really very long.) For the last half hour everyone was asleep.
- j. For the last half hour everyone has been asleep.
- k. For the last half hour everyone had been asleep.

In examples (8.42.a-d) the *for*-governed DP is a phrase that denotes an eventuality – an initial or final part of some particular lecture, or of a certain marathon race. In this regard these DPs differ from the amount-of-time denoting DPs that we have encountered as constituents of *for*-adverbials. Nevertheless, these *for*-adverbials are like the earlier *for*-adverbials with pure measure phrases in that they predicate duration of the eventualities they select as arguments, and they also impose the same selection restrictions. (As before, possible inputs are state descriptions, as in (8.42.a,b) and the progressive variants of the sentences in (8.42.c,d), and homogeneous event descriptions, as in the non-progressive variants in (8.42.c,d).) But they also do something more: They locate the eventuality they select as having occurred at (exactly) the interval denoted by the DP. Thus *for*-adverbials with anchored measure phrases do double duty, you might say: They locate and measure all at once. We can think of these two operations, however, as folded into one: the DP introduces a discourse referent t_{adv} for the interval it denotes and the *for*-adverbial adds the condition ‘dur(e) = t ’, which sets the duration of its referential argument e equal to this interval.

That it should be possible for a *for*-adverbial with an anchored measure phrase to do both of these things is not hard to account for. By virtue of denoting some particular eventuality, as in the first variants of the sentences in (8.42.a,b) which speak of the ‘first/second half of his lecture’, the DP can be construed as picking out a certain amount of time, viz. the duration of that eventuality; and by virtue of picking out that interval of time, it can be construed as picking out an amount of time, viz. the amount of time that interval represents. And when the DP directly refers to an interval of time, as in the second variants of (8.42.a,b) which speak of the ‘first/last half of his lecture’, an interval is denoted directly and an amount of time picked out via that interval in the way indicated. Thus the *for*-adverbial evidently contains all the information that is needed to locate the selected eventuality somewhere along the time axis and to assign a temporal size to it.

However, that *for*-adverbials with anchored measure phrases *do* in fact function in this double capacity is another matter, for which we do not have a

compelling explanation. (And we doubt that any could be given.) There are various forms of DPs that can pick out particular intervals – *the first half hour of his lecture*, *the half hour it took him to get through the first part of his lecture*, *the first part of his lecture* (provided it is clear what was the first part of the lecture and that it did take up thirty minutes) and so forth¹⁶ – and all of these determine, *ipso facto*, the amount of time that the denoted interval instantiates. But in order that such DPs perform the double duty of which we have spoken, they must be embedded in the right linguistic environment. Embedding them under *for* is one way of achieving this. (Arguably there are other forms of embedding which produce this double duty effect, but those will be ignored.¹⁷)

One way in which *for*-adverbials with anchored measure phrases appear to differ from *for*-adverbials with pure measure phrases is that they seem more natural in sentence-initial position. As the sentence pairs in (8.42.a-d) seem to indicate, it now is the sentence-final position that suggests a special information-structural effect, and not the sentence-initial one. We conjecture that this has to do with the locating role of such *for*-adverbials. But we will not pursue this conjecture here, for one thing because we want to keep the present paper free from information-structural considerations, which would add yet another layer of complexity.

The sentences in (8.42.a-d) are all in the simple past. This tense form is consistent with the assumption that the intervals denoted by the *for*-governed DPs is fully located in the past of *n*. This consistency is predicted for both the sentence-initial and the sentence-final occurrences of the *for*-adverbial. When the *for*-adverb is sentence-final, then it will operate on the homogeneous description that is passed up from the VP to AspP, locating it at the time t_{adv} denoted by its DP and pass the event description it produces as output up to PerfP. There the described event is located in the past of *n* by the feature value of T. The resulting interpretation is consistent so long as it is consistent to assume that the time represented by t_{adv} has a non-empty overlap with the past of *n*. When the *for*-adverbial is sentence-initial, then the eventuality described by the PerfP representation is first located by T

¹⁶ Note also the second variants *the first five miles*, *the last two miles* for the *for*-DPs in (8.42.c,d) which exemplify the widespread practice to indicate parts of motion events (or of their durations; it is difficult to decide between these two possibilities) by means of distance covered, rather than by the actual time needed to cover that distance

¹⁷ One such embedding context is provided by the direct object position of the verb *last*. An example: *Their relationship lasted the time it took them to find and move into an apartment for the two of them.*

as preceding n and the *for*-adverbial applied only then. Since at that point the eventuality representation is still homogeneous, application of the *for*-adverbial is still possible, and the final result is the same as it is when the *for*-adverbial is sentence-final.

The sentences in (8.42.e-j) differ from those in (8.42.a-d) in that their tenses are present perfects rather than simple pasts. The difference in tense manifests itself in ways that at this point, after all that has been said in Section 8.5.3, are more or less expected. But let us go through the different cases one by one. Sentence (8.42.e.i) is felicitous only when the interval denoted by the *for*-DP, viz. the first half hour of the lecture, has just gone by – as if the speaker wanted to say ‘so far, so good’. This restriction is predicted by our earlier observations and assumptions. The sentence-initial *for*-adverbial *for the first half hour* is like the *for*-adverbials with pure measure phrases discussed in the last section in that it only requires the perfect operator within its scope to be interpreted via inchoative coercion. The output representation of this construction step is the description of a state of the audience being asleep and this state must hold at n (the contribution made by present tense). This description is an acceptable input to the *for*-adverbial with its beginning point and end point presuppositions, and, as suggested in the last section, the natural resolution (and apparently, by virtue of some form of conventionalisation, the only one) of the end point presupposition is to n . That is, the state s' that serves as argument to the *for*-adverbial predication is one that ends at n . But this predication is now of the form ‘ $\text{dur}(s') = t_{adv}$ ’, which requires that t_{adv} , the denotation of the *for*-DP, denote an interval of which n is the upper bound. In other words, the sentence will be uttered felicitously only when the period described as ‘the first half hour of his lecture’ ends at the time when it is uttered.

(8.42.f) is like this too. It must be uttered at the moment when the last half hour of the lecture is over, and thus at the end of the lecture as a whole.¹⁸ But (8.42.e.ii), with its sentence-final occurrence of *for the first half hour*, raises some new questions. According to the principles we made use of in the last section this sentence should be acceptable also when uttered at times after the first half hour of the lecture has passed. Is that true? As far as intuition is concerned, this is a little less clear to us than it is for the present perfect sentences with sentence-final *for*-adverbials whose DPs are pure mea-

¹⁸ When the utterance is made at this time, then it would be slightly more natural to say ‘For *this* last half hour of his lecture everyone has been asleep.’ But in the form in which we have given it (8.42.f) seems to us to be acceptable as well.

sure phrases. This may be due to a tendency to interpret *for*-adverbials with anchored measure phrases as locating adverbs, which after all is one of their functions; such an analysis arguably favours a high attachment analysis even when the adverbial occurs at the end of its clause. We leave the question whether (8.42.e.ii) can be used felicitously at times that are clearly after the first half hour of the lecture – for instance, after the entire lecture is over – for a more careful investigation, empirical as well as theoretical.

The principles of Section 8.5.3 predict the sentences in (8.42.g) and (8.42.h) to be bad: Since the input to the perfect operator is an event description, there is no room for inchoative coercion, so the input for the *for*-adverbial is of the wrong kind and the derivation comes to a halt. This intuition is confirmed by the judgements of those we have consulted, but this is another case where more canvassing would be desirable.

What remains to be addressed are the principles that govern the interpretation of the anchored measure phrase DPs that are part of the *for*-adverbials discussed in this section. The *for*-DPs in (8.42.a-h) all have the form of partitive definite descriptions, with an embedded definite – *his lecture*, *that marathon* – which denotes that of which the denotation of the outer DP is a part. The superlative forms *first* and *last* serve to select a certain part of the denotation of the embedded DP, by a process that we do not go into here.

But what matters for our purposes is what happens when the *for*-DP contains *last* but no embedded DP under *of*, as in (8.42.i,j,k). In such cases the contribution of *last* to the denotation of its DP involves an element of anaphora and/or deixis. Some cases can be seen as fairly standard instances of bridging. (8.42.i) is one of those; the DP of the *for*-adverbial of the second sentence is understood as denoting the last half hour of the lecture mentioned in the first sentence. But other cases take the form of reconstructing the end point of the denoted interval, using for this purpose a time that is salient in the given context. Often this salient time has the status of the TPpt; in particular, when the TPpt is *n*, then the end of the denoted interval is the interval itself. Furthermore, when the DP occurs as part of a sentence-initial *for*-adverbial in a present perfect sentence, then, as we have seen, the end point of the denoted interval must be *n*. So the choice of *n* as end point of the DP denotation is obligatory. (8.42.j) is an illustration of this last case, (8.42.k) would in all likelihood be one where the end of the interval is a TPpt distinct from *n*.

This is in essence all we want to say about *for*-adverbials with anchored measure phrases. We wind the section up with a display of the most important stages in the representation computation of sentence (8.43), a simplification of (8.42.j) that avoids the irrelevant complication of nominal quantification.

(8.43) For the last half hour Fritz has been asleep.

The only part in the representation construction for (8.43) that is new and merits our attention is the construction of the representation for *for the last two hours* and its application to the representation of the lower TP. It is the construction of the *for*-adverbial representation that constitutes our main problem. What we offer here is a bit of a hack – one that we are forced into because we have decided against an in-depth analysis of the internal structure of *the last two hours* and the role that *last* plays in it. The hack takes the following form. We analyse *the last* as if it were a syntactic unit, an expression that plays the part of an operator that takes pure measure phrases as input and returns DPs that are anchored measure phrases. And furthermore, we only consider the interpretation option for *last* according to which it introduces a presupposition for its end point. So the ‘hack’ lexical entry for *the last* that we adopt can be assumed to have the form given in (8.44).

	the-last (category ?)	DP (pure measure phrase)
(8.44)a.	t	d
	Sel. Restr. time	amount of time

$$\text{b. } \left\langle t \mid \left\langle \left\{ \begin{array}{c} t_{end} \\ \hline \end{array} \right\} \right\rangle, \left[\begin{array}{c} t \supset \subset t_{end} \\ \text{Dur}(t) = d \end{array} \right] \right\rangle$$

We also need a new entry for temporal *for* that documents the way it can apply to anchored measure phrases, which on the present analysis directly denote times rather than amounts of time. (Ideally this entry should be unified with our earlier entry for *for*, but that too would require a deeper and more careful analysis of the structure of *for*-adverbials with anchored

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measure phrases than we are prepared to face in this paper.) The entry we adopt for the purpose of constructing the semantics for (8.43) is that in (8.45).

	for (prep. (temp.))	DP (oblique)
	ev	t
(8.45)a.	Sel. Restr. event	time
	Restr. homogeneous eventuality	
	on Input description	
	Repres:	

$$\text{b. } \left\langle ev \mid \left\langle \left\{ \begin{array}{c} t_b \\ \text{beg.pt} \end{array} \right\}, \left\{ \begin{array}{c} t_e \\ \text{endpt} \end{array} \right\} \right\rangle, \left[\begin{array}{c} t_b \supset C ev \quad ev \supset C t_e \\ \text{dur}(ev) = t \end{array} \right] \right\rangle \rangle$$

Two construction steps – the first combining the semantics specified for *the last* in (8.44) with that of the pure measure phrase *two hours* and the second combining the result of this with the lexical semantics of *for* in (8.44) – lead to the representations in (8.46.a) and (8.46.b).

$$\text{(8.46)a. } \left\langle t \mid \left\langle \left\{ \begin{array}{c} t_{end} \\ \text{end} \end{array} \right\} \right\rangle, \left[\begin{array}{c} d \\ t \supset C t_{end} \\ \text{Dur}(t) = d \\ \text{two-hours}'(d) \end{array} \right] \right\rangle \rangle$$

$$\text{b. } \left\langle ev \mid \left\langle \left\{ \begin{array}{c} t_b \\ \text{beg.pt} \end{array} \right\}, \left\{ \begin{array}{c} t_e \\ \text{endpt} \end{array} \right\}, \left\{ \begin{array}{c} t_{end} \\ \text{end} \end{array} \right\} \right\rangle, \left[\begin{array}{c} d \\ t \supset C t_{end} \\ t_b \supset C ev \quad ev \supset C t_e \\ \text{dur}(ev) = t \\ \text{Dur}(t) = d \\ \text{two-hours}'(d) \end{array} \right] \right\rangle \rangle$$

(8.47) gives the construction stage at the point where the representations of the lower TP and the *for*-adverbial are in place. The structure is reminiscent

presupposition gets resolved to the ONSET event e and the end point presupposition to the utterance time n . To obtain a coherent interpretation, the presupposition introduced by *(the) last* must be resolved to n as well, but we have seen that this is one of the admissible resolutions for such presuppositions. These resolutions, followed by transfer of the discourse referents from store to DRS universe, give as the representation in (8.48).

$$(8.48) \quad \boxed{\begin{array}{l} ec \ e \ t' \ t \ s' \ f \ d \\ \text{Fritz}(f) \\ e \supset C \ ec \ ec \supset C \ n \\ \text{dur}(ec) = t \ \text{Dur}(t) = d \\ \text{two-hours}'(d) \\ t = n \quad t \subseteq s' \\ s': \text{asleep}'(f) \\ \text{ONS}(e, s') \\ \text{res}(s', e) \\ ec = e \oplus_{ev} s' \end{array}}$$

8.7 German equivalents of English *for*-phrases

What is expressed by temporal *for*-phrases in English is typically expressed in German either by ‘bare measure phrases’ or by phrases in which a the ‘dimensional’ adjective *lang* is modified by a pure measure phrase. More specifically, in (8.49) there are a few *for*-adverbials with their German equivalents.

(8.49)

English	German transl. 1	German transl. 2
<i>for two hours</i>	<i>zwei Stunden</i>	<i>zwei Stunden lang</i>
<i>for the last two hours</i>	<i>die letzten zwei Stunden</i>	
<i>for the first two hours</i>	<i>die ersten zwei Stunden</i>	
<i>of his lecture</i>	<i>seines Vortrags</i>	
<i>for the last two miles</i>	<i>die letzten zwei Meilen</i>	

The question why English and German express durative modification in these different ways may well be a rather deep one, but it is one we must leave to others. We just note a few more of the facts and make some hints regarding

possible explanations. First, there is the question why German has the constructions *zwei Stunden lang* and *zwei Stunden*, but English does not. One part of the answer must have to do with the fact that European languages differ in their tolerance towards measure phrase modifications of the positive forms of adjectives. For many languages, measure phrase modification of comparative adjectives is freely available (so long, of course, as the unit of measurement indicated by the head of the measure phrase is compatible with the adjective). That is as true of English as it is of German. Thus we find *two hours longer/zwei Stunden länger two pounds heavier/zwei Pfund schwerer, two degrees hotter/zwei Grad wärmer* and so forth. But measure phrase modification of positive adjectives is more restricted – for instance, neither in English nor in German can one say * *35 degrees hot/35 Grad warm*. But in English this type of modification is even more restricted than it is in German. English does allow for it when the adjective is a so-called ‘dimensional’ adjective, indicating a certain dimension within 3-dimensional space, as found in a sentence like ‘This box is 40 cm long, 25 cm wide and 15 cm high.’[See Bierwisch and Lang]. But time has only one dimension to begin with, so there never is a need to select a dimension within it. This, we conjecture, is why *two hours long* is not an option. But in German, which is less restrictive in this regard, the corresponding phrase, *zwei Stunden lang*, is acceptable.

The role that *zwei Stunden lang* plays in sentence (8.50.a) is the same as that of *for two hours* in its English translation (8.50.b). That is, both *zwei Stunden lang* and *for two hours* play the part of an adverb; *for two hours* exemplifies the adverbial use of PPs and *zwei Stunden lang* the adverbial use of Adjective Phrases.¹⁹

- (8.50)a. Fritz arbeitete zwei Stunden lang.
 b. Fritz worked for two hours.
 c. Fritz arbeitete zwei Stunden.
 d. Fritz arbeitete für zwei Stunden.

¹⁹ German adjectives can be used as adverbials without special morphology, unlike English adjectives, which for the most part require modification by the suffix *-ly*. What distinguishes adverbial uses of German adjectives from their prenominal uses is the absence of nominal declension, compare e.g. (8.50.a) with *die zwei Stunden lange Arbeit* (‘the two hours long work’). Predicative uses of German adjectives are in this respect like adverbial uses, e.g. *Die Sitzung war lang* (‘The meeting was long.’). English *long*, by the way, is one of the comparatively few adjectives that cannot be turned into adverb by suffixing *-ly*. But it can be used as adverb without modification; it is just that it cannot be modified by measure phrases: ‘I won’t stay (*two hours) long.’

For phrases of the type *zwei Stunden*, as they occur in sentences like (8.50.c), two analyses come to mind. According to the first, *zwei Stunden* is elliptical for *zwei Stunden lang*. (This is not implausible given that *lang* is semantically redundant in this context; the relevant dimension – of time – is selected by the measure unit noun *hour* in any case.) On this analysis *zwei Stunden* in (8.50.c) is an instance of an adverbially used AP. On the second analysis *zwei Stunden* in (8.50.c) is a DP with the status of some kind of direct object. (The origin of such direct objects might be the same as that proposed by Kratzer (??) for the direct objects of transitive verbs with unergative intransitive alternates, such as *schreiben* ('write').) We do not know which of these analyses is the right one.

And finally, what about the phrase *für zwei Stunden* in (8.50.d)? Earlier in Section we said that (8.50.d) cannot be used to express what is expressed by (8.50.a-c): that there was a bout of work by Fritz which went on for two hours. But is it really true that (8.50.d) cannot express this? That is not all that clear after all, even if the use of *für zwei Stunden* for this use feels 'marked' and there is a lingering feeling of intention: that Fritz started his work with the intention to work for two hours. We suspect that the more restricted use of *für zwei Stunden* as compared with *for two hours* is an effect of the availability of the alternatives *zwei Stunden* and *zwei Stunden lang*, which English lacks. In the remaining paragraphs of this section *für*-phrases will not be considered.

What matters more directly to the over-all argumentation of this paper are the semantic contributions *zwei Stunden* and *zwei Stunden lang* make to the sentences in which they occur as temporal adverbs and in particular their interactions with perfects. As regards the semantics of such adverbials, there is nothing to be added to the observation that they function in the same way as *for*-adverbials with pure measure phrases: they select for homogeneous input representations and turn these into (non-homogeneous) descriptions of an event that satisfies the input representation and that lasts for the amount of time denoted by their DP. Furthermore, they are also like *for*-adverbials with pure measure phrases in that when they cooccur with a perfect, they operate on the representation that would be the input to the perf operator had they been absent. We leave the question how syntax and syntax-semantics interface make sure that it is always to this representation that they are applied. (*zwei Stunden* and *zwei Stunden lang* can also occur in sentence-initial position, but – like *for*-adverbials with pure measure phrases – with clear information-structural implications.)

At first sight the ways in which *zwei Stunden* and *zwei Stunden lang* interact with the German perfect differ from the interactions we see in English. But at this point there is nothing very surprising about these differences. As expected at this point of our investigation, the combination of German perfects and these durative adverbials is subject to fewer constraints than the combination of the English perfect and a *for*-adverbial. But this is due to two factors, with which we are already well familiar and neither of which has anything to do with the durative adverbials as such: (i) the German perfect is subject to fewer restrictions than the English present perfect, and (ii) German doesn't have overt morphological marking of the distinction that English expresses by the presence or absence of the progressive. Thus the German sentence in (8.51.a) is grammatical, whereas its English counterpart in (8.51.b) is not because of the conflict between the present perfect and *yesterday*. And the sentence in (8.51.c) can be accepted too (although somewhat strained because of the state-to-event coercion that is needed to apply *zwei Stunden (lang)*, whereas (8.51.d) is 'ungrammatical twice over', because of the same clash as in (8.51.b) and because of the impossibility to coerce 'write a letter' into a state description. (The corresponding state description requires the progressive.)

- (8.51)a. Gestern hat Fritz zwei Stunden (lang) gearbeitet.
 b. Yesterday Fritz has worked for two hours.
 c. Gestern hat Fritz zwei Stunden (lang) einen Brief geschrieben.
 d. Yesterday Fritz has written a letter for two hours.

German also has an equivalent to *for*-adverbials with anchored measure phrases. But in this case only the version without *lang* is possible. In other words, we find, say, *die letzten zwei Stunden*, but not *die letzten zwei Stunden lang*.²⁰ And as we noted for *for*-adverbials with anchored measure phrases in English, sentence-initial occurrences of such constituents are more natural than they are for pure measure phrases.

- (8.52)a. Fritz hat die letzten zwei Stunden gearbeitet.
 (Fritz has been working for the last two hours.)
 b. Die letzten zwei Stunden hat Fritz gearbeitet.
 (For the last two hours Fritz has been working.)

²⁰ This suggests an internal direct object analysis for such phrases, which in turn adds weight to the option of such an analysis for constituents that consist of a pure measure phrase without *lang*, such as *zwei Stunden*.

As far as we can see, there is no significant difference between the semantics of any of the three types of duratives discussed in this section and that of the *for*-adverbials discussed in the previous sections. So we don't think that much can be gained from going through actual representation constructions involving them. We will therefore leave these expressions for what they are and move to the next topic of Section 8, German temporal adverbials formed with *seit*.

8.8 *Seit*-Adverbials

The first point of which to remind ourselves is that German *seit*-phrases are now-extenders: they are compatible with the normal use of the present tense (see Section 7)

- (8.53)a. Seit letzter Woche ist Fritz krank.
 (Lit. Since last week is Fritz ill.)
 (Since last week Fritz has been ill.)
- b. Seit halb acht arbeitet Fritz.
 (Lit. Since half eight works Fritz.)
 (Since 7.30 Fritz has been working.)

So we will analyse *seit*-phrases as partial specifiers of the 'discourse-now': A present tense sentence containing a *seit*-phrase is true iff there is a state of the kind described which holds throughout an interval which includes *n* and has been extended with the denotation of the *seit*-phrase.

seit-phrases come in different varieties. The main division is between:

(i) *seit* phrases in which *seit* is followed by a phrase that specifies a time, as in *seit halb acht* these we will call 'S(tarting)T(ime) *seit*-adverbials' – and

(ii) *seit* phrases in which *seit* is followed by a pure measure phrase (as in *seit zwei Stunden* – these we will call 'M(easure)P(hrase) *seit*-adverbials'. Moreover, variety (i) can be subdivided further. The time-specifying phrase following *seit* can be either a DP or a clause, and furthermore the DP can be either one which denotes a time or one which denotes an event. (8.54) gives examples of the four options.

- (8.54)a. seit halb acht

- b. seit dem Zweiten Weltkrieg
(since the Second World War)
- c. seit Fritz nach Stuttgart umgezogen ist (lit: since Fritz to Stuttgart moved has)
(since Fritz has moved to Stuttgart)
- d. seit zwei Stunden
(lit: since two hours)
- e. Seit Fritz in Stuttgart wohnt, ist er deprimiert.
(lit: Since Fritz in Stuttgart lives, is he depressed)
(since Fritz has been living in Stuttgart.)
- f. Seit Fritz in Indien war/gewesen ist, ist er ein anderer Mensch.
(lit: since Fritz in India was/been is, is he a different person)
(Since Fritz has been to India, he has been a different person.)

The semantics of ST-*seit*-phrases (those of variety (i)) is as follows. The *seit*-phrase denotes an interval which starts with the time provided by the phrase or clause that is governed by *seit*. Furthermore, the interval ends with a time that the *seit*-phrase does not explicitly mention but that is always the TPpt of the clause of which the *seit*-phrase is a constituent. As (8.54) shows, the specification of the starting time can take different forms. The specifying expression can either be a time denoting DP, as in (8.54.a), in which case the starting time is just the time denoted by the phrase; or it can be an event-denoting phrase, as in (8.54.b), in which case the starting time is the duration of the denoted event; or it can be a clause describing an event, as in (8.54.c), in which case the starting time is, once again, the duration of that event.

MP-*seit*-phrases (the phrases of variety (ii)) denote their intervals according to a different principle. Here the starting time is given by ‘subtracting’ the amount of time denoted by the measure phrase that is governed by *seit* from the end point, i.e. from the TPpt determined by the environment in which the *seit*-phrase occurs. Thus, when (8.54.d) occurs as part of a present tense sentence, which selects n as TPpt, the interval denoted will be the interval that extends backwards from n over a period of two hours. (In other words, it is the interval that reaches from two hours ago up to and including now.)

An interesting case is (8.54.e). Here the clause governed by *seit* a state description. This too is an *seit*-ST-phrase. But its semantics indicates that *seit*-ST-phrases come with a selection restriction to the effect that the phrase or clause governed by *seit* must specify either a time or an event. On this

view the interpretation of (8.54.e) requires coercion, and, as we will argue in the next paragraph, this coercion can only be inchoative. So it is the duration of the event resulting from that coercion, i.e. the start of the state described by the complement clause of *seit*, which ends up being the event supplied by the complement. In this way it is the starting time of the state described by the complement that becomes the starting point of the interval that is denoted by the *seit*-phrase.

When we dealt with state-to-event coercion in connection with the perfect in Section 4, we found that such coercions can take one of two forms, of which inchoative coercion is just one. The other form was coercion via closure. What entitles us to postulate that in the case of (8.54.e) only inchoative coercion is an option? The reason is this. Temporal adverbials typically come with a presupposition of proper reference. That is true in particular of locating adverbs. Their task is to specify a time to which the relevant eventuality can be temporally related. When no time is supplied, then the location operation cannot be carried out and the interpretation process aborts. In fact, all locating adverbs we have considered in this paper did come with a reference presupposition. But there was no need to draw attention to it, since it was always intuitively obvious that those presuppositions were satisfied (as with adverbs like *today* and *yesterday* or PPs involving definite descriptions like *Sunday*, *the first of January* and so on. English *for*- and German *lang*-adverbials with anchored measure phrases also come with reference presuppositions for their embedded DPs. Again we did not draw explicit attention to this, but took the assumption for granted that these DPs – *the first half (hour) of his lecture*, *the last half hour*, etc. – all of which were definite descriptions, do come with reference presuppositions.

ST-*seit*-phrases too come with a reference presupposition. When their complement is a DP, then this presupposition is simply the reference presupposition for DPs of its kind. When the complement is a clause, then the presupposition requires that the clause supply an actual eventuality from which the starting time of the interval denoted by the *seit*-phrase can be derived. And that requires that the complement clause be true, i.e. that there is an eventuality that satisfied all the conditions that the clause imposes on it. But in the case of (8.54.e) the complement clause is in the present tense, and an eventuality that instantiates it is a state – that of Fritz living in Stuttgart – that holds at the utterance time. Suppose now that we subject this state description to state-to-event coercion via closure. Then that would give us an event that stretches across *n*. Presumably such coercions are excluded on general grounds. But in any case it is clear that such a coercion wouldn't do

in the case of (8.54.e). For the event obtained by coercion must be able to serve as starting point for the interval denoted by (8.54.e) and therefore must precede the end point of that interval, which is the TPpt. And the TPpt for the interpretation of the clause of (8.54.e) is n .²¹ Since coercion via closure is excluded on these grounds, inchoative coercion is the one remaining option.

It is interesting in this connection to compare (8.54.e) with (8.54.f). (8.54.f) does involve coercion via closure. But note that here it is not *seit* which triggers the coercion, but the perfect of its complement clause. German perfects, we argued in Section 4, only allow for state-to-event coercion via closure. And once the perfect of the complement clause has been interpreted in this way, an event description has been obtained, and no further coercion is needed to interpret *seit*.

For the time being this gives us a sufficiently precise description of the denotations of the different types of *seit*-adverbials. But what part do these denotations play in the semantics of sentences containing *seit*-phrases as adverbials? We will approach this questions in stages, first looking at the types of sentences which led us to classify *seit*-adverbials as now extenders in Section 7, i.e. at present tense sentences, and then at sentences with other tenses.

We start with a sentence with a minimum of complications. It is given in (8.55) gives examples of the four options.

(8.55) Seit dem ersten Januar 2001 wohnt Fritz in Stuttgart.

We already identified *seit*-adverbials as now-extenders. But we can now see more clearly in what way they are. They are, you might say, ‘one-sided’ extenders, which only specify the left hand side of the extended now. That is, in terms of the modification of the semantic representation of the present tense proposed at the end of Section 7, *seit*-phrases make their contribution to the semantics of present tense sentences by identifying the part of the extended now representative t_{xn} that precedes n with their own denotation t_{seit} . Assuming that the TPpt which the *seit*-adverbial selects for the end point of its denotation is the same that is involved in the interpretation of

²¹ As the argument is stated, there is a slight hitch to it. When providing a first outline of the semantics of *seit*-phrases a few paragraphs above we said that the end point of the interval denoted by a *seit*-phrase is the time serving as TPpt. But what we had in mind there was the TPpt for the clause that contains the *seit*-phrase as a constituent, not the TPpt of the clause that is part of the *seit*-phrase (in case *seit* governs a clause rather than a DP). However, we will see that in all cases – or at any rate all cases of which we are aware – the two TPpts – that for the main cause and that for the *seit*-clause – coincide.

Tense we can capture this by only stating that the beginnings of t_{seit} and t_{xn} coincide. There is more than one way in which this can be made formally explicit. The way for which we opt has the modest advantage that it doesn't require us to introduce new notation into our formalism. It consists in postulating a time t_{beg} with the conditions that it left-abuts both t_{seit} and t_{xn} : ' $t_{beg} \supset \subset t_{seit}$ ', ' $t_{beg} \supset \subset t_{xn}$ '.

It is now clear how the interpretation of (8.55) should go: the semantic representation of its PerfP node is the description of a state $s_{tt,alt}$ of Fritz living in Stuttgart. The present tense value at T locates this state via the condition ' $t_{xn} \subseteq s$ '. The function of the TP adjunct *seit dem ersten Januar 2001* is then to specify the part of t_{xn} that is in the past of n as coinciding with its denotation t_{seit} . This seems to capture the truth conditions of (8.55) well enough. But as it stands it still leaves a few questions unanswered. First: Is specification of t_{xn} the only contribution that the *seit*-phrase makes to the semantics of this and other sentences containing *seit*-adverbials, or do such adverbials also have a role to play as temporal locating phrases? And second: Exactly how is the denotation of the starting point constituent *dem ersten Januar 2001* of *seit dem ersten Januar 2001* semantically related to the beginning point of t_{xn} ? So far we have finessed this question, adopting the implicit assumption that the denotations of the complements of ST-*seit*-phrases are points. But it is obvious that they aren't. The denotation of *dem ersten Januar 2001* is a day and very day has a beginning and an end. When the duration of the denotation of a ST-*seit*-complement is short as compared to the duration of the denotation of the *seit*-phrase as a whole, then this question may seem to have little practical importance. Whether the eventuality described by the clause did or did not obtain during the denotation of the *seit*-complement tends to feel like hair-splitting – descending to a level of granularity that is too fine to capture the pragmatics of the content that the sentence tries to express. But in cases where the complement denotation is of a more comparable magnitude to that of the *seit*-phrase, the question gains intuitive substance, and it is one that has been addressed in the literature [e.g. Mittwoch 1988 or 2008]. We will return to the first question in Section 8.7.1, where we look more closely at the representation construction for (8.55). The second question will be postponed to Section 10, in which we deal with temporal quantification.

It is worth noting that when the complement of *seit* is a finite clause, as in (8.54.e,f), there is no close correlation between the tense of the *seit*-clause and that of the main clause. The only requirement is that the tense of the *seit*-clause be suitable for describing the *seit*-clause eventuality – the eventu-

ality which marks the beginning of the *seit*-interval and which must therefore lie before the TPpt of the main clause – from that TPpt. Thus, in (8.54.e,f), where the main clause tense is the present tense, each of the *seit*-clause tenses displayed – simple present, simple past and present perfect – is acceptable, as each of these can be interpreted as involving the TPpt n.

There is, however, a further twist to this. The simple past of the *seit*-clause of (8.54.f) can be interpreted as involving the feature past_1 , in which case it serves to describe an eventuality in the past of n. But for the present perfect of (8.54.f) and the simple present of (8.54.e) this is not so, or at least not obviously so. But the semantic intuitions we connect with these cases are obvious enough. The simple present of (8.54.e) provides the start of the denotation of the *seit*-adverbial by way of its own beginning. We can explain this by assuming that *seit* imposes on its complement the selection restriction that it provide either a time or an event. If the complement is a clause providing a state description, then state-to-event description is needed. For the present tense *seit*-clause of (8.54.e) only inchoative coercion will yield an event that precedes the TPpt n, so that is the mode of coercion that must be chosen in this case.²² (The result of this is that the past+present state of Fritz living in Stuttgart which is described by the *seit*-clause coincides with the denotation of the *seit*-adverbial. But that is an indirect effect.)

Given the commitments we have made in earlier sections, the contribution of the present perfect *seit*-clause of (8.54.f) must involve state-to-event coercion as well and again only inchoative coercion yields a coherent result. This time the state described is a result state of an earlier event and inchoative coercion returns that event. (Had we assumed that the German present perfect can be interpreted as a simple past, then the present perfect *seit*-clause of (8.54.f) could be interpreted as describing a past state of Fritz being in India. Since *seit* requires an event, state-to-event coercion will have to be involved in this case too, either as part of interpreting the present perfect itself or as preparatory step to combining of *seit*-clause interpretation with the semantics of *seit*. If we were to assume in addition that the German present perfect requires state-to-event coercion irrespective of whether it is otherwise interpreted as a simple past, then that would mean, in the light of

²²This entails that inchoative coercion is possible in this case. In Section 4 we argued that inchoative coercion is not possible for the German present perfect. In the light of the present observation it is clear that the non-admissibility of inchoative state-to-event coercion is a property of this particular operator (i.e. the *German present perfect* (as opposed to the English present perfect). It is not a feature that distinguishes German from English in general.

our assumptions in Section 4, that the coercion involved would be via closure. That would entail that – on this interpretation – the beginning of the interval denoted by the *seit*-adverbial is the ‘event’ of Fritz being in India (i.e. his visit to India), which fits our intuitions about the meaning of (8.54.f.)

Clauses with *seit*-adverbials can have other tenses besides the simple present. Examples are given in (8.56).

- (8.56)a. Seit 1998 hat Fritz in Stuttgart gewohnt. (Aber jetzt zieht er um/ist er gerade ausgezogen.)
(Since 1998 Fritz has lived in Stuttgart. (But now he is moving/he has just moved out.))
- b. Seit gestern hat Fritz (mindestens) dreimal angerufen.
(Since yesterday Fritz has called (at least) three times.)
- c. Seit letztem Sonntag hat Fritz jeden morgen angerufen.
(Since last Sunday Fritz has called every morning.)
- d. ?* Seit gestern hat Fritz angerufen.
(Since yesterday Fritz has called.)
- e. Seit Januar war Fritz krank.
(Since January Fritz had been ill.)
- f. Seit Januar war Fritz krank gewesen.
(Since January Fritz had been ill.)
- g. Im Sommer werden wir in unseres neues Haus einziehen. Ich werde dann seit dem ersten März/seit drei Monaten bei Siemens arbeiten/gearbeitet haben. . . .
(In the summer we will move into out new house. Since the first of March/for three months I will then have been working for Siemens. . . .)

The good examples in (8.56) can be subdivided into two types, those that involve the TP_{pt} n (8.56.a,b,c) and those that involve a TP_{pt} distinct from n, either preceding n (8.56.e,f) or following it (8.56.g)²³. The latter cases do not demand special attention: Their semantics follows from what have said and will say about the cases with TP_{pt} n together with what was established in Section 6 about tenses involving TP_{pts} that precede n. But the first three examples, together with the unacceptable (8.56.d), do require a comment. The first sentence of (8.56.a) is well-formed and coherent and its meaning

²³ Examples like (8.56.g) are rare, but that is because examples with future-shifted TP_{pt} are rare in general

is close to that of the simple present tense sentence ‘Seit 1998 wohnt Fritz in Stuttgart.’ But there is nevertheless a clear difference: the latter sentence entails that Fritz is living in Stuttgart now. (8.56.a) does not entail this. (There may even be a tendency for it to be understood as entailing the contrary; but we are inclined to believe that that is a pragmatic effect: if the simple present tense form entails that the described state holds the utterance time, and the present perfect form does not, then the choice of the present perfect form will often implicate that the stronger condition does not obtain, i.e. that the state does not hold at n.

(8.56.b) and (8.56.c) are fully acceptable sentences too, and in this respect they differ from (8.56.d). The difference between (8.56.a,b,c) on the one hand and (8.56.d) on the other is that in the former the input to the *seit*-adverbial is a state description, whereas in (8.56.d) it is hard to interpret this input in any other way than as an event description. In (8.56.b) and (8.56.c) the input representation is the description of a *quantificational state* ((Reyle et al. 2007)). Such states have long been playing an important part in the discussion of perfects and especially of the present perfect in English, though, we would contend, often because discussions have failed to recognise their status for what it is: In general quantification gives rise to state descriptions and this has the effect that quantifying expressions – expressions that can or must be interpreted as introducing an element of quantification – can turn what would otherwise have been an ill-formed present perfect sentence into a well-formed one. (8.56) shows an example of this: (8.56.d) is ill-formed, but the addition of *dreimal* in (8.56.b) renders the sentence acceptable; and that is because *dreimal* is naturally interpreted as turning its input description – the description of an event of Fritz calling – into a quantification state description.

Quantificational states will be the topic of Section 10. The reason for mentioning quantification here is to provide additional support for the general claim we want to make, viz. that *seit*-adverbials select for homogeneous eventuality descriptions. It is this selection constraint that explains why (8.56.a,b,c) and the full sentences in (8.54) are well-formed while (8.56.d) is not.²⁴ We honour this principle with its own reference number:

²⁴ We have marked (8.56.d) with a ‘?’ to indicate a slight hesitation about whether the sentence should be wholly dismissed. The reason for this hesitation is that it is perhaps marginally possible to (re-)interpret the input representation to the *seit*-adverbial of this sentence as a case of quantification, and thus as the description of a (quantification) state. On such an interpretation the sentence would become equivalent to ‘Seit gestern hat Fritz einmal angerufen.’ (Since yesterday Fritz has called once.) In fact, these paraphrases, with

(8.57) *seit*-adverbials are durative temporal adverbs, in the sense that they select for (semi-)homogeneous eventuality descriptions as input representations.

Our conclusion, then, is that *seit*-adverbials too are ‘durative’ adverbials in that they select for homogeneous descriptions.²⁵ The further facts about the tenses with which they can combine, and which they may contain in case their complements are clausal, follow from two principles: (i) *seit*-adverbials are now extenders; (ii) *seit*-adverbials denote temporal intervals that reach from the times or events supplied by their complements up to the TPpts of the clauses that contain them as adverbial constituents.

8.8.1 Two constructions with *seit*

The role of *seit*-adverbials as now extenders introduces a new element into the representation constructions for sentences in which this role is important – that is, sentences whose main verb is in the simple present tense. The example of such sentences that we will look at more closely from this perspective is our earlier (8.54.e), repeated here as (8.58).

(8.58) Seit Fritz in Stuttgart wohnt, ist er deprimiert.
(since Fritz has been living in Stuttgart.)

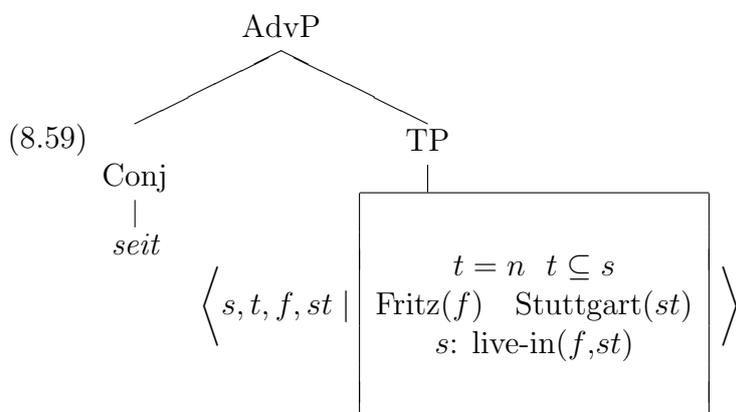
As noted in Section 7 and elaborated in the preceding one, the contribution made by the *seit*-adverbial to (8.58) is that of adding information about the extended now: it says that the discourse-relevant present extends as far into the past as its (the *seit*-adverbial’s) own denotation. There are various ways

their explicit quantifying devices *einmal/once* sound very much better than (8.56.d) and its literal English translation. It may be that speakers vary in their ability to accommodate the missing quantifying device in the German or English version of (8.56.d). For us these accommodations are virtually impossible.

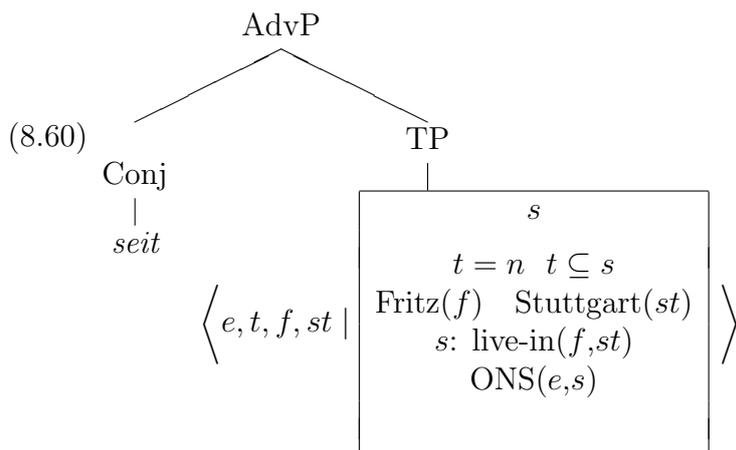
²⁵ We add one word of caution here. The assumption that *seit*-adverbials select for (semi-)homogeneousness is a natural one in the light of our conclusions about the types of durative adverbs considered in the earlier parts of Section 8, *for*-adverbials and their German equivalents. And the assumption is also consistent with the facts about sentences with *seit*-adverbials we have observed. But we should not forget that German event descriptions are generally, and for the most part easily coerced into state descriptions. So (8.57) competes with an alternative principle, according to which *seit*-adverbials select for state descriptions. So long as we are just concerned with *seit*-adverbials, the choice between these two ways of stating their selection restrictions may not matter much. But the point gains some importance when *seit*-adverbials are compared with their English counterparts the *since*-adverbials. We will return to this point in Section 8.9.

in which this understanding of the contribution made by *seit*-adverbials to simple present tense clauses can be formalised. The one we have chosen is to simply require that the denotation of the *seit*-adverbial is included within n . That *seit*-adverbials can play the role of now extenders is one of the lexical properties of *seit*. We will not provide an exhaustive formal version of how this information is encoded in the lexical entry for *seit* or how it can percolate up to the semantic representation of a *seit*-adverbial, but simply assume that it is available in the form of a subscript $n-ext$ on its semantic representation. It is this subscript which licenses and triggers the contribution of the condition ‘ $t' \subseteq s'$ ’, with t' representing the denotation of the adverbial and s' the state described by the clause, which expresses that t' is part of the extended present n .

Before we can execute this operation in the representation construction for (8.58) we must first construct the representation for the denotation of the *seit*-adverbial. By choosing a *seit*-adverbial in which *seit* governs a full clause we have made things a little more complicated for our selves than we might have our first *seit*-sentence construction, but this way we can catch two birds with one stone. The case at hand, in which the complement clause is also in the present tense, is, we have seen, just one among several; however, it is the only one for which we will trace the representation construction here. As argued, this is a case where the state description that is provided by the *seit*-governed clause has to be subjected to inchoative state-to-event coercion before *seit* can apply. The result of this coercion then becomes the beginning of the interval denoted by the *seit*-adverbial. The relevant steps are shown in (8.59) - (8.62). (8.59) displays the relevant parts of the syntactic structure we assume for the adverbial, in which, we assume, *seit*, classified as a ‘Conj(unction)’, occupies the C position of the clause it governs. The representation of TP is assumed to have already been constructed: the description of a state of Fritz living in Stuttgart at the utterance time n .



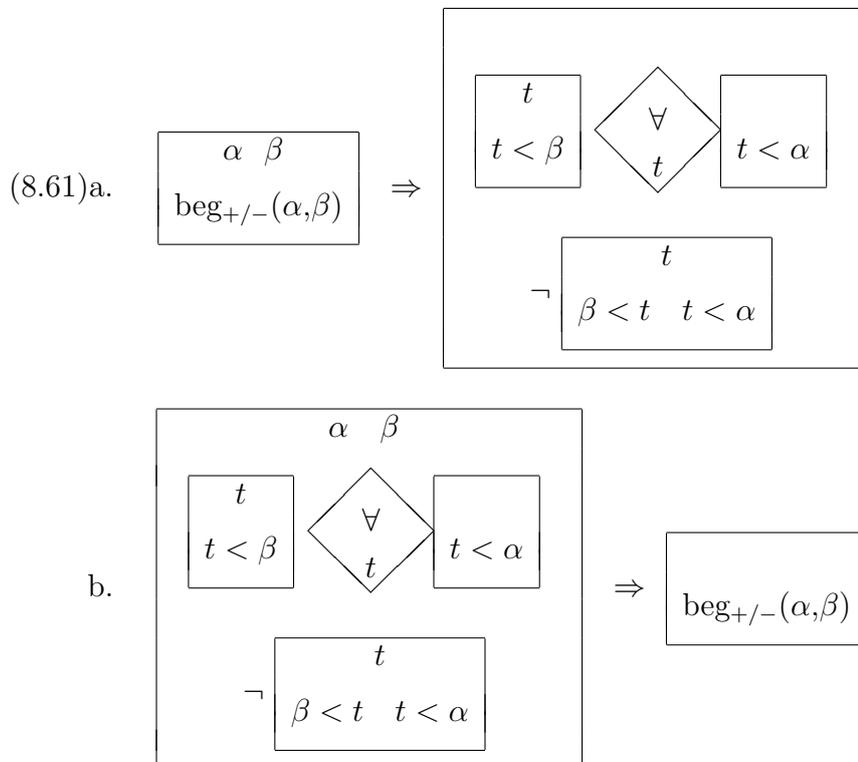
It is the recognisable properties of this representation – that it is the description of a state holding at n – which trigger the inchoative coercion preparatory to the actual application of *seit*. The result of coercion is the revised TP representation shown in (8.60).

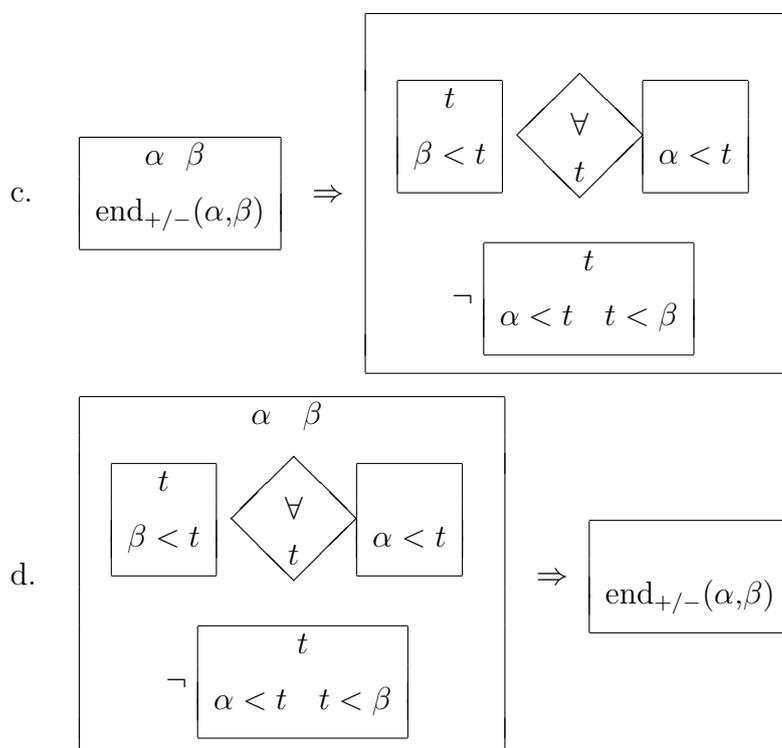


The result of applying the lexical semantics of *seit* (which we do not show separately) to the TP representation of (8.60) will then lead to the t' description that figures as AdvP representation in (8.62) below. To do this, however, we need to first determine more precisely than we have so far how the denotations of *seit*-adverbials are determined from the input representations to *seit*. So far we have been fairly loose on this point, skirting the hard questions. We said that the event e contributed (with or without the benefit of coercion) by the input representation gives the beginning of the interval t denoted by the *seit*-adverbial and that n provides its end. But what precisely does that come to? Is e part of t ? Is n ? Or does one or the other about t ? Or can there be partial overlap between them and t ? Up to now we have skirted all these questions by speaking in rather non-committal ways about

what marks the beginning of t and what its end. But at this point these questions are becoming important.

It is always helpful, and in this case we will find it is a necessity, to take these questions one by one, one about the beginning of t and the other about its end. We will argue that in either case the general relation – between t and e in the one case and between t and n in the second – should be a fairly weak one, to the effect that t cannot start earlier than e and cannot end later than n . Formally these relations can be defined as in (8.61). (8.61) defines these as relations between terms α and β both of which can stand either for a time or an eventuality. The first relation can be paraphrased ‘ α starts neither before nor truly after β ’ and will be abbreviated as ‘ $\text{beg}_{+/-}$ ’. The second relation can be paraphrased as ‘ α ends neither truly before nor after β ’ and will be abbreviated as ‘ $\text{end}_{+/-}$ ’. ‘ $\text{beg}_{+/-}$ ’ can be defined as holding between α and β iff (i) every t that precedes β also precedes α and (ii) there is no t such that $\beta < t$ and $t < \alpha$. Analogously, ‘ $\text{end}_{+/-}(\alpha, \beta)$ ’ can be defined as (i) every t that follows β also follows α and (ii) there is no t such that $\alpha < t$ and $t < \beta$.





(As usual, we can simplify the ‘definition’ in (8.61) by introducing into this formalism the conventions for (quantified) biconditionals. Note well that as we define these notions they are symmetric: if α marks the beginning of β , then β marks the beginning of α ; and likewise for ‘end’. In fact, the relation ‘beg’ can also be paraphrased as ‘ α and β start at exactly the same time’ and ‘end’ as ‘ α and β end at exactly the same time’.)

The reasons for wanting the weak beginning relation $\text{beg}_{+/-}$ and for wanting the weak ending relation $\text{end}_{+/-}$ as part of the specification of the denotations of *seit*-adverbials are not the same. For now we save the reason for $\text{beg}_{+/-}$. But we can reveal at least part of the reason for $\text{end}_{+/-}$. In the representation construction for (8.58) we want the specification of the denotation of its *seit*-adverbial to be compatible with the condition that its denotation t' be included in n . So it would be wrong to insist that t' end before n , or that it left-abuts n . On the other hand we will see in connection with our second construction example that it would also be wrong to insist in general that t' include n , or even that it overlap with n .

As announced, (8.62) specifies the result of applying the semantics of *seit* to the TP representation of (8.60).

AdvP representation, which tells us that t' is part of n , and on the other by the form of the TP representation, which shows this representation to be the description of a state holding at n . This form – viz. that the *alt*-bearing eventuality discourse referent is for a state, which has already been located by TENSE as holding at n – licenses the role of the *n-ext*-marked AdvP representation as ‘mere’ now extender. (We will return to this point below when dealing with a *seit*-sentence in which the main tense is a present perfect.) The result of the representation is shown in (8.64).

$$(8.64) \quad \begin{array}{c} \text{S} \\ | \\ \text{TP} \\ | \\ \left\langle t'', s'_{alt}, t', t, f, st \mid \right. \end{array} \quad \begin{array}{c} \boxed{\begin{array}{c} e \quad s \quad x \\ \\ \text{Fritz}(f) \quad \text{Stuttgart}(st) \\ s: \text{live-in}(f, st) \\ \text{ONS}(e, s) \quad \text{beg}_{+/-}(t', e) \quad \text{end}_{+/-}(t', n) \\ \\ t'' = n \quad t'' \subseteq s' \\ x = f \\ s': \text{depressed}'(x) \\ t'' = n \quad t'' \subseteq s' \\ \\ t' \subseteq n \end{array}} \right. \end{array}$$

The remaining construction steps are familiar and we omit them.

The second representation construction we consider in this section is for the present perfect sentence (8.56.a), repeated as (8.65).

- (8.65) Seit 1998 hat Fritz in Stuttgart gewohnt. (Aber jetzt zieht er um/ist er gerade ausgezogen.)
 (Since 1998 Fritz has lived in Stuttgart. (But now he is moving/he has just moved out.))

As compared with (8.58) this is the hard case. We argued in Section 8.8 that sentences like (8.65), in which the main tense is a present perfect rather than a simple present, do not entail that the described state – here that of Fritz living in Stuttgart – must hold at the utterance time itself (nor that they entail the contrary, although there will often be an implicature to that effect). We will account for the well-formedness of (8.65) and its truth conditions by

assuming that *seit*-adverbials combining with present perfects function much like anchored *for*-adverbials and their German equivalents: on the one hand they act as durative adverbials, which select for (semi-)homogeneous eventuality descriptions, and on the other the function as temporal locating adverbs.

Thus the construction of the semantic representation for (8.65) will resemble that for (8.43) in Section 8.6 quite closely. But there are also some differences, some of which derive from the different assumptions we were led to make in earlier sections about the English and German present perfects and some others from the fact that in connection with *seit* we have been forced to become more precise about the nature of the beginning and end of the adverb's denotation. Let us have a closer look at the problems we are facing.

In our construction for (8.43) we assumed that the *for*-adverbial *for the last half hour* can recognise its input representation as fitting its selection restrictions because as a description of the eventuality represented by the discourse referent bearing *alt* it is semi-homogeneous. In the case of the English (8.43) this eventuality discourse referent was the sum-representing *ec*; but shifting of *alt* to *ec* is an assumption we have made for English but not for German. In fact, we haven't been so far sufficiently explicit about present perfects of a verb like *wohnen*. Presumably *wohnen* is an activity verb, more precisely, an event verb but not a target state verb, and that is what we will assume. Furthermore, no target state gets added when the verb gets combined with an *in*-PP denoting the place where the subject is said to live. So the input to the present perfect will still be the representation of an event without target state. The present perfect of such a verb introduces, we assumed in Section 4, a result state *s* for the event described by this input representation. There may have been an implication in the way we described this operation to the effect that *s* marks the end of the time over which the event describing condition – here: that of Fritz living in Stuttgart – though no explicit statement to this effect was actually made. But at this point this question is becoming important.

The facts seem to be these. (i) In the absence of a durative adverbial the present perfect carries a strong implication of termination. For instance the simple sentence 'Fritz hat in Stuttgart gewohnt.' ('Fritz has lived in Stuttgart.') carries a strong implication that Fritz is no longer living in Stuttgart. But when a durative adverb is present, bringing with it the constraint that its input representation be a (semi-)homogeneous eventuality description, then that may force a homogeneous interpretation on the result of the perfect operation. We will assume that in particular the presence of a

seit-adverbial has this coercive power.²⁶

On this assumption the output of the present perfect in (8.65) will be a representation the store of which contains an event discourse referent *e* which carries the feature *alt* and a result state *s* of *e* carrying the feature *ult*. The feature *pres* at *T* adds to this the condition that *s* holds at *n*. This description does not provide an independently identified upper bound for *e* and thus qualifies as a semihomogeneous description of *e*, thereby satisfying the selection requirement of *seit 1998* which is looking at its complement representation as a description of the eventuality represented by the *alt*-bearing discourse referent. So *seit 1998* accepts its input and locates the described eventuality in the way that anchored durative adverbs do: the eventuality is supposed to hold for at least as long as the period it denotes. Formally this can be expressed by saying that the denoted period is temporally included within the described eventuality.

The final result of these successive operations is a semantic representation of (8.65) in which the eventuality of Fritz living in Stuttgart is said to hold throughout the denotation of *seit 1998* and its result state is said to hold at *n*. However, since the end of *s* does not necessarily coincide with termination of the condition that Fritz lives in Stuttgart, and since the denotation of *seit 1998* may but need not overlap with *n*, this representation of (8.65) allows for the possibility that the condition of Fritz living in Stuttgart does not hold at *n* itself. However, as we noted explicitly above, the representation will entail that this condition hold all the way up to *n*.

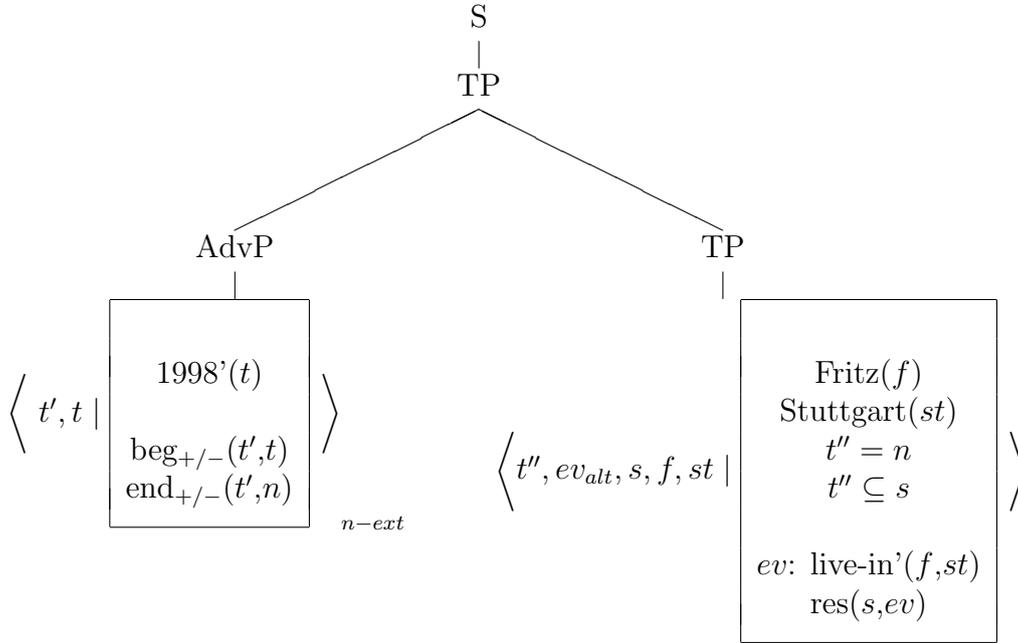
This then is in essence the kind of representation that we were aiming for. But there still is a loose end in connection with how the condition of Fritz living in Stuttgart is related to the beginning of the interval denoted by *seit 1998*. In the last paragraph we used the phrase that the condition of Fritz living in Stuttgart should hold ‘throughout’ the denotation of the adverbial, but is it really all that clear exactly what that should mean? When we delve into this question we see that there are several as yet unsolved questions that need an answer. One is where the denotations of *seit 1998*-adverbials start. We left this question hanging and will look at it more closely in the

²⁶ It is a difficult question whether we should treat the application of the present perfect to non-target state event descriptions as ambiguous between a terminative and a non-terminative interpretation of the event described by the input description, or whether this should be seen as a matter of underspecification, with the possibility of additional factors in the sentence or context deciding between these options. We incline towards an account of the latter sort and will assume such an account here.

next section. But even when this first question is answered, there is a second question about the *relation* between this denotation and the eventuality described by the lower TP representation – we just said that this relation is inclusion, but as we will argue, on closer reflection it isn't quite so obvious that that is right. And with this second question comes a third one: How can the relation between *seit*-adverbial denotation and locandum eventuality be justified on the basis of the general principles that govern adverbial location of different types of eventualities. We postpone discussion of these two questions till the next section as well, and note at this point only that the perfect-triggered state-to-event coercion that we are now assuming is licensed in the presence of a *seit*-adverbial leads to 'semi-homogeneous' eventuality descriptions – descriptions of eventualities with no independently identifiable upper bound, but for which the lower bound could, for all we have said, have a precise, independent characterisation. In the light of this possibility the simple principles governing temporal location that we have been using so far – an event is included within the denotation of a locating adverb, a state includes it – will have to be reconsidered too.

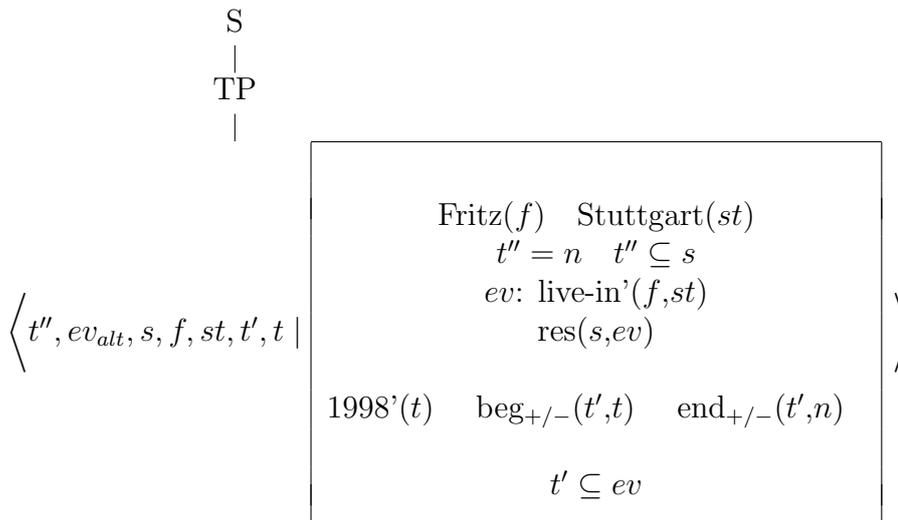
For the time being, then, we assume that the relation between the denotation of the *seit*-adverbial and the eventuality represented by the discourse referent bearing *alt* is inclusion of the former within the latter. With this provisional decision in place the formalities of the representation construction to which we now proceed should need no further comment. (8.66) gives the construction stage at which the lower TP representation and the representation of the AdvP are in place. (The representation of the AdvP is obtained in a much simpler way this time. We simply assume that *1998* is a DP (a proper name!) governed by *seit* and that its denotation is a certain time t_{1998} .)

(8.66)



The combination of the two representations (8.66) leads to the upper TP representation in (8.67).

(8.67)



8.8.2 When exactly do *seit*-adverbial intervals begin and how exactly do they locate?

This section is devoted to the discussion of several matters relating to the denotations of *seit*-adverbials and the way they interact with the eventualities described by clauses containing *seit*-adverbials.

The first of these is the question in precisely what way the complement of *seit* determines the beginning of the interval denoted by the *seit*-adverbial. It has been noted repeatedly in the literature (e.g. (Mittwoch 1988), (Mittwoch 2008), (Rathert 2004)) that ‘universal’ and ‘existential’ perfects differ in that a ‘universal perfect’ with a *seit*-adverbial is typically understood as asserting that the relevant conditions holds over a period that includes (all of the) the denotation of the complement of *seit*, whereas the eventuality described by an ‘existential’ perfect is typically understood as lying within an interval that starts only at the end of the complement denotation. Consider for instance the examples in (8.68).

- (8.68)a. Seit gestern hat Fritz einmal angerufen.
(Since yesterday Fritz has called once.)
- b. Seit gestern hat Fritz nur einmal angerufen.
(Since yesterday Fritz has called only once.)
- c. Seit vorgestern hat Fritz dreimal angerufen.
(Since the day before yesterday Fritz has called three times.)
- d. Seit gestern hat es ununterbrochen geregnet. (Since yesterday it has been raining uninterruptedly.)
- e. Seit vergangenem Sonntag hat Fritz jeden Morgen angerufen.
(Since last Sunday Fritz has called every morning.)
- f. Seit gestern regnet es ununterbrochen. (lit: Since yesterday it is raining uninterruptedly.)
- g. Seit vergangenem Sonntag ruft Fritz jeden Morgen an.
(lit: Since last Sunday Fritz is calls every morning.)

The perfects in (8.68.a,b,c) can be regarded as examples of ‘existential’ perfects – they say that an event of a certain kind happened once, or only once, or some larger number of times within the period indicated by the *seit*-adverbial; those in (8.68.d,e) are ‘universal’ perfects in that they say of a certain condition that it obtained throughout the time indicated by the *seit*-adverbial or that eventualities of a certain type occurred at all times within

the *seit*-adverbial denotation of some specified sort.²⁷ The observation that has often been made about the ways in which ‘existential’ and ‘universal’ perfects interact with *seit*-adverbials – that an existential perfect is true only when the required number of events described by the AspP representation occurred after the time or event denoted by the complement of *seit* and that a universal perfect is true only if the condition expressed by the AspP representation holds from the beginning of the denotation of the *seit*-complement (or that eventualities of the kind described occurred at times of the specified sort starting from that beginning) – seems right enough. For instance, for (8.68.a) to be unequivocally true it seems necessary that Fritz called after yesterday (i.e. sometime today); likewise for (8.68.b), except that this requires that between yesterday and the time of utterance there was just one call from Fritz. And the truth of (8.68.c) requires that there were three calls from Fritz within the time between now and the end of the day before yesterday (or, equivalently, the beginning of yesterday). On the other hand, (8.68.d) seems true only when it rained throughout yesterday and not just throughout today. And it seems that (8.68.e) clearly qualifies as true only if Fritz called Sunday morning as well as on the mornings of the following days. The sentences (8.68.f,g) are like (8.68.d,e) except for having simple presents instead of present perfects. These two are ‘universal’ sentences of sorts, and with regard to the beginning of the *seit*-adverbial interval they seem to pair with their present perfect counterparts. Thus (8.68.f) seems to require that it rained yesterday; and if our intuitions do not fool us, then the unequivocal truth of (8.68.g) requires that Fritz also called on Sunday morning.

These observations suggest that *seit*-adverbials involve an element of ambiguity or underspecification also with regard to when the intervals they denote begin (and not just with regard to when their denotations end). And once again the same question arises: How should we treat this phenomenon, as a case of ambiguity or of underspecification? Furthermore, both with regard to the starting points of *seit*-adverbial denotations and with regard to their end points the question should be asked how such ambiguity or underspecification could have arisen in the first place?

These questions about the beginning and end points of *seit*-adverbial deno-

²⁷ We are referring to the terms ‘existential perfect’ and ‘universal perfect’ in scare quotes because we have the impression that these terms are often used without proper foundation or reflection. We think that our informal elucidation comes close enough to what seems to be intended, and for now these characterisations will do. We will return to these notions and to their place within the spectrum of different types of perfects in Section 10, which deals with the interaction between the perfect an quantification.

tations may look the same. But as far as we can see, the answers are quite different. If we are right, the ambiguity/underspecification of when of *seit*-adverbial denotations begin is a phenomenon of a quite different nature from any that have so far been discussed. This is our tentative diagnosis: Our conception underlying the semantics of *seit*-adverbials is designed to treat the denotations of the complements of *seit* as points: The denotation of the complement of *seit* mark the start of the denotation of the *seit*-adverbial, while the TPpt marks its end. This idealisation is (fairly) unproblematic when the complement denotation is short as compared to the denotation of the *seit*-adverbial as a whole. In such cases the imprecision that arises from this idealisation is marginal and will tend to escape attention in actual use (much as we have to live, and have learned to live, with vagueness of various other kinds).

But the fuzziness is there. One way in which we can describe it is as a fuzziness with regard to where exactly the *seit*-adverbial interval should be assumed to begin in relation to the non-punctual denotation of its complement – at the start of that denotation, at its end or somewhere in between. If this is right, and the relation between starting point of the *seit*-adverbial interval and the temporal extent of the complement denotation is underdetermined by the way the semantics of *seit*-adverbials is understood, then it can be expected that speakers will tend to judge sentences involving such adverbials as indisputably true only in scenarios in which the sentence will come out true irrespectively of where in relation to the complement denotation the starting point of the *seit*-adverbial interval would be chosen.

If this is right, then the contrast between ‘existential’ and ‘universal’ perfects illustrated by the sentences in (8.68) have nothing to do with the perfect as such; they are just a pragmatic, if perhaps largely conventionalised, effect of an intrinsic indeterminacy in the denotations of *seit*-adverbials as such. Partial evidence for this position is provided by the simple present sentences (8.68.f,g). But this evidence can be partial only, since simple present tense ‘existential’ sentences with *seit*-adverbials are ill-formed, and so do not have truth conditions at all.

This answer to the question why there should be any ambivalence about the starting points of *seit*-adverbial denotations is also an answer to the question: Ambiguity or underspecification? Our description of the ambivalence places it squarely on the side of underspecification: the starting point can be anywhere between the beginning point of the complement denotation and its end; but no specification is given of exactly where within that interval.

So far we didn't explicitly address the question why there should be some kind of ambivalence with regard to the end of *seit*-adverbial denotations (in spite of the fact that it is this ambivalence to which almost all of the present section has been devoted). But it is well to add a word on this question now, if only as a way of bringing out how different this issue is from the one about beginning points. We have been assuming that the upper bounds of *seit*-adverbial denotations are underspecified: as far as the semantic specification of the denotation is concerned, it could left-abut the TP_{pt}, it could include it or overlap with it partially. However, when you look closely at the construction principles we have adopted for sentences which seem to favour the inclusion assumption – those in which the tense is a simple present, see (8.58) – and those used in the representation construction of sentences which seem to favour the abutment assumption, we see that we could have made do in either case with a *seit*-adverbial semantics according to which there is no underspecification of the upper bound, but where the denotation always left-abuts the TP_{pt}. By itself this observation does not settle the question which of these two possible semantics for *seit*-adverbials – the one according to which the upper bound is always given by left-abutment and the underspecification of which we have made use in our sample constructions above – is the right one, though perhaps considerations of simplicity speak in favour of the unambiguous semantics.

One reason for going into the question about the end points of *seit*-adverbial denotations as extensively as we have is that *seit*-adverbials are now extenders, whereas the close English counterparts, the *since*-adverbials, do not. But that is a difference which has to do with the upper ends of the denoted intervals, not with their lower ends. The ambivalence that we have observed for the denotations of *seit*-adverbials with regard to their starting points, and the way that ambivalence is typically resolved by the semantic properties of the clauses which contain such adverbials is something that *seit*-adverbials and *since*-adverbials have in common. (It is mostly in relation to *since*-adverbials that the difference in the behaviour of 'existential' and 'universal' perfects has been remarked on.) Since as far as we can tell, *seit*-adverbials and *since*-adverbials are alike in this respect, we will not return to this complication in the next section, which is devoted to temporal *since*.

The other two questions we saved for this section concern the temporal relation between *seit*-adverbial denotation and 'alt-bearing' eventuality. In the last section we assumed this to be inclusion. In the light of the discussion

above this assumption seems right at least for the example – (8.65) – that we are looking at. In the terminology that distinguishes between ‘existential’ and ‘universal’ perfects (8.65) seems on the side of the universal perfects insofar as the condition of Fritz living in Stuttgart is claimed to hold ‘throughout’ the denotation of *seit 1998*. According to the assessments reported in the first part of this section this means ‘throughout the interval that starts at the beginning of 1998’ and as far as we can tell, that is the intuitive content of (8.65).

So let us stick for at least a little longer to the principle that in the case of ‘universal’ perfects the temporal location relation is that of the adverb denotation being included within the located eventuality. The question we then have to ask is: Is this principle in accordance with the assumptions we have thus far been making about temporal location by adverbs? There is an obvious conditional answer to this question: If the input representation to the *seit*-adverbial is a state description, then the principle is in accordance with our earlier assumptions; if the input representation is an event description, then it is not. That suggests that the input representation should be the description of a state. But is there a way in which we can justify this? For as we already noted in the last section, this is not really what our treatment of the ordinary German perfect predicts. According to that treatment the output representations of the normal German perfect operator are representations involving a (result) state discourse referent carrying *ult* and an event discourse referent carrying *alt*; and it is as a description of this event that the *seit*-adverbial will ‘read’ this representation; unless we assume that some further operation intervenes.

One way in which the conflict we are facing could be resolved is to assume that the *seit*-adverbial is capable of triggering such an operation. On this view its selection restriction is not, as we assumed in the one but last section, for (semi-)homogeneous eventuality descriptions, but rather for state descriptions. But the coercion backup which it makes available for cases where this restriction is not met is applicable only when the input representation is (semi-)homogeneous. So we get a coherent interpretation only when the output representation of the perfect operator has the (semi-)homogeneousness assumed so far in our discussion of perfects accompanied by *seit*-adverbials, but a further coercion step then turns this (semi-)homogeneous event description into a state description.

In this way we can resolve the fudge we can be accused of having created with our assumption that in the presence of *seit*-adverbials perfects can coerce

to eventuality descriptions that are unspecific with respect to the question whether what they describe is an event or a state. But the price we pay is the assumption of yet another coercion operator, whose ultimate purpose is just to make sure that the location relation contributed by the *seit*-adverbial is that of inclusion of its denotation within the eventuality described by its input.

We are prepared to swallow the need for this extra coercion operation for the sake of keeping the general location principles as simple as we have assumed them to be up to now. But on the other hand there may also be cause for wondering whether inclusion of the *seit*-adverbial denotation within the input eventuality really *is* the right relation. We do not wish to challenge the conclusion that sentences like (8.65) do in fact express such an inclusion relation, but only whether inclusion is all that they express. To put this question in more intuitively accessible terms: Does (8.65) just require that the condition of Fritz living in Stuttgart holds throughout the interval starting at the beginning of 1998 and continuing (at least) up to the utterance time *n*? Or does the sentence say some thing stronger, viz. that the beginning of that condition *coincided* with the beginning of the adverb denotation (and thus with the beginning of 1998)?

The reason for raising this question are dialogues like those in (8.69).

(8.69)A: Wie lange/Seit wie langem wohnen die schon in Stuttgart/haben die schon in Stuttgart gewohnt?

B: Seit 1998.

(A: For how long/Since when have those people been living in Stuttgart?

B: Since 1998.)

The answers of such exchanges strongly imply that the denotation of the *seit*-phrase of which the answer is made up gives the exact duration of state of affairs mentioned in the question. If B knows that the state has held for longer than 1998, then the answer clearly seems wrong. And even when B is certain that the people in question have been living in Stuttgart but unsure whether they moved to Stuttgart in or before 1998 the answer seems wrong – B should have said ‘Mindestens seit 1998’ (‘At least since 1998’) in that case.

Examples like this may look like strong *prima facie* evidence that the truth conditions of sentences with *seit*-adverbials go beyond mere inclusion. But we have learned to be careful on this point. The dialogues in (8.69) show

an obvious similarity with cases like (8.70), which have been extensively discussed in the literature in connection with the question whether numerals, such as *two, three, four* and so forth, have an ‘exactly n’ or an ‘at least n’ semantics.

(8.70)A: How many children do they have?

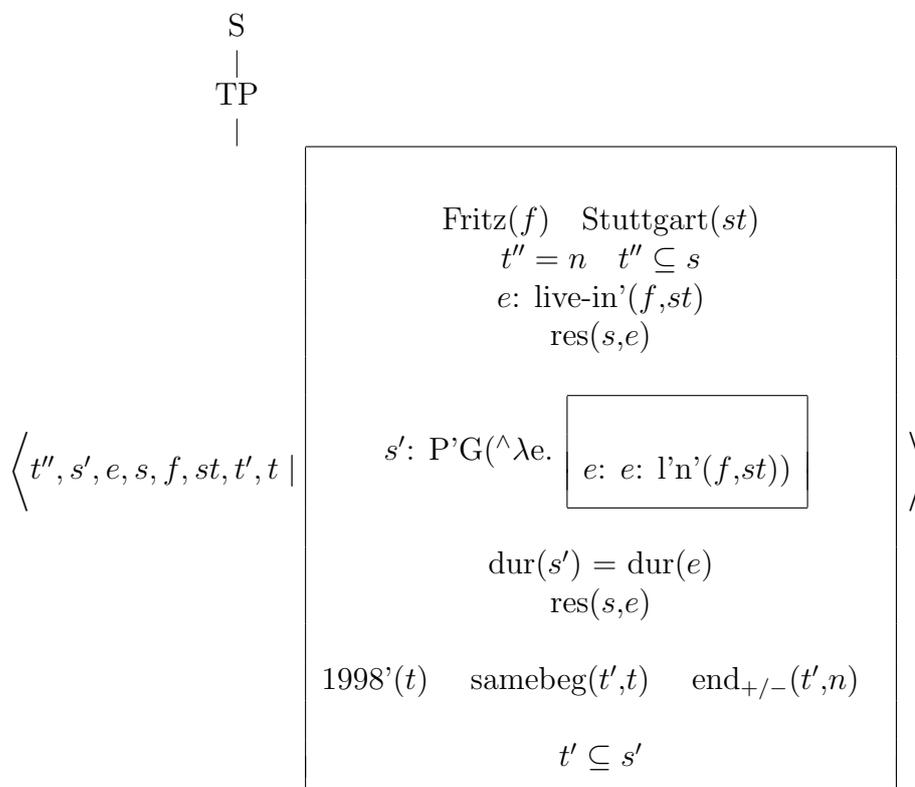
B: Three.

The answer ‘three’ to A’s question would be wrong if the actual number of children of the people in question was anything other than three. But that has not been the end of question whether *three* means ‘exactly three’ or ‘at least three’. With respect to the question whether a *seit*-adverbial give the exact beginning of the condition described in the clause of which it is part or only some upper bound to that beginning seems to be of the same making.

For these and related reasons we find it difficult to come to a firm decision on the lower bound part of the truth conditions of sentences with *seit*-adverbials, and feel we have no choice but to leave the matter as unsettled. In view of this we propose to stick with the weaker truth conditions – according to which inclusion within the condition described by the clause is all that *seit*-adverbials contribute to ‘universal’ perfects – and with our implementation of these truth conditions, which includes the additional event-to-state coercion immediately before application of the adverbial, until something or someone will convince us of the stronger truth conditions, according to which the condition described by the input representation starts holding at the very time when the adverb denotation starts. But note well: If sentences like (8.65) are subject to these stronger truth conditions, then the principles that govern temporal location will have to be rethought, and may prove to be in need of a general overhaul.

It may be helpful to see how the assumptions we have made in the course of this section affect the details of the construction process for (8.65). Once again we start with the representation at the point where adverb representation and lower TP representation are in place; but the TP representation is now the (semi-homogeneous) description of an *alt*-bearing event; see (8.71).

(8.73)



8.9 *Since-Adverbials*

As noted at the end of the last section, temporal *since*-adverbials in English and *seit*-adverbials in German resemble each other in many ways, but one salient difference, perhaps the most important one, is that *since*-adverbials are not now extenders. Why they aren't, whereas *seit*-adverbials are, we do not know. We take this to be a fact about the lexical items *since* and *seit*; if there exists a deeper connection between this difference and that between the simple present and/or present perfect tenses of English and German, we have not been able to find it.

Is the fact that *since*-adverbials are not now extenders reflected in their semantics? This too is a question to which we have no clear answer. It seems plausible, in the light of this difference between *since*- and *seit*-adverbials, that TPpts are not included in the denotations of *since*-adverbials: if even *seit*-adverbials, which are now extenders, do not come with the requirement

that their denotations contain their TPpts, then one would expect this even less from *since*-adverbials which can never play the part of now extenders. However, we do not see that this consideration could be turned into a compelling argument.

However, it is compatible with the observable facts to assume that the denotations of *since*-adverbials do not include their TPpts, and that is the assumption we will make.²⁸ In fact, we are faced with the same two options that we have considered in connection with *seit*-adverbials: either the denotation is specified as left-abutting the TPpt or its upper bound is underspecified, with left-abutment to the TPpt the ‘narrowest’ option. We will return to the choice between these two alternatives later on.

A second difference between *since* and *seit* is that *since* does not take measure phrases (For instance, *since two hours* is ungrammatical.) This too is a difference for which we have no explanation and we doubt that one could be given. A third difference is closely related to the first. The simple present tense is not only impossible in clauses that contain *since*-adverbials, but also in clausal complements of temporal *since*. (Thus *since we are living in Stuttgart* is impossible on the temporal interpretation of *since*; the phrase is acceptable only on the rhetorical reading of *since* – that which is cognate with *because* and *as*.) Presumably these two prohibitions against the use of the simple present are connected: Since *since*-adverbials cannot serve as now extenders, the present tense cannot occur either in a complement clause of *since*, for that would amount to presenting the *since*-adverbial denotation as if it were an extension of n.²⁹

²⁸As we read the literature, it is widely assumed that *since*-adverbial denotations do include their TPpts, and more specifically that the denotations of *since*-adverbials which are constituents of present perfect clauses include n. The reason for this assumption is, as far as we can see, the conviction that such sentences often appear to entail that the condition described by the verb also holds at n. But even if this observation is correct, it doesn’t entail, we will see, that n is included in the *since*-adverbial denotation.

²⁹This is a delicate argument, however. In German we can combine a simple present in the complement of *seit* with a present perfect, as in (8.74).

(8.74) Seit wir in Stuttgart wohnen, sind wir jede Woche in die Sauna gegangen.
(lit: Since we live in Stuttgart, we have gone every week to the sauna.)

As this example seems to show, we can present the denotation of a *seit*-adverbial in a form that seems to presuppose that it can be regarded as part of n, but then use that denotation to locate an eventuality that presents itself as not holding at n. There is undoubtedly more to say about this problem, but we do not feel in a position to say more about it in this paper.

A fourth difference between *since* and *seit* is that an English clause containing a *since*-adverbial cannot be in the simple past. This is not so for *seit*-adverbials, as shown by the example in (8.76.a).³⁰ As illustrated by (8.76.b), this use of the simple past is not possible in English.

- (8.76)a. Seit Januar waren wir dreimal/oft in der Oper.
(lit: Since January we were three times/often in the opera.)
- b. * Since January we went to the opera three times/we often went to the opera.)

Nothing in what has been said so far seems to predict this restriction or even to suggest it. In fact, in conjunction with the prohibition against the simple present in clauses containing *since*-adverbials it amounts to a ‘special relationship’ between temporal *since*-adverbials and the present perfect: When the denotation of a *since*-adverbial involves *n* as its upper bound, then the present perfect is the only tense compatible with it. And this statement is part of a larger generalisation: temporal *since*-adverbials are always accompanied by perfect tenses – either the present perfect when the TPpt is *n*, or the past perfect when the TPpt is in the past of *n*, or the future perfect when the TPpt is in the future of *n*. Prima facie this ‘special relationship’ may look like a substantial argument in favour of eXtended Now and Perfect Time Span accounts of the English perfect: the perfect comes with a slot for an interval of time that reaches from the TPpt backwards, and the semantics of *since*-adverbials makes them fit that slot to perfection. In fact, they have been outfitted so well for this role that it is only as occupants of the slots that perfects, and only perfects make available that it is only in that capacity that they can occur at all. We will return to this point below, after presenting our final difference between *since* and *seit*, and then again in Section 8.10.

³⁰ It is important to note that the simple past in (8.76.a) is acceptable in spite of the fact that the TPpt of the sentence (and likewise the upper bound of the interval denoted by its *seit*-adverbial) is *n*. That simple pasts can co-occur with *seit*-adverbials in sentences for which the TPpt is located in the past of *n*, as in (8.75), is a different matter. The use of the simple past in the second sentence of (8.75) is a case of ‘shifted present’ – in terms of our assumptions about the feature values of TENSE its feature is *past*₂, whereas the feature value of the past tense in (8.76.a) is presumably *past*₁. That *seit*-adverbials can co-occur with simple pasts in sentences like the second sentence of (8.75) in no way entails that they can co-occur with simple pasts in sentences like (8.76.a).

- (8.75) In 1998 wurde unser Sohn geboren. Wir wohnten damals seit drei Jahren in Stuttgart.
(lit: In 1998 our son was born. We lived at that time since three years in Stuttgart.)

The fifth difference may not be a real difference at all. Consider the examples in (8.77).

- (8.77)a. Since three o'clock Fritz has been working.
 b. Since 1998 Fritz has been living in Stuttgart.
 c. ?? Since three o'clock Fritz has worked.
 d. (?) Since 1998 Fritz has lived in Stuttgart.

Of the examples in (8.77) the sentences (8.77.a,b) are unimpeachable. But (8.77.c) is awkward and arguably ungrammatical. (8.77.d) is better, but for some of those we have asked it isn't quite as good as (8.77.b). This difference suggests that what *since*-adverbials select for is not (semi-)homogeneousness but imperfectivity (i.e. input representations that are descriptions of states). For that is the difference between the progressive forms in (8.77.a,b) and the non-progressive forms in (8.77.c,d): the former give rise to semantic representations that are imperfective, and thus a fortiori homogeneous, the latter to representations that are merely homogeneous. (The difference in judgements relating to (8.77.c) and (8.77.d) presumably has to do with the fact that the verb *live in* is ambivalent between an interpretation as event verb and one as state verb.)

In the light of this observation – that *since*-adverbials select for imperfectivity – we should reconsider what we said in Section 8.8 about the selection restrictions of *seit*-adverbials. We noted there that it was difficult to decide whether *seit*-adverbials select for homogeneousness or imperfectivity. We provisionally opted for the former, since that was more in line with what we found for *for*-adverbials and their German counterparts; and also it is the weaker, and therefore less committal of the two options, both of which seem to be compatible with the facts about *seit*-adverbial sentences. But now that we have seen that it *since*-adverbials select for imperfectivity the selection restrictions of *seit*-adverbials seem more open to question: Why should there be a difference in this regard between *since* and *seit*? Well, as we have seen in this section there are quite a few other differences between *since* and *seit*, so it seems premature to rely on the similarities as an argument for adjusting our account for *seit* to our findings about *since*. Indeed, we do not feel that we are in a position to make a decision on this point, and leave this for further exploration. Perhaps a deeper understanding of the semantics of *since* and *seit* and their interactions with the different English and German tense forms will eventually reveal what the correct decision is.

The sixth and last difference *since* and *seit* is one of which we are unsure whether it really exists either. In Section 8.8 we made the observation that German *seit*-adverbials select for homogeneous eventuality descriptions as input representations. With English *since*-adverbials this is less obviously so. Consider for instance the two sentences in (8.78).

- (8.78)a. Since we moved to the countryside, we have bought ourselves a camper.
- b. ? Seit wir aufs Land gezogen sind, haben wir uns einen Camper gekauft.
(Engl: see (8.78.a))
- c. Since January we have bought ourselves a camper.

(8.78.b) may be a little better than the (non-)sentences we presented in Section 8.8 to illustrate this point – presumably because the interpreter is invited to establish some rhetorical relation between the proposition expressed by the main clause and the proposition expressed by the clause embedded under *seit* – but even so it isn't very good, and by our own lights it isn't really acceptable. (8.78.a), on the other hand, seem to be quite acceptable, something that is both confirmed by our informants and consistent with claims made in the literature.

How big the difference is between (8.78.a) and (8.78.b) may nevertheless be a matter for debate. And so may be the question why (8.78.a) is acceptable. ((8.78.c), which does not offer the kind of basis for the construal of a rhetorical relationship that is provided by (8.78.a), appears to be significantly less acceptable.) Perhaps the right assessment is that *since*-adverbials come, like *seit*-adverbials, with a selection preference for homogeneous input representations, but that, for reasons that would still have to be identified, this preference can be more easily overwritten. (An alternative possibility is that English sentences like (8.78.a) are more easily reinterpreted as existential sentences in the sense that will be made explicit in Section 10, in which case there would be no violation of the selection restrictions imposed by *since*.) We will, somewhat tentatively, assume that *since*-adverbials impose the same selection restrictions as *seit*-adverbials, banking on a satisfactory way of accounting for the differences shown in (8.78).

Why should temporal *since*-adverbials be subject to the constraint that they cannot co-occur with simple pasts? We would have an explanation for this if it we could argue that the simple past (as morphological realisation of the feature past: 1) carries a kind of remoteness connotation – the eventualities

it describes are separated from n by a non-zero temporal interval – and that this property renders them compatible only with locating adverbs that have this same property, viz. that their denotations are separated by a non-zero temporal interval from n . For then it could be argued that *since*-adverbials, whose denotations must (at a minimum) reach up to n , fail to qualify on this score and thus are prevented from co-occurring with the simple past. Let us state this hypothesis and provide it with a label, (8.79).

(8.79) The English past tense is compatible only with temporal locating adverbs that are *wholly past* in the sense that the representation of their denotations entails that these precede n and are separated from n by a ‘non-zero’ time t .

(A non-zero time t is one that can be split into successive components; i.e. there are at least two times t' and t'' such that $t' \subseteq t$, $t'' \subseteq t$ and $t' \supset \subset t''$.)

What are the prospects for an explanation along these lines? On the face of it they do not look too good. For isn't the simple past compatible with adverbs of which it is evident that they are not ‘wholly past’ in the sense of (8.79)? Consider the examples in (8.80.a,b).

- (8.80)a. Today Fritz submitted his paper.
 b. This year we moved to Stuttgart.
 c. Today Fritz has submitted his paper.
 d. This year we have moved to Stuttgart.

According to what we have been saying about temporal adverbs, those in (8.80.a,b), *today* and *this week*, would seem to be prime examples of now extenders – adverbs whose denotations include the utterance time (in the strict sense of this term) and which serve to indicate that the extended now extends at least as far as they do. Could there be clearer counterexamples to the claim that the English simple past only tolerates locating adverbs whose denotations are past in the strong sense of being separated from n by a non-zero interval?

And yet! How good, really, are (8.80.a,b)? Or, better, when are they good? When we compare (8.80.a,b) with (8.80.c,d) we notice a difference. (8.80.c,d) are fine to use during any time in the course of the day, in the middle of it just as well as at the end. (Recall that (8.80.c) is our old friend (1.1.a), the starting point for this entire paper. In our discussion of that sentence we

did not make a point of its being usable at any point in the course of the day, but that was an implicit part of that discussion. And what is true for (8.80.c) is equally true for (8.80.d).) But this does not seem true for (8.80.a) and (8.80.b). These sentences seem fine when uttered at the end of the day or the week in question, at a point where it is still possible to refer to that day or week by using these terms, but where it is at the same time possible to think of them as wholly past.

If this intuition is correct, then it is no longer clear that the sentences in (8.80.a,b) are no longer counterexamples to (8.79). And there is also another consideration that should be mentioned here. The sentences in (8.81.a,b) can be used at any time within the day or week referred to. But that is not surprising for the adverbs *earlier today* and *earlier this week* are naturally construed as ‘wholly past’: *earlier today* refers to some time earlier in the day denoted by *today*, that is, to some time of the day that precedes the utterance time *n* and of which it is consistent to assume that it is separated from *n* in the way that (8.79) explicates. In the light of these examples anyone to whom (8.80.a,b) do not seem all that bad when used in the middle of the day or week should ask himself whether that isn’t because of a willingness to accommodate a tacit *earlier* although none is overtly present in the sentences as given.

We are aware that these attempts to account for the incompatibility of *since*-adverbials with the simple past in terms of principle (8.79) may well seem contorted and contrived. Our reason for presenting these suggestions in spite of what may be deemed their unfinished state and tenuous character is that we see the correlation between *since*-adverbials and perfects as a potential trump card for PTS theories, which account for it by postulating a semantics for perfects which provides a slot that *since*-adverbials can fill and that is made available by no other tense forms. In our approach, in which such a slot is not postulated, the correlation has to be explained in some other way. For a comparison between the two approaches this is a matter of central importance, to which we will return at greater length in the Section 10.

Before we turn to this confrontation, we will first, in the next section, look at some issues that arise in connection with representation constructions with *since*-adverbials, which are in many ways similar to the representation construction for (8.65) in Section 8.8.1, but at the same time are also importantly different in some of the details.

8.9.1 Constructions for some sentences with *Since*-adverbials

We consider two sentences in this section, both of which closely resemble the German sentence (8.65). The first, (8.81.a) is a direct analogue of (8.65) and the second, (8.81.b), differs from the first only in that the *since*-adverbial is sentence-final instead of sentence-initial.

- (8.81)a. Since nine o'clock Fritz has been working.
 b. Fritz has been working since nine o'clock.

We focus on the representation construction of (8.81.a). Once again we assume that the adverbial is adjoined to TP. This means that the perfect operator has done its work (as has the TENSE value *pres*) by the semantics of the adverbial is combined with that of its adjunction site. So it is (in essence) the output result of the application of *perf* that serves as input to the *since*-adverbial of (8.81.a) and just as for the combination of sentence-initial *seit*-adverbials and present perfects in German, the question arises whether this output representation of *perf* is compatible with the *since*-adverbial's selection restrictions.

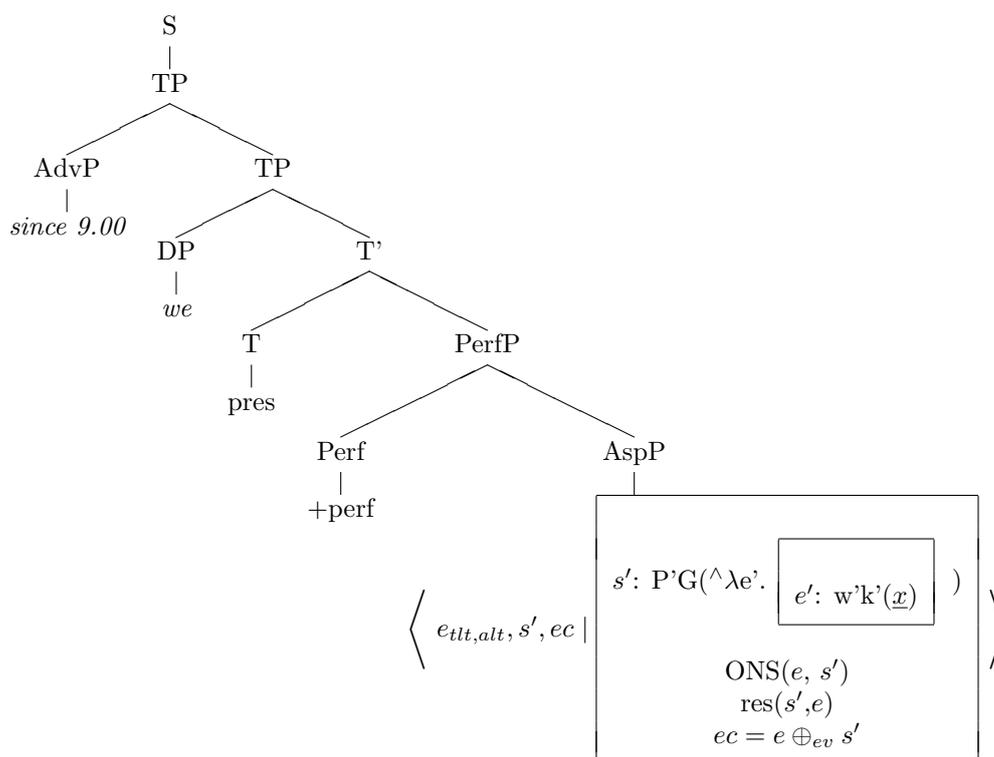
According to the position we reached in Section 4 the application of the English present perfect operator to a state description can give rise to two kinds of preliminary state-to-event coercion, via closure and inchoative. For German on the other hand, we concluded then, the only option was coercion via closure. The eventual effect of that coercion is a lower TP representation that does not fit the selection restrictions of *seit*-adverbials. Partly because of this incompatibility we were led, when discussing in Section 8.8 how *seit*-adverbials combine with present perfects, that in the presence of a *seit*-adverbial state-to-event coercion need not be via closure, but may take the form of transforming the input state description into the description of an event without specification of an independently identifiable upper bound.

The combination of *since*-adverbials and perfects present us with a different situation insofar as state-to-event coercion via closure is only one of the options that are admitted by the English present perfect. The output of this form of coercion does lead to a lower TP representation that satisfies what we have identified as the selection restriction of *since*-adverbials, since as a description of the eventuality represented by the discourse referent bearing *alt* it is the description of a state. In the light of this a question arises whether any other form of state-to-event coercion is licensed by the presence

of a *since*-adverbial as well. We first have a closer look at what happens when the application of *perf* in the representation construction for (8.81.a) is preceded by inchoative coercion, and then return to this question.

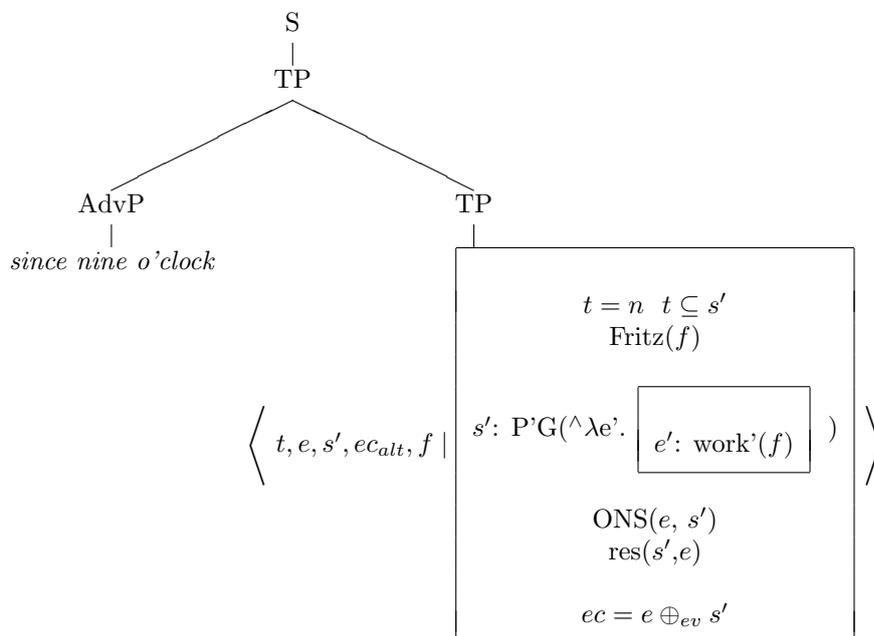
The structure in (8.82) gives the result of inchoative state-to-event coercion just before *perf* is applied.

(8.82)



If we follow the construction principles outlined in Section 4.5, then application of the *perf* operator to the AspP representation of (8.82) followed by the application of *pres* and combination with the subject DP leads to the structure in (8.83), with the feature *alt* assigned to *ec*, as shown in (8.83).

(8.83)



But is this really what we want? That depends in large part on what aspectual properties we ascribe to the discourse referent ec . If ec is to be treated as an eventuality discourse referent with the distinguishing properties of a state, then the corresponding location principle would be that according to which ec includes the denotation of the *since*-adverbial. This assigns to (8.81.a) the same truth conditions for which we settled when discussing German present perfect sentences with *seit*-adverbials. But note that these same truth conditions could also have been obtained by assuming that $_{alt}$ moves with $_{tt}$ to s . Since we first discussed inchoative coercion in Section 5 we have encountered versions of the perfect that involve such joint shifts of $_{tt}$ and $_{alt}$. (In particular we argued that this is the right analysis for the German Zustandsperfekt.) So the assumption that this can happen also with certain occurrences of the perfect in English (perhaps under the explicit influence of a *since*-adverbial) does not seem quite so outlandish. If this is what we assume – that $_{alt}$ shifts with $_{tt}$ as part of the operations triggered by the perfect – we get the ‘mere inclusion’ interpretation without the need for any additional assumptions.

But once again we must raise the question whether the ‘mere inclusion’ interpretation is really what we want. The arguments against this which we briefly considered when discussing this same issue in connection with *seit* seem to equally relevant to *since*. If we want the stronger truth conditions, which include the condition that the work started at nine o’clock and not

before, then shifting *alt* to *ec* might arguably provide the right signal that mere inclusion is not the right location condition in this case. But of course the details of this would still have to be worked out.

What we to say about the relationship between the condition of W working and the denotation of the *since*-adverbial *since nine o'clock* is independent of what the construction we have been describing tells us about what happens at the other end of *since nine o'clock*'s denotation. The main point about the semantics of (8.81.a) is that it entails that the condition of Fritz working does not hold for some period leading up to n but also at n itself. But note that this is not due to the fact that the denotation of *since nine o'clock* includes n, but rather to the fact that the state s of Fritz working plays a double role: on the one hand it is, or is part of, the eventuality that gets located by *since nine o'clock*, on the other it also functions as the result state that gets located at n by the feature pres. In other words, the intuition that present perfect sentences like (8.81.a) include the claim that the conditions they describe hold at the utterance time itself does not provide an argument for the position that the denotation of the *since*-adverbial must include n.

But perhaps this is a two-edged sword. For *does* a sentence like (8.81.a) really entail that the working is still going on at the time of utterance itself? Certain sentence pairs in which the second sentence explicitly denies this – like the one in (8.84) – do not seem incoherent to us.

(8.84) Since nine o'clock Fritz has been working. But now we have stopped.

Such examples strongly suggest that there must be a way of constructing the semantics for (8.81.a) which does not carry this entailment. Arguably such an alternative exists. We can obtain it by assuming that *since*-adverbials are like *seit*-adverbials in that they license a state-to-event coercion (preparatory to application of the perfect operator) which produces an output representation that does not describe the newly introduced event as terminated by an independently identified end. The remainder of the construction then parallels the construction for (8.65), yielding a sentence representation that does not entail that the working is still going on when the sentence is uttered.

The difference between (8.65) and (8.81.a) is that for (8.81.a) the predominant reading seems to be one in which Fritz is still working at n. This difference is no doubt due in part to the fact that German has two forms – present perfect and simple present – where English has only one. But of course that can be only part of the story. Since the use of the German simple

present in conjunction with *seit* entails that the described condition holds at *n* whereas the present perfect does not, we would expect that the latter is easily understood as reserved for occasions where this is not so, and thus as conveying that. But that does not explain the strong intuition that (8.81.a) do entail current holding of the described condition, unless this implication is explicitly cancelled. This suggests that the inchoative interpretation of sentences like (8.81.a) is a kind of default, which gets overridden only under duress.

We have mentioned variant (8.81.b) only because there are contexts in which it feels more natural than (8.81.a). In many cases this may be only a information-structural effect. But we also detect a difference with regard to the question whether the described condition must start at nine o'clock or whether it might also have started at some time before that. And it is perhaps just conceivable that this has to do with different attachment possibilities for sentence-final as opposed to sentence-initial adverbs. We will not pursue these matters further at this point but will return to them in Section 9, in which adverb attachment is the central topic.

8.10 Feature Shifting vs. Perfect Time Spans

Even by the standards established by the start of Section 8 that section has been of exceeding – some may want to say: of excruciating – length. And many a reader who has made it this far may have wondered why so much time and effort should have been spent on this one of a wide range of interactions between perfects and other constructions. What is so special about their interactions with durative adverbials and especially with *since*- and *seit*-adverbials? The reason why we thought it necessary to lavish so much attention to this small cluster of interactions is that if we are right it has been the role of *since*-adverbials more than anything else that most of the advocates of Perfect Time Span accounts of the English perfect have seen as compelling evidence for this approach.

A first and global assessment of Section 8 may well be that it does much to confirm PTS theorists in their convictions. The principles that we developed in the sections preceding Section 8 don't do a very good job dealing with sentences containing *since*- or *seit*-adverbials and all sorts of extra assumptions had to be made to make things come out right for the few examples for which we have tracked down the details of their semantic representation

constructions. (And that has also been arguably the main important reason why the section has ended up as long as it is.) ‘Isn’t’, a proponent of the PTS approach might say ‘the very fact that you have been making so many special assumptions to get sentences with *since*- or *seit*-adverbials come out the way you want an indication that there is something unsatisfactory about the theory you had developed when you at last turned to this variety of temporal adverbs?’ It is not hard to understand that this is what the account of this paper should at this point look to someone who has come to this study with a natural scepticism that the feature shifting approach we have been pursuing can be the right way to think about the semantics of perfects. And for someone whose focus is primarily on the present perfect of English – clearly the perfect form that has been given far more attention by semanticists than any other – the ‘special relationship’ that there seems to be between English perfects and *since*-adverbials could quite naturally have come to appear like a pointer towards a perspective that might have been difficult to distil from the thicket of bewildering facts, viz. that perfects have a special ‘parameter’ or ‘argument slot’ that may often be left without overt occupant but that can be filled by *since*-adverbials, and that *since*-adverbials seem specially designed for, so that they cannot occur in other syntactic environments.

It is this perspective, we take it, that constitutes the core of all eXtended Now and Perfect Time Span accounts: perfects are designed to speak about a period of time reaching backwards from the TPpt. Often this period is just implicit, but it can also be overtly realised by a phrase in the sentence. This will always be an adverbial that is durative in the sense of denoting an interval that is conceived as non-punctual; and in addition it must have the property that the denoted can or must have an upper bound that coincides with the TPpt of the sentence. *since*-adverbials are the most optimally and specifically designed for this purpose: the periods they denote are always conceived as extending back from the TPpt and, by virtue of so extending, as durative. But as we have seen, anchored *for*-adverbials can also serve this role. [Here some quotations from: McCoard, Iatridou et al., Stechow, Rothstein, (Rathert (?) and ?)]

When we focus on English, and more specifically on the English Present Perfect, the XN-PTS perspective comes across as having a number of attractive features. On the one hand it seems to account for the ‘special relationship’ between perfects and *since*-adverbials, and also promises a handle on the question how other duratives can partake in this relationship too. And on the other it may suggest a simple explanation of why the English Present Perfect cannot be combined with adverbs that denote events that are situ-

ated wholly in the past: they cannot fill the slots perfects make available because their denotations do not reach up to the TP_{pt}.

However, when one looks at the compositional aspects of perfect sentences with and without durative and non-durative temporal adverbials more closely, it becomes clear that what the PTS perspective has to offer isn't quite such plain sailing either. Some problems for this approach become visible in analyses that compare the perfects of English with those of other languages. An interesting example is Rothstein's study of the perfects of English, German and Swedish ((Rothstein 2008)). Rothstein's account too is PTS-based. But it is the only one known to us that tries to explain the differences between the perfects of different languages in terms of different principles that govern the perfect time spans that those perfects speak about. In particular, the normal German perfect, Rothstein argues, involves a PTS that does not necessarily reach up to the utterance time. That is why the German present perfect tense is compatible with locating adverbs whose denotations are situated wholly in the past: such adverbs can be construed as denoting the PTS of a German present perfect precisely because that PTS need not reach all the way up to *n*.³¹

One question that may be asked in relation to Rothstein's 'cross-linguistic' PTS theory is whether allowing for 'Proper Time Spans' that do not reach up to the TP_{pt} isn't giving the game of the PTS approach away: How does a tense form whose associated PTS could be in principle a single point somewhere in the past of *n* still qualify as a 'present perfect'? What distinguishes such a tense from a plain simple past? More concrete problems rear their heads when we shift attention from the tense forms of English and German to the *since*- and *seit*-adverbials with which they can or cannot co-occur. As we have seen, the principles that determine the denotations of *since*- and *seit*phrases are by and large the same: in both cases the adverb-denotation is an interval of time which reaches from some time before the TP_{pt} up to the TP_{pt} itself. But in spite of this, *since*- and *seit*-adverbials differ in a number of ways. One of these differences is that *seit*-adverbials can occur with the simple present but *since*-adverbials cannot.

How could a PTS account for this difference? By arguing that *seit*-adverbials are not designed to fill the slots that are made available by perfects, in the way that *since*-adverbials are? But what would this difference consist in? A

³¹[Rothstein's argument that this difference cannot be explained on the basis of a difference in the simple presents of English and German]

similar difficulty arises in connection with the simple past. *since*-adverbials and *seit*-adverbials also differ in that the former cannot be combined with the simple past whereas the latter can (and in cases, where the TP_{pt} is n). Again, is there a natural way in which PTS accounts can explain this? (Recall that the accounts that we have offered of these two differences are quite different from each other – the first fastens upon a difference between *since*- and *seit*-adverbials: the latter are now extenders, the former are not – and the latter on an (admittedly tentative) hypothesis about a difference between the simple past of English and that of German. Those assumptions may not be the last word on these matters, but the ways in which they differ is indicative of an obvious, but complicating feature of the explanatory task at hand. We start with two supposed correlations between sentence constituents of English and German: (i) the English present perfect and the German present perfect, (ii) the English simple present and the German simple present, (iii) the English simple past and the German simple past, and (iv) English *since*-adverbials and German *seit*-adverbials. The zero hypothesis about the members of either pair is that they obey the same principles of syntax and semantics. But then we find differences in the ways that the tenses can combine with the temporal adverbs, and for each difference the question arises: is it a difference between the tenses that is responsible for the combinatory difference, or a difference between the adverbials, or differences between both tenses and adverbs? On the face of it there is quite a bit of manoeuvring room for the theoretician here. But on the other hand the differences we postulate between superficially similar tenses, or between *since*- and *seit*-adverbials will have their repercussions for other configurations in which those tenses and adverbs can occur, and a good account must of course account for what happens in these other configurations as well. For *since*- and *seit*-adverbials and the simple present, simple past and present perfect tense forms we have pushed this investigation as far as we could. Arguably that is just a beginning. But at this point it is fair to ask of competing approaches that they push their explanation at least to roughly this point.

But is it even right to speak of competing theories here? There are two respects in which the PTS approach to the semantics of perfects and the feature splitting approach are much alike: (i) Both attribute a prominent role to the TP_{pt}, the PTS approach in making TP_{pts} the upper bounds of the intervals that it takes perfect clauses to be talking about and the feature splitting approach in making the TP_{pt} the tense locator of perfects. Second, both see it as a distinctive feature of perfects that they involve a temporal interval of sorts. For the PTS approach this is the very point of departure. For the feature splitting approach this conception is less central, and in the

version of this approach we have developed here it isn't there in all cases. But for the sentences that set us on the path of this investigation – those in (1.1) – it is present in the form of the locating times that are presupposed in the separated features *alt* and *itt*. If these times are distinct, then the *alt*-time will always precede the *itt*-time (since the latter is for locating the result state of the eventuality to be located by the former) and the two times can be seen as the beginning and end of an interval that is the temporal focus of the perfect that has brought the feature separation about.³² But of course, the combination of claims relating to two distinct times doesn't feel like the same thing as making a claim about the interval they span – it can be, but it doesn't have to. Indeed, the account we have developed here allows for different extents in which, at least conceptually, the part of the interval between its beginning and end can be involved in the claim made by a perfect clause. An early point at which we committed ourselves to such a difference in grades of involvement was in our proposals for the English and the German present perfect: the German present perfect keeps *alt* at e, the English present perfect shifts it to ec, consisting of event and result state. This has the effect that English adverbs have to locate the entire event complex ec, which forces the role of perfect time spans upon them. The German perfects differ in that they simply locate the result state at n while allowing for the event to be located by an adverb whose location is entirely in the past of n.³³ We have also surmised that with this formal difference between the English and German present perfect comes one that is more difficult to catch in formal terms and more diverse in its manifestations: the English present perfect carries an implication that the result state which must hold at n is not just a formal

³² One option for explaining the interaction between English perfects and *since*-adverbials – it is one that we have not pursued here – would be to say that such adverbials as making available a couple of times, viz. their beginning and their end, and that these must be used to locate the eventualities that are marked *alt* and *itt*, respectively. This would directly explain why *since*-adverbials can only occur with perfect tenses, since it is only they that have the power to separate *alt* from *itt*. But again we run into difficulties when we want to explain why things are different in German. In what way are *seit*-adverbials different from *since*-adverbials, or German tenses different from the 'corresponding' English tenses, to account for the distributional and semantic properties that have been observed for the combinations of those tenses and adverbials? Nevertheless, this line of investigation should perhaps be pursued further. It may lead to the insight that there is even less to choose between the PTS approach and the feature splitting approach than is apparent from what has been said here.

³³ Our treatment of the German present perfect is truth-conditionally equivalent to Rothstein's, but at the level of representation it still retains some direct connection with the TPpt n: a result state has to be located there, even if this may be a formal result state, which stands in no causal or other substantive relation to the event. Rothstein's account in terms of PTSs which need not reach up to the TPpr drops this connection entirely,

result state, but connected to the event in a more substantive way. This connection, it could be argued, is what provides the interval bounded by *alt*-time and *tt*-time with a certain kind of unity, binds its beginning and end together.

But there are many other constructions where the unity of the interval is more striking. This is so in particular when perfects combine with *since*- or *seit*-adverbials (and also with other types of durative adverbs). In fact, a focus on some interval is a general feature of ‘universal’ perfects, and more generally of quantificational perfects of any variety. But as soon as temporal quantification comes into play, it is less the special properties of perfects that produce such a focus on an interval, but rather an intrinsic feature of temporal quantification in general. In fact, we already got a taste of this when we encountered sentences that express that a certain condition holds throughout some interval, but where the tense was not a perfect.

Quantificational perfects are among the most important topics that a theory of perfects should address. It could be said that those who make much of the difference between ‘existential’ and ‘universal’ perfects have shown themselves aware of this importance. But, to repeat an observation we ventured earlier, those ‘existential’ and ‘universal’ perfects are only some from a much wider range of ‘quantificational perfects’. As we will see in detail in Section 10, ‘quantificational perfects’ vary widely not only with regard to the logical quantifiers they express, but also in the means they use to express those quantifiers.

To conclude this section: we started with the consideration that the difficulties we experienced with the combinations of tenses and durative adverbs throughout Section 8, and especially (but not exclusively, the combinations of *since*- and *seit*-adverbials and perfect tenses, might suggest that we have been approaching the semantic problems posed by perfect tenses from the wrong end. Would it not be better to see the combinations of English perfects with *since*-adverbials (and perhaps by extension the combinations of German perfects and *seit*-adverbials) as the key to a general theory of perfects, taking *since*-adverbials as the paradigm of those sentence constituents that can fill the special interval slot that distinguishes perfects from other tenses? Such a change of perspective would be in line with the PTS approach, as we understand it. But if we look more closely at this alternative, we find that many of the details that any account of the various perfect-adverb combinations should be able to deal with. And the range of problems that confront us at this level are going to be hard to solve no matter which general approach we take.

Moreover, the differences between the PTS approach and the feature shifting approach pursued here may not be all that big in any case, at least when it comes to the present perfects of English and German: both approaches can be understood as tying the semantics of those perfects to intervals that end at the TP_{pt} and start at some earlier time. Exactly what role the different parts of this interval – its beginning, its end and what lies between – play in the interpretation of particular sentences is subject to many other factors. We have made an effort in this essay to sort out some of those problems. And we think the time is gone when might have been possible to have a serious go at the semantics of perfects without trying to do as much.

Chapter 9

Attachment Sites for Temporal Adverbs

Still to come after Sn 8.:

9. The placement of temporal adverbs
10. Quantificational perfects

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