

**Spanish *imperfecto* and *pretérito*:
Truth conditions and aktionsart effects in a Situation Semantics**

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Abstract: Spanish verbs display two past-tense forms, the *pretérito* and the *imperfecto*. We offer an account of the semantics of these forms within a situation semantics, addressing a number of theoretically interesting questions about how to realize a semantics for tense and events in that type of framework. We argue that each of these forms is unambiguous, and that the apparent variety of readings attested for them derives from interaction with other factors in the course of interpretation. The meaning of the *imperfecto* is constrained to always reflect atelic aktionsart. In addition, it contains a modal element, and a contextually-given accessibility relation over situations constrains the interpretation of the modal in ways that give rise to all the attested readings. The *pretérito* is indeterminate with respect to aktionsart, neither telic nor atelic. One or the other aktionsart may be forced by other factors in the clause in which the *pretérito* occurs, as well as by pragmatic contrast with the possibility of using the *imperfecto*.

§0 Introduction¹

In this paper we have both a descriptive and a theoretical aim. The former consists in attempting to formulate truth conditions for the Spanish *pretérito* and *imperfecto* tenses and in identifying the implications they each have for the aktionsart of the resulting clause; so far as we know, this has not been addressed previously in the literature on Spanish. While aspect is related to aktionsart, they are distinct: Aspect is a grammatical notion, reflected in morphological distinctions such as that between *pretérito* ('perfective') and *imperfecto* ('imperfective'), while aktionsart is a semantic notion, a classification of the events corresponding to clauses. As is often the case in human languages, there is no one-to-one correlation between the aspect of a given verbal form and the aktionsart of the corresponding event. We will argue that while the *imperfecto* will always entail atelic aktionsart in the interpreted utterance, the use of the *pretérito* will not necessarily result in telic aktionsart. We show that this follows from the truth conditions we suggest for these aspectual forms.

Most recent treatments of aktionsart (e.g., see Hinrichs 1985, Krifka 1987, Link 1987, Parsons 1989, 1990, ter Meulen 1984, 1995) have been couched in an extensional event semantics. The use of events in modeling aktionsarten permits us to characterize more adequately the important features which distinguish them. It also helps us to capture the way in which the semantics of the aktionsarten parallels that of nominal expressions, and

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hence the way in which the aktionsart for a particular clause is influenced by the semantics of its nominal arguments and adverbial modifiers, as we will illustrate below. But the work of Dowty (1979), Landman (1992), and Portner (1998) on the English progressive argues that the interpretation of a particular grammatical aspect may involve modality, necessitating an intensional perspective. We argue that this is the case with the Spanish *imperfecto*, and that this perspective will permit us to give it a single truth conditional interpretation while accounting for the various types of readings attested for it in the literature. So, in order to properly characterize this particular aspectual element, we need to consider aktionsart in an intensional fragment with events.

We will formulate the truth conditions for *imperfecto* and *pretérito* in a situation semantics of the sort originally proposed in Kratzer (1989). The use of this framework reflects our second, theoretical aim, which is to begin to explore how to enrich this framework with a semantics for tense and aspect. Again, this is a subject which, so far as we know, has not yet been systematically explored, and, of course, the present study only represents a modest beginning. But it already presents some interesting problems which may be useful to keep in mind in subsequent work, whether on Spanish or other languages.² And it raises the question of whether we need two distinct types of objects in the model, events and situations, or whether instead the latter alone might suffice.

In what follows, we first, in §1, give a brief overview of the traditionally observed meanings of the *pretérito* and *imperfecto*. In §2, we consider the associated aktionsarten. In §3 we discuss some of the issues which arise in introducing temporal factors into a situation semantics, and propose how to characterize atelic and telic aktionsarten in this type of framework. And in §4 we offer truth conditions for the *imperfecto* and the *pretérito* and consider how these permit us to account for the readings discussed in §1. §5 is a brief conclusion to our discussion.

§1 Observed meanings of the *pretérito* and *imperfecto*

§1.1 *Pretérito*

The Spanish *pretérito*, exemplified by (1a) and (1b), is generally said to make an unambiguous contribution to the meanings of expressions in which it occurs, with a sense which is often said to be punctual, terminative, or definite.

- (1) a. Llegó el tren.
 arrive-3sg.PRET the train
 ‘The train arrived.’
- b. Teresa cantó en el teatro.
 Teresa sing-3sg.PRET in the theater
 ‘Teresa sang in the theater.’

Informally, the terminative character seems to reflect the fact that events corresponding to *pretérito* clauses are taken to have an end, e.g. in (1a), the train's arrival is a culmination, an end of the trip. When definiteness is invoked, the point seems to be that the entire

²See Cooper (1986) for an earlier discussion of (English) tense within situation semantics.

event is referred to, as opposed to some indefinite subpart; hence, e.g., (1b) might be taken to refer to the entire event of Teresa's singing in the theater, as opposed to some sub-event of her singing there. We will argue that these senses are captured by a requirement that the event(s) corresponding to a *pretérito* clause have a definite termination point, or end-point, in contrast to the events corresponding to *imperfecto* clauses. The relationship to the terminative sense is obvious and direct, that to the definite and punctual senses less so, mediated by aktionsarten. The *pretérito*, unlike the *imperfecto*, may denote a telic aktionsart; this aktionsart in turn entails the definiteness, in the relevant sense, of the event in question; and it influences the way that a Reference Time is established in discourse and leads to the impression that the corresponding event is viewed as punctual relative to other events under discussion. We'll review how these effects arise below.

§1.2 *Imperfecto*

Traditional discussions of the *imperfecto* propose various meanings for different tokens, including progressive, habitual, and intentional; hence at first glance it appears to be ambiguous. The *imperfecto* is often said as well to convey a durative, continuous, or indefinite sense: durative, as opposed to the punctual sense of the *pretérito*, continuous as opposed to the terminative character of the *pretérito*, and indefinite in the sense that some nonspecific subpart of the event is referred to, in contrast to the *pretérito*, which refers to the event in its entirety.

To illustrate the different senses of the *imperfecto*, consider (2a). Its different possible interpretations may be suggested by the context, or by modifying adverbials like those in (2b–d):

- (2) a. Ibamos a la playa.
 go-1plu.IMPF to the beach
 'We went/ were going/used to go to the beach.'

The temporal adverbial clause in (2b) suggests a progressive reading.

- (2) b. Ibamos a la playa cuando nos encontramos con Miguel.
 go-1plu.IMPF to the beach when RECP. meet-1plu.PRET with Miguel
 'We were going to the beach when we ran into Miguel.' (progressive)

The adverbial *los domingos* in (2c) suggests a habitual reading.

- (2) c. Ibamos a la playa los domingos.
 go-1plu.IMPF to the beach on Sundays
 'We went/used to go to the beach on Sundays.' (habitual)

In (2d) the "intention-in-the-past" reading is clear:

- (2) d. Hasta ayer, íbamos a la playa de vacaciones,
 until yesterday go-1plu.IMPF to the beach on vacation

pero hoy Pepa dijo que no hay dinero para eso.
 but today Pepa say-3sg.PRET that not there is money for that

‘Up until yesterday we were going to the beach on vacation but today Pepa said that there is no money for that.’ (intention-in-the past)

Examples like those in (4), patterned after the English example due to Dowty (1987) in (3), help to clarify the distinction between the progressive and the intentional readings:

(3) Lee was going to Radcliffe until she got accepted by Parsons.

- (4) a. Laura iba a Radcliffe hasta que Parsons la aceptó.
 Laura go.IMPF to Radcliffe until Parsons her accept.PRET
 ‘Laura was going to Radcliffe until Parsons accepted her.’
- b. Laura estaba yendo a Radcliffe hasta que Parsons la aceptó.
 Laura be.IMPF going to Radcliffe until Parsons her accept.PRET
 ‘Laura was going to Radcliffe until Parsons accepted her.’
- c. Laura iba a ir a Radcliffe hasta que Parsons la aceptó.
 Laura go.IMPF to go to Radcliffe until Parsons her accept.PRET
 ‘Laura was going to go Radcliffe until Parsons accepted her.’

(4a) is ambiguous between the two types of readings. That this is a true ambiguity, and not merely vagueness, is argued by the fact that if we conjoin (4a) with *y Rosa también* ‘and Rosa too’, then both conjuncts must share the same reading – either the progressive or the intentional. (4b), with the past *progresivo* form *yendo*, is synonymous with the progressive reading of (4a), while (4c), with the periphrastic future *ir a*, is synonymous with the intentional reading. Note that one of these readings might be true while the other is false, underlining their non-synonymity. For example, for (4b) to be true, Laura must already be at Radcliffe when she learns that Parsons has accepted her, while this need not be the case with (4c).

There is another meaning which the *imperfecto* is sometimes said to have, the iterative; we will illustrate this further below. The iterative and the three meanings for the *imperfecto* that we have just examined all have two things in common. First, they involve reference to a past time. Second, they display atelic aktionsart, a notion which we turn to now.

§2 Aktionsarten and the *imperfecto* and *pretérito*

We assume a truth conditional semantics in which sentences denote propositions, where propositions are classically taken to be sets of worlds or situations. But it has long been clear to those who work on tense and aspect that sentences and the clauses they consist of allude as well to the existence of various kinds of events or states. In §3, we will discuss how the propositions expressed by clauses are related to these events or states. For the moment, it suffices to acknowledge the correlation.

The aktionsarten constitute a classification of eventualities, where eventualities are either events or states. By extension, one talks of the aktionsart of a given clause on the basis of the aktionsart of the event or state correlated with the proposition it expresses. We often talk of the aktionsart of a predicate, defined in terms of the aktionsart of simple clauses in which it occurs as main predicate. However, it is important to remember that in general the aktionsarten of a clause cannot be determined by examining the verb alone; we must consider other constituents of the clause as well, including especially the arguments of the verb and any adverbial modifiers, as we will illustrate below. There are two major classes of aktionsarten: telic and atelic.³ Thus, we often speak of the aktionsart of a given clause or predicate as its *telicity*. The characterization used here is that of Dowty (1979, 1987), who draws in turn on Kenny (1963).

Atelic aktionsarten may be states (e.g. *saber* ‘know’, *querer* ‘want’, *vivir* ‘live’) or processes (e.g. *correr* ‘run’, *llover* ‘rain’, *escuchar* ‘listen’). In general, telic situations involve the achievement of a goal or some other change of state; they may be simple (sometimes called achievements, e.g. *win the contest*) or complex (sometimes called accomplishments, e.g. *write the dissertation*). There is one property that centrally distinguishes the atelic from the telic aktionsarten, which we call the **subinterval property**. Informally, we can say that if a state or process holds at some interval of time then it also holds at any subinterval of that interval, so that, e.g., if it is true at an interval of an hour that I know something, I also know it at any subinterval of that hour (**distributivity**). Also, its truth at the hour-long interval does not exclude the possibility that there may also be a super-interval, say of two hours, during which the same state or process is true (**cumulativity**). Dowty (1987) formally defines atelicity for predicates in terms of the subinterval property, as shown in (5):

(5) **The SubInterval Property for Atelic Aktionsarten**

If δ is an (n-place) atelic predicate, then necessarily, $\delta(x_1, \dots, x_n)$ is true for interval I if and only if $\delta(x_1, \dots, x_n)$ is true for all subintervals I' of I .

This requirement is a bit too strong as given. As Dowty notes and Hinrichs (1985) discusses at length, even in relatively homogeneous eventualities, such as processes like walking, there are subeventualities which are so small that they are too small to identify as eventualities of walking; they might be identifiable as eventualities of lifting a foot or flexing a heel, but aren't sufficiently temporally extended to be differentiated from a standing in place and lifting one foot. We could modify (5) to take this into account, requiring that $\delta(x_1, \dots, x_n)$ be true for all *long enough* subintervals I' of I , i.e. those which are sufficiently temporally extended to determine that the event in question is taking place.

The predicted entailments are illustrated for the process of running in (6):

- (6) a. Jaimito corrió de 4 a 5.
 Jaimito run.PRET from 4 to 5
 ‘Jaimito ran from 4 until 5.’

³These terms were first introduced by Garey (1957).

- b. Jaimito corrió de 4 a 4:30.
 Jaimito run.PRET from 4 to 4:30
 ‘Jaimito ran from 4 until 4:30.’

Because the interval from 4 to 4:30pm is a subinterval of that from 4 to 5pm, the atelicity of *correr* is reflected in the fact that (6a) entails (6b) (distributivity). Similarly, this permits us to say that if Jaimito runs during the period from 4 to 5pm and also during the period from 5 to 6pm, it is also true that he runs from 4 until 6pm (cumulativity).

Telic aktionsarten do not have the subinterval property, and in fact if a telic event is true at an interval, none of its proper subintervals will verify an instance of the same type of event. Thus, we can only say that a telic like (7) is true at the maximal interval which it took for Jaimito to write the poem in question.

- (7) Jaimito escribió un poema.
 Jaimito write.PRET a poem
 ‘Jaimito wrote a poem.’ (telic)

If (7) is true at an interval i , we cannot say that it is true at any subintervals of i , at least for the same poem (though of course, the *progresivo* version of (7) or its English counterpart may be true at a subinterval of i). From this it also follows that if (7) is true of the interval from 4 to 5pm and then again of the interval from 5 to 6pm, it is not true at the interval from 4 to 6pm, though we could say that it is true at the larger interval that Jaimito wrote two poems.

Dowty (1987) formally defines telicity as in (8):

- (8) If δ is a telic predicate, then the truth of $\delta(x_1, \dots, x_n)$ for interval I entails that $\delta(x_1, \dots, x_n)$ is false for all proper subintervals I' of I .

The telicity or atelicity of a clause is not determined by its verb alone (Verkuyl 1972, Dowty 1979). Rather, the presence of certain argument NPs, adverbial phrases, or aspectual markers on a verb can yield a different aktionsart from the one suggested by the verb in isolation. To see how non-verbal elements contribute to aktionsart, observe that often in English sentences with a simple past tense verb, an argument NP whose head is a count noun will yield telic aktionsart for the whole clause, whereas a mass NP will yield atelicity; this is illustrated in (9a) and (9b):

- (9) a. Oil flowed through the pipes. (atelic)
 b. 3000 liters of oil flowed through the pipes. (telic)

(9a) may be true both at an interval i and at subintervals of i . But on at least one reading of (9b), which may be the easiest reading to access out of the blue, if it is true at i , then though (9a) will be true at subintervals of i , (9b) itself will not be true at those subintervals. The measure phrase in (9b) sets the boundaries on the event's duration: Once the measure is achieved, the event is completed, but not before.

The facts are somewhat different for Spanish, given the distinction between *pretérito* and *imperfecto*. The use of the *imperfecto* will always imply atelicity, while the *pretérito* will not necessarily imply telicity, as we already saw in (6) above. We claim that this should

follow from the truth conditions associated with each of these verbal tense/aspect forms, so that in the case of the *imperfecto*, atelicity is part of its core meaning. Thus, example (11) with an *imperfecto* verb and the count NP *3000 litros de petróleo* has the same aktionsart (atelic) as the proposition in (10), with the mass noun *petróleo*:

- (10) Corría petróleo por las cañerías.
 flow-3sg.IMPF oil through the pipes
 ‘Oil flowed/was flowing through the pipes.’ (atelic)
- (11) Corrían 3000 litros de petróleo por las cañerías.
 flow-3pl.IMPF 3000 liters of oil through the pipes
 ‘3000 liters of oil flowed through the pipes.’ (atelic)

Examples (10) and (11), like (9a), are atelic because if one of them is true at an interval *i*, it is true to say of any given subinterval of *i* that oil (in the case of (11), 3000 liters of it), was flowing at that subinterval. To imagine when (11) would be true at an interval *i*, suppose we have a circular pipe that can hold exactly 3000 liters and oil keeps flowing around in it continuously; then it is true for a given subinterval of *i* that “3000 liters of oil were flowing” during that subinterval. Also, (10) and (11) have a habitual reading, even without an adverb such as *diariamente/por día* ‘daily/per day’. In the proper context or with an appropriate adverbial modifier, (9b) can have this habitual reading as well. In retrospect, we can see that (9b) may also have the non-habitual reading of (11); however, unlike (9b), (11) has no telic reading.

The examples with the *imperfecto* which we considered earlier were all atelic. So, in (2b) the sub-situations of the event of “going to the beach” are instances of “going to the beach” as well. (2c) says that it was a habit of ours to go the beach on any normal Sunday during some past period of time; it entails that our having this habit would also be true of any subperiod of that period. Notice that this does not rule out the possibility that on one Sunday during that period we didn't go to the beach, for example because we had to attend a meeting or we were sick, since with the habitual we are dealing with what was the typical or usual case. With the intentional reading illustrated by (2d), the intention to go to the beach holds over some past interval, and also, then, over any subinterval of that interval.

But the *pretérito* is compatible with either aktionsart. In (12), with the *pretérito* and the mass NP argument *petróleo*, the proposition has atelic aktionsart (cf. (9a)). The measure phrase in (13) interacts with the end-point requirement of the *pretérito* (and the meaning of the predicate) to entail telicity:

- (12) Corrió petróleo por las cañerías.
 flow-3sg.PRET oil through the pipes
 ‘Oil flowed through the pipes.’ (atelic)
- (13) Corrieron 3000 litros de petróleo por las cañerías.
 flow-3plu.PRET 3000 liters of oil through the pipes
 ‘3000 liters of oil flowed through the pipes.’ (telic)

Like (9a), (10) and (11), example (12) has an atelic reading because it is true to say of any given subinterval of the flowing process that oil was flowing at that subinterval. (13) has

a telic interpretation, with the same sense as the telic reading of (9b): If it is true at some past interval *i* that 3000 liters of oil flowed non-circularly through the pipes at *i*, then it is not true that 3000 liters of oil flowed through the pipes at any subinterval of *i*; instead only some part of the 3000 liters flowed during any subinterval of *i*.

Like (9b), (13) can have a habitual, i.e. atelic, interpretation as well in the proper context; but the point here is to contrast it with (11), which does not have a telic reading. Uttered out of the blue, the telic reading of (13) is the default. We take this to be pragmatically motivated: since the *imperfecto* can have only the atelic reading, when that is the meaning the speaker wishes to convey the use of the *imperfecto* is less likely to lead to a misunderstanding than that of the often telic *pretérito*. Among others, Horn (1984a, 1984b) has argued that when we have two elements in a paradigm, one unmarked for some feature and the other marked, the use of the unmarked element will tend to take on the interpretation which is not possible for the marked element. He illustrates this with a number of lexical items and argues that it is motivated by Gricean principles, principally the Maxim of Quantity, which would lead the cooperative speaker to use the more informative marked form if it were applicable. We would argue that the default character of the telic interpretation of the *pretérito* is another instance of the sort of phenomenon that Horn has discussed: the *pretérito* may display either aktionsarten and hence is the unmarked element, while the *imperfecto* may only lead to an atelic interpretation, so that it is marked. Hence, by the maxim of Quantity, there is a tendency to interpret the *pretérito* as telic if the *imperfecto* could have been used instead to unequivocally yield the atelic. However, in certain contexts, partly because of the discourse effects of the *pretérito* vs. the *imperfecto*, to be discussed in §3.3.2 below, the *pretérito* may be preferred even though an atelic interpretation is intended. For example, we might utter (13) in the following context:

- (13') Normalmente, corrían 1500 litros de petróleo por las cañerías, pero una vez,
 usually flow-impf liters of petroleum through the pipes but one time
 en 1985, a causa de un desperfecto, corrieron 3000 litros de petróleo (por las
 in due to a malfunction flow-pret liters of petroleum through the
 cañerías) hasta que se solucionó el problema.
 pipes until solve-pret the problem
 'Usually, 1500 liters of oil flowed/were flowing through the pipes. But once, in
 1985, due to some malfunction, 3000 liters were flowing (through the pipes) until
 the problem was solved.'

Here, the *pretérito* form *corrieron* has an atelic reading. The possibility of contextually overriding the default in (13), argues that the tendency for a telic interpretation of the *pretérito* is indeed only pragmatic, a Gricean conversational implicature, and not part of its truth conditional semantics.

The examples in (15) illustrate how the temporal adverbials *por una hora* and *en una hora*, like their English counterparts *for an hour* and *in an hour* in (14), may also affect aktionsart:

- (14) a. Frida rehearsed the libretto for an hour. (atelic)
 b. Frida rehearsed the libretto in an hour. (telic)
- (15) a. Frida ensayaba el libreto por una hora.
 Frida rehearse.IMPF the libretto for an hour
 ‘Frida used to rehearse/was rehearsing the libretto for an hour.’
 (atelic: habitual or progressive)
- b. Frida ensayaba el libreto en una hora.
 Frida rehearse.IMPF the libretto in an hour
 ‘Frida rehearsed/used to rehearse/was rehearsing/intended to rehearse the libretto in an hour.’
 (telic: inchoative; or atelic: habitual, progressive, or intentional)
- c. Frida ensayó el libreto por una hora.
 Frida rehearse.PRET the libretto for an hour
 ‘Frida rehearsed the libretto for an hour.’ (atelic: iterative)
- d. Frida ensayó el libreto en una hora.
 Frida rehearse.PRET the libretto in an hour
 ‘Frida rehearsed the libretto in an hour.’ (telic)

It is argued in the literature on English that *for an hour* requires that its argument, the clause within its scope, be atelic in aktionsart, while *in an hour* requires telic aktionsart. English *Frida rehearsed the libretto* may be within the scope of either adverbial, because it is indeterminate with respect to aktionsart, yielding either a telic reading as argument for *in an hour* (where the complete rehearsal takes place) or an atelic argument for *for an hour* (where the libretto was rehearsed repeatedly, or worked on without necessarily getting through the entire piece). If the Spanish counterparts to these adverbials work similarly, this would predict that the atelic *imperfecto* may occur with *por una hora* ‘for an hour’ to yield the habitual or progressive readings in (15a), and that the *pretérito* can yield whatever aktionsart is required for the adverbial, i.e. either an atelic (iterative) reading with *por una hora*, or else the telic with *en una hora* ‘in an hour’. We correctly predict that the *imperfecto* in (15b) cannot occur with *en una hora* to yield the telic reading we find in (15d), where the complete rehearsal takes place in one hour.

The telic interpretation noted for (15b) might appear to be a counterexample to the generalization that the *imperfecto* always yields atelic aktionsart. However, this reading does not share the truth conditions available for (15d), where the entire rehearsal took one hour. Rather, it is only required that in one hour the rehearsal began; the simple telic change of state is from one in which no rehearsal was underway to one in which it had begun. In general, when a telic adverbial like *en una hora/in an hour* occurs with an atelic clause, one way of making the result felicitous is to shift to an inchoative interpretation, where the endpoint of the hour period marks the beginning of the process or state corresponding to the atelic clause—here, the process of rehearsal. We can see this in English if we give *in an hour* wide scope over the progressive, which is always atelic:⁴

⁴(14c) also has an habitual reading, of course. The inchoative is the only interpretation when the adverbial *in an hour* is sentence-initial.

(14) c. Frida was rehearsing the libretto in an hour. (telic: inchoative)

Since the only telic reading available for (15b) is the inchoative, the *imperfecto* patterns with the atelic English progressive, as expected. The other readings available for (15b) may be accounted for by assuming that in them the adverbial takes as its argument the tense/aspectless *ensayar el libretto*, which is indeterminate with respect to aktionsart, like its English counterpart; the *imperfecto* then applies to the resulting clause to yield atelic aktionsart.

The preceding discussion would suggest that (15d) has the same atelic readings as those noted for (15b). These readings do not seem to be available. We would offer, again, a pragmatic explanation for this fact, i.e. that the availability of the unambiguously atelic *imperfecto* strongly favors it over the ambiguous *pretérito* in such cases.

An endpoint adverbial such as *to the store/a la tienda* may similarly suggest telic aktionsart, as illustrated in (16–17), but this effect is overridden by the *imperfecto* in (18), which has only an atelic (habitual or progressive) interpretation:

(16) Juana ran to the store. (telic)

(17) Juana corrió a la tienda.
 Juana run.PRET to the store
 ‘Juana ran to the store.’ (telic)

(18) Juana corría a la tienda.
 Juana run.IMPF to the store
 ‘Juana ran/was running to the store.’ (atelic: habitual or progressive)

Summarizing, it is interesting to note that the use of the *imperfecto*, with at least three attested meanings (progressive, habitual, and intentional), always results in a single aktionsart, the atelic; while the *pretérito*, with an apparently unitary meaning, can display either telic or atelic aktionsart. This will follow from our truth conditions, to which we will turn in the next section.

First, though, let us be more precise about what we mean when we say that a given clause, or the proposition it denotes, displays telic or atelic aktionsart. In Dowty (1979) and subsequent work on English tense and aspect, it is assumed that aspectual markers like the progressive have scope independent of the scope of tenses like the Past or Present. E.g., in Dowty's fragment the progressive has VP scope, while tenses have sentential scope. This assumption is crucial to the treatment of aktionsart in English, e.g. in the English (14b), repeated here:

(14) b. Frida rehearsed the libretto (in an hour).

Consider the usual truth conditions for such a sentence: The Past tense leads to a shift in the course of interpretation from the Speech Time to a time which is past relative to the Speech Time; call this past time the Event Time, following Reichenbach. The sentence will be true at the Speech Time iff there is a past Event Time at which ‘Frida rehearse the libretto’ is true. Note that (14b) will also be true for any subinterval of the Speech Time, since the Event Time which makes ‘Frida rehearse the libretto’ true in the past relative to

the Speech Time will be past relative to subintervals of the Speech Time as well. Hence, if we consider the Speech Time and its subintervals, (14b) appears to display the SubInterval Property for Atelic Aktionsarten given in (5) above. But (14b) is intuitively telic, as reflected in the acceptability of the optional telic PP *in an hour*. As suggested above, this adverbial is telic because it requires that its argument be telic. Since only the proposition evaluated relative to the Event Time is technically telic, and not that evaluated at the Speech Time, this means that the adverbial must take narrow scope relative to the Past tense, so that the shift from the Speech Time to the Event Time will have already taken place.

In the English progressive counterpart of (15a), *Frida was rehearsing the libretto for an hour*, the PP adverbial is taken to have narrow scope relative to the Past tense, but it may either take wide or narrow scope relative to the progressive *-ing*. Dowty (1979) treats aspectual adverbials like *for an hour* as VP-modifiers like the progressive, which may apply in either order. If we give the adverbial wide scope over the progressive, the truth conditions require that there was actually one hour of rehearsal (though the whole libretto may not have been rehearsed); if the progressive takes wide scope over the adverbial, the (presumably intended) hour of rehearsal may not have been completed. With either scope, the whole atelic proposition *Frida be rehearsing the libretto for an hour* then serves as argument to the Past tense.

Similarly, although we may speak of the telicity of any predicate or clause, in the discussion of the *imperfecto* and *pretérito* examples in (10–13), (15) and (17–18) above, the telicity in question pertains to Event Times, and not to the time of evaluation for the examples. But in Spanish this leads to a potential problem for compositionality. E.g., in (15a), the *imperfecto* contributes both Past tense and habitual or progressive aspect:

- (15) a. Frida ensayaba el libretto por una hora.
 Frida rehearse.IMPF the libretto for an hour
 ‘Frida used to rehearse/was rehearsing the libretto for an hour.’

In order to characterize the sense in which the *imperfecto* is atelic, we must talk about the habitual or progressive past event, i.e. telicity is determined with respect to material under the scope of the Past tense, as in English. But unlike English, in languages like Spanish the tense and aspect may be combined in one morphological form, as is the case in the *imperfecto*. If we assume that the *imperfecto* has sentential scope and that we want the adverbial to have narrow scope relative to the Past tense, then this seems to predict that the habitual or progressive aspect of the *imperfecto*'s character must also take wide scope over the adverbial. But it turns out that in order to explain the aktionsart properties of *por una hora* and derive all the possible readings for examples like (15a), the durative PP must be able to take scope which is *internal* (cf. Dowty 1979:250ff) to the lexical meaning of the *imperfecto*, i.e. having narrow scope with respect to the tense contribution of the *imperfecto* but wide scope with respect to the aspectual contribution. This can be accomplished technically, as we will show in section §4; but it illustrates a whole range of problems with adverbials in various languages, problems which surely deserve a deeper insight into the semantics of adverbials than we can provide here.

§3 Eventualities and situations

Most previous truth conditional characterizations of the aktionsarten have assumed a semantics with temporal primitives which are either intervals, as in Dowty's definitions (5) and (8) above, or eventualities, as in Hinrichs (1985). Hinrichs characterizes atelic eventualities in terms of the cumulative property: they are those eventualities such that two of the same type (e.g., two eventualities of running), join to give a third, combined eventuality of the same type (a super-eventuality of running). Telic eventualities never display this property. Hinrichs' approach, thus, is an event analogue to Dowty's definitions of aktionsarten in terms of intervals.

We develop our theory in an intensional semantics based on situations. This is partly because the *imperfecto* is similar to the English progressive in calling for an account which is essentially intensional. There is now extensive literature arguing that situations are needed in order to give a more adequate account of the semantics of various intensional expressions (Barwise & Perry 1981, Barwise 1986, Kratzer 1989, Portner 1992). Further, Cooper (1986) argues that the combination of possible worlds with temporal intervals of evaluation is too coarse-grained to capture the correct interpretation of examples like his (19):

(19) It didn't snow on the trip from Madison to Chicago.

(19) will generally be judged to be true when "it did in fact snow on the road from Madison to Chicago during the time of the trip, but it did not snow at the place where the car was at any time". If we were to evaluate this example in a world w at an interval i extending from the time of the speaker's departure from Madison to the time of his arrival in Chicago, then in the entire world w during i it *did* in fact snow on the route between the two cities, which would suggest (19) should be false. But if we use situations instead, viewed as "space-time sausages", then (19) might be true in a situation which included, say, Madison at 9am and Chicago at noon, but not Chicago at 9am or Madison at noon. Then although it snowed 30 miles south of Madison at 11:30am, the travelers, who were just north of Chicago at that time, did not experience it because that space-time location was not part of their situation (even though part of their world). Such examples seem to argue that we speak as if situations can change continuously in both their spatial and temporal dimensions, excluding irrelevant places, as well as times, and that we need to use such situations, rather than whole possible worlds, as our indices of evaluation. And finally, we will argue that using situations as indices of evaluation will permit us to get the effect of an event semantics for aktionsarten, but without explicit quantification over events in the object language.

When we make the move to situations in a fragment where tense and aspect are relevant, we need to address the relationship between intervals, situations and events. In classical Montague Grammar (e.g. Montague 1973), natural language constituents are interpreted relative to an *index of evaluation* which includes both a world and a time (now generally assumed to be an interval); we'll call the latter the *time of evaluation*, or **EvalT**. Assume the use of a temporally extended situation instead of a world as a parameter of the index of evaluation for a constituent; call this parameter the *situation of evaluation*, or **EvalS**. Now we need to consider what relationship the temporal extension of that situation should have to EvalT. Note that there must be some restriction on the relationship between the EvalS and the EvalT. What would it mean to interpret an utterance relative

to an EvalT which was not a subinterval of the temporal extension of the EvalS? Surely something cannot be true in a situation at a time other than that of the situation itself.⁵ And super-intervals of the temporal extension of EvalS won't do either, as they might crucially include entities or eventualities which are not in EvalS. Let us define a function on situations, **Time**, which assigns to each situation its temporal extension, an interval. We don't want to say that Rosa built a house in situation s if it took longer than $Time(s)$, the temporal extension of s , to build the house. We can say she was building the house during s , but that's not the same, of course. So, if we have an independent EvalT, we need to guarantee that for all EvalT and EvalS, $EvalT \subseteq_t Time(EvalS)$, where \subseteq_t is the subinterval relation on pairs of intervals. But this, in turn, suggests that we might manage without the EvalT and this *ad hoc* stipulation if we use $Time(EvalS)$ in place of EvalT in our interpretation. That is, the temporal extension of the situation of evaluation now serves as the Event Time of the eventuality described.

With this in mind, we adopt a situation semantics of the sort proposed in Kratzer (1989, 1998), with modifications to address temporal semantics. Here are its main ingredients:

(20) **A Situation Semantics with Times:**

S	the set of possible situations
D	the set of possible individuals
\leq	the part-whole relation between situations, a partial order on S satisfying at least the following additional condition: for all $s \in S$ there is a unique $s' \in S$ such that $s \leq s'$ and for all $s'' \in S$, if $s' \leq s''$, then $s'' = s'$.
W	the set of possible world histories, the set of maximal elements with respect to \leq . For any $s \in S$, w_s is the world-history of s .
T	the set of times ⁶
$<_t$	a total order on T , the relation of temporal precedence
I	the set of intervals, defined as $\{i \in Pow(T): \forall t, t', t'' \in T [t <_t t' <_t t'' \ \& \ t, t'' \in i \rightarrow t' \in i]\}$
\subseteq_t	the temporal subinterval relation on $I \times I$
Time	a function in $S \times I$, assigning to each situation an interval, its temporal extension, and satisfying at least the following condition: for all s, s' , if $s \leq s'$, then $Time(s) \subseteq_t Time(s')$.

⁵As pointed out by an anonymous reviewer, Lewis (1970) considers examples where various aspects of an index of interpretation may change in the course of interpretation. For example, an experimenter might tell her subject:

(i) Three symbols will flash on the screen in sequence – now, now, and now.

Each instance of *now* is, of course, anchored to a distinct time, and each of these is a time of utterance, or Speech Time. What this points up is that, like everything else about the context of interpretation, including the situation of utterance itself, the Speech Time, and hence the evaluation time (at least in a main clause) are dynamic, changing over the course of an utterance (see Heim 1982, Kamp 1981b, and the extensive subsequent literature on dynamic interpretation). However, we find it intuitively clear that whatever the situation of interpretation at a given point in an utterance, the time of evaluation at that point must be the temporal extension of that situation. This is compatible with Cooper's conception of a spatiotemporally extended situation as a space-time sausage, discussed above.

⁶Instead of taking times as primitive elements, we could follow Kamp (1979b), Portner (1992) in assuming that situations have temporal relations (of overlap and precedence) defined directly over them, with a time defined as a maximal set of pairwise temporally-overlapping situations. There may be advantages to this approach, as we will note below.

- Pow(S) the set of propositions. A proposition p is true in a situation s iff $s \in p$.
- Implication A proposition p logically implies a proposition q iff $p \cap W \subseteq q \cap W$.

A situation is a partial world-history, and a part-of relation is defined over the set of all situations.⁷ In what follows, $s < s'$ iff situation s is a proper part of situation s' ($s \leq s'$ and it is not the case that $s' \leq s$); $>$ and \geq are the inverse relations of $<$ and \leq , as usual. Since Kratzer doesn't treat tense or time, the part-of relation between situations is presumably based at least partly on spatial partiality, as well as perhaps other more abstract properties. Each situation is part of one and only one possible world-history, with the latter a maximal situation, i.e. one which is part of no other situation. The parts of a world-history, the situations, intuitively have (at least) two dimensions, a spatial extension and a temporal extension. Moreover, as Cooper's example suggests, these two can co-vary continuously: a situation with spatial extension x at time t might have spatial extension x' , a sub- or super-space of x or even a distinct (e.g., adjacent) space, at a later time t' . If situation s is a proper part of situation s' , then s is presumably a proper spatial part and/or a proper temporal part of s' , across its entire extension. The condition on *Time* is intended to capture this intuition about the relationship between situations and their temporal extensions, guaranteeing that if s is a sub-situation of s' , then their times are appropriately related as well. In a temporally extended situation s , not only may entities have properties, but things may happen, i.e. change, as well, so that the properties which entities in s have in its initial sub-situations may differ from those they have in its final sub-situations. Such a situation sounds very much like an event, especially if we follow Portner (1992) in abstracting away from extraneous entities and simultaneous occurrences to make s in some sense minimal with respect to the realization of some event-type.

An event semantics along the general lines of the theory in Hinrichs (1985) uses quantification over events in the object language. If we assume, following de Swart (1992) and contra Kratzer (1995), that in such a semantics all predicates, both stage-level and individual-level, carry an event argument, and further, if we take events to be a type of situation, then this quantification over events amounts to quantification over situations. But then, in a situation semantic framework of the sort assumed here, we can get much the same semantics without object language event quantification. This is because the situation of evaluation for a given clause plays the role of a witness situation for quantification over events, whether existential or universal (the latter, e.g., under the scope of a modal or adverbial with universal force). That is, the truth of an expression in

⁷Kratzer (1998) defines the part-of relation over all entities, including individuals as well as situations. This raises interesting questions about the status of the individuals in D in a model where worlds become world-histories. We tend to think of individuals as persisting across situations. What would it mean to say that an individual is part of a situation, the latter conceived of as having limited space-time parameters? One might take such individuals to be individual-stages, in the sense of Carlson (1977), in which case an individual-stage would reasonably be contained within a situation. But then, of course, we would have to introduce the objects of which these were stages. Or we might take an individual to be itself a space-time sausage, and require that if an individual is in a situation, there is an intersection between the individual-sausage and that of the situation. We cannot do justice to this complex issue here, so we have attempted to side-step the issues. We restrict the part-whole relationship \leq to situations, and assume loosely that if an individual has a given property in a situation, then it is some sense a participant, or has a stage, in that situation. In a more detailed consideration of this matter, other factors come into play, e.g. the relations between the mass/count lattices over individuals and the atelic/telic lattices over events, kinds, etc.

a given situation of evaluation entails the existence of a verifying situation (or eventuality), obviating the need to assert its existence in the object language.

In shifting to a situation semantics for temporal and aspectual phenomena, there is another matter to consider. Kratzer (1989) argues that propositions ought to be persistent, in order to get the correct semantics for counterfactual conditionals. Here is how she defines persistence:

(21) **Persistence in Situation Semantics** [Kratzer 1989:616]

A proposition $p \in P(S)$ is *persistent* iff for all s and $s' \in S$ the following holds:
Whenever $s \leq s'$ and $s \in p$, then $s' \in p$.

What this means is that if a proposition is true in a situation s , then it must be true in all the super-situations of s , including the maximal situation, or world, w_s , of which s is part. Assuming that Kratzer's argument is sound, then we will want to require persistence of propositions in our situation semantics enriched with times, as well. The problem is that if we require persistence of propositions and take the primitives in terms of which we define aktionsarten to be situations instead of primitive events or intervals, then we must take care to avoid imposing conflicting requirements on the interpretation of clauses, arising from their telicity and persistence.

To see the problem, consider how we might define the aktionsarten in such a framework. First we consider the preliminary, simple definition of atelicity in (22):

(22) A clause (or formula) ϕ expresses an atelic proposition iff for all situations s , $\|\phi\|^s = 1$ just in case for all $s' \leq s$ (such that s' is sufficiently temporally extended to be in principle a ϕ -ing), $\|\phi\|^{s'} = 1$. (preliminary version)

Since the set of situations which are parts of s will include those which are temporal parts of s , (22) might seem to capture Dowty's subinterval property for atelic aktionsarten in (5), repeated below, which is defined in terms of the intervals at which certain (atelic) predicates hold of a set of arguments:

(5) **The SubInterval Property for Atelic Aktionsarten**

If δ is an atelic predicate, then necessarily, $\delta(x_1, \dots, x_n)$ is true for interval I if and only if $\delta(x_1, \dots, x_n)$ is true for all subintervals I' of I . [Dowty 1987]

Now suppose we try to extend this approach to develop the analogue of Dowty's (8) in situation semantic terms, as in (23):

(8) If δ is a telic predicate, then the truth of $\delta(x_1, \dots, x_n)$ for interval I entails that $\delta(x_1, \dots, x_n)$ is false for all proper subintervals I' of I . [Dowty 1987]

(23) A clause (or formula) ϕ expresses a telic proposition iff for all situations s such that $\|\phi\|^s = 1$, for all $s' < s$, $\|\phi\|^{s'} = 0$. (preliminary version)

(23) does mirror (8), but if we require persistence of propositions, this will mean that there can be no telic propositions. For persistence requires that if $\|\phi\|^s = 1$, then for all s'' such that $s < s''$, $\|\phi\|^{s''} = 1$. So long as s isn't a world history, persistence would entail

that ϕ is true in both a situation, s'' , and its sub-situation s , precluding telicity as defined in (23).

Further, consider a clause ϕ , of the form *María tomó/tomaba cerveza*, 'María drank beer', atelic by the usual tests (considering the Event Time of María's drinking). Suppose that this is true by virtue of the fact that María is drinking beer in some past situation s , which is not itself a world history, and that she is drinking beer in all of the sub-situations of s , reflecting its intuitive atelicity; $Time(s)$ will then be the Event Time of María's drinking. By persistence, María will also have to be drinking beer in the world history of which s is a part, w_s . But surely she wouldn't be drinking beer in all the sub-situations of w_s . Even if she's a drunkard, María has to sleep sometime! But then María's drinking beer would be true of a situation, w_s , but not of all of its sub-situations, so that the clause would *not* satisfy the definition of atelicity in (22). Hence, we could not reflect the atelicity of ϕ under (22) while maintaining persistence, without imposing a very unrealistic requirement on its truth in the model.

Finally, another problem with (22) is that it requires the truth of ϕ even in the sub-situations of the past situation s which, while they may be in principle temporally extensive enough to contain ϕ -ings, are spatially radically smaller than s , to such an extent that they are too small to contain all of the individuals which play central roles in ϕ -ing. This is clearly too strong a requirement.

In order to address these problems, we need to find a way to restrict those situations of which we require the subinterval property for atelic aktionsart, i.e. the requirement that all the sub-situations of an atelic "event" be themselves events of the same type. We take as our point of departure Portner's (1992) notion of a *minimal situation* in which a proposition is true. Portner (1992) suggests, without argument, that we view an event as a situation which is minimal in that it includes all and only the participants in the event and verifies that they stand in the appropriate relations entailed by that participation but no others.⁸ (24) is modelled on Portner's definition of minimal situations:⁹

(24) A situation s is **ϕ -minimal** iff $\|\phi\|^s = 1$ and s contains nothing irrelevant to its being a ϕ -ing.

What does it mean to be irrelevant to being a certain type of situation? This seems like a reasonable characterization: If something is irrelevant to being a ϕ -ing, then removing that entity from the situation in question will result in a sub-situation which is still a ϕ -ing. But this will mean that when ϕ is atelic, in general we cannot assume that there are minimal situations of ϕ -ing. For example, in a model in which time is dense we can not define for a given existent entity a minimal situation of its existing. Hence, in the lattice-structured models for eventualities of Bach (1986) and Link (1987), the mass-like lattice for atelic eventualities—states and activities—is non-atomic, unlike the count-like lattice

⁸ The problem of what constitutes a minimal situation of a certain type has been under discussion in the literature for some time; see Berman (1987), Heim (1990), as well as Portner's work. Certainly it deserves more careful and extended attention than we can give it here. We are particularly indebted to an anonymous referee for suggestions which led to improvements in the definition in (25) below.

⁹ Here is Portner's (1992:61) actual definition: "A situation is a **minimal situation** in which c runs iff it contains nothing irrelevant to the truth of c runs, in the sense that if any part of it were taken away, we would say that we no longer had the whole of c 's run anymore."

for telic eventualities. What this shows us is that ϕ -minimality is not yet sufficient as the basis for a situation semantic definition of atelicity.

We adopt a suggestion due to Angelika Kratzer (p.c.) and use her notion of *an eventuality that exemplifies a proposition*. Here is the definition, from Kratzer (1998:178):

(25) **Eventualities that exemplify propositions:**

If s is any possible situation and p any proposition, then s is an eventuality that exemplifies p iff for all s' such that $s' \leq s$ and p is not true in s' , there is an s'' such that $s' \leq s'' \leq s$, and s'' is a minimal situation in which p is true.

Suppose p is the (atelic) proposition that Maria is drinking beer. If this proposition is true by virtue of Maria's behavior in the situation s corresponding to Columbus, Ohio on March 23, 1996, we would want to guarantee that it's also true in the super-situation of s corresponding to all of March, 1996 in the state of Ohio, guaranteeing persistence. But neither of these situations would be an eventuality that exemplifies the proposition that Maria is drinking beer, because there would be sub-situations of each in which it wouldn't be true that Maria is drinking beer. For example, if Maria drank beer on that date at The Grapevine, but didn't go to The Eagle, then the sub-situation s' of s which included only The Eagle and its occupants wouldn't have a super-situation s'' which was a minimal Maria-drinking-beer situation. Any super-situation of s' would always include The Eagle and its customers, all of them irrelevant to Maria's drinking beer. An eventuality that exemplifies a proposition p may have sub-situations which also exemplify p , so that it may be a non-atomic atelic eventuality, but it cannot contain any sub-situations which don't themselves make p true.

Using (25), we can now define atelicity as in (26). This definition retains the simple indexing schema argued for above, without temporal indices, while avoiding some of the pitfalls of (22).¹⁰ In (26), if a situation s' exemplifies the proposition expressed by a formula ϕ , in the interest of brevity we say that s' *exemplifies* ϕ .

(26) **Atelicity in a Situation Semantics**

A clause (or formula) ϕ expresses an atelic proposition iff for all situations s , $\|\phi\|^s = 1$ just in case:

- (a) there is an $s' \leq s$ such that s' exemplifies ϕ ; and for all $s' \leq s$ such that s' exemplifies ϕ , for all s'' such that $s'' \leq s'$, s'' exemplifies ϕ (unless s'' is 'too small' to be a ϕ -situation); and
- (b) there is an s' such that either $s' < s$ or $s < s'$ and s' exemplifies ϕ .

In (26a), s' intuitively plays the role of Portner's event at which ϕ is true, because s' exemplifies the proposition expressed by ϕ ; a situation s which does not exemplify ϕ only makes ϕ true in case it contains a witness sub-situation like s' . Further, it is ϕ -exemplifying situations like s' , and not the situation of evaluation s , of which the subinterval property holds: Each of the sub-situations s'' of s' also exemplify ϕ (so that ϕ is true in s''), unless s'' is "too small" in some sense – e.g., lacking one of the key players

¹⁰Again, we are indebted to (the same) anonymous referee and to Angelika Kratzer (p.c.), whose comments led us to improve (26) significantly.

present in s' , or not sufficiently extended (temporally or spatially) to evidence the activity or state in question. Hence, (26a) is a situation-semantic counterpart of Dowty's (5).

In a model rich enough in situations and times to reflect the atelicity of *drink beer*, if a given situation s' exemplifies *Maria drinks beer*, then at any sub-interval i of $\text{Time}(s')$, there will be a situation $s'' \leq s'$ such that $\text{Time}(s'') = i$ and s'' is ϕ -minimal (unless i is too short an interval to evidence the drinking of beer). In order to guarantee this, a condition like (26) will have to be something like a meaning postulate for the relevant basic atelic predicates, like *run*, and will have to follow from the meaning of non-basic expressions like *drink* when they are combined with mass objects, along lines suggested in the work of Krifka (1987). In addition, this will require that a model for a language with atelic predicates will have to have enough situations that each situation s has at least one sub-situation corresponding to each of the sub-intervals of $\text{Time}(s)$.¹¹

Clause (26b) is necessary in order to distinguish atelics from telics which happen to be true at a temporally minimal situation. Suppose that in the model there are temporally atomic situations, i.e. time is not dense; and that the situation of evaluation s is such an atomic situation, exemplifying ϕ . Or suppose that a telic ϕ is true in a (non-atomic) situation s which is the shortest type of situation that can exemplify ϕ . In either of these cases, by clause (26a) alone ϕ would be technically atelic, because it would be vacuously true at all the (long-enough) sub-situations of that atomic or minimally-sized situation s exemplifying ϕ . Note that Dowty's (5) would present the same problem in such a model (and (22) as well). (26b) requires that the witness situation s' which makes ϕ true in s either contain or be contained in another situation which exemplifies ϕ , so that the proposition expressed by ϕ displays either the sub-interval property (if it isn't a smallest ϕ situation) or at least cumulativity (in case it is). Hence, (26b) will be incompatible with the definition of a telic in (27) below.

By (26), if ϕ is true at s , it is true at w_s as well, guaranteeing persistence. But we don't thereby require its truth at all sub-situations of w_s , any more than its truth at all sub-situations of s itself; hence, atelicity is compatible with persistence. The role of Event Time is implicitly played by $\text{Time}(s')$, the temporal extension of the eventuality corresponding to ϕ ; $\text{Time}(s')$ may well be a proper subinterval of $\text{Time}(s)$.

We define telicity as follows:

(27) **Telicity in a Situation Semantics**

A clause ϕ expresses a telic proposition iff for all situations s if s exemplifies ϕ , then there is no s' such that $s' < s$ and $\|\phi\|^{s'} = 1$.

Where a situation s exemplifies telic ϕ , we preclude the existence of proper sub-situations of s in which ϕ is also true. Hence, an eventuality that exemplifies telic ϕ will turn out to be a ϕ -minimal situation.

Now consider the following:

¹¹ This might be taken as an argument for defining times in terms of event-situations, as in Kamp and Portner, op.cit., since then this correspondence of situations to temporal intervals would be automatically guaranteed.

(28) María tomó cerveza.
 María drink.PRET beer
 ‘María drank beer.’

(29) María tomó una cerveza.
 María drink.PRET a beer
 ‘María drank a beer.’

Under Dowty's characterization of atelicity and telicity, intuitively (28) is atelic and (29) telic (under the scope of the past tense), judgments which are reflected in the acceptability of adverbials: atelic *por una hora* is fine for (28), odd with (29), while telic *en una hora* is fine for (29) but odd with (28). As in examples (9–13), this difference in aktionsart stems from the difference between a mass argument, *cerveza*, and a count argument, *una cerveza*, and not from the verb *tomar* or the *pretérito*, both of which are neutral with respect to aktionsart. Suppose we take the logical form of these examples to be as in (28') and (29'):

(28') PAST[ϕ PRET-ASP [tomar (María,cerveza)]]

(29') PAST[ψ PRET-ASP [tomar (María,una cerveza)]]

The head of the NP *cerveza* is a mass noun; hence whatever its denotation, the material parts of that denotation are also in the denotation of *cerveza* (see Link 1983).¹² By virtue of the fact that drinking itself is a relatively homogeneous process, any sub-situation of a situation of drinking some amount of a liquid will contain a proper part of that amount which is also drunk (see Krifka 1986, 1987). Suppose that in (28'), ϕ is true in a past situation s . Then we know that all the sub-situations s' of s which are big enough to exemplify drinking also exemplify the proposition that María drank beer, making (28') atelic by (26). Further, if it is true that María drinks beer in s , it will also be true in w_s , satisfying persistence; but she needn't be a drunkard, drinking beer at all the subintervals of w_s itself.

Similarly, if ψ in (29') is exemplified by a past situation s , then we know that all (big enough) proper sub-situations s' of s such that $\text{Time}(s') \subseteq_t \text{Time}(s)$ will be situations of beer drinking, as well. However, in this case, a proper part of a beer is not itself a beer in the nominal count lattice, so ψ will not be true in s' : It takes just so long to drink a beer; any less is a beer-drinking, but not the drinking of *a* beer. So the proposition expressed by (29) is non-atelic, as desired, though persistent. Suppose that (29) is true by virtue of two past beer drinking situations, so that ψ in (29') is exemplified by both s and s' , where $w_{s'} = w_s$ but s and s' are non-identical, temporally non-overlapping past situations. Then by persistence, ϕ is still true in $w_{s'} = w_s$, i.e. it's true in that world history that Mary drinks a beer. This seems quite reasonable to us. Even though we can also say that she drinks two beers in that world history (and in the join of s and s' which is also part of it), that shouldn't mean that she doesn't also drink one. This is a problem, we think, for Dowty's definitions, according to which María couldn't be said to have drunk a beer at $\text{Time}(w_{s'})$ or at the join of $\text{Time}(s)$ and $\text{Time}(s')$.

¹²at least down to the level where there are sufficient molecules of the appropriate sort in solution.

We will henceforth assume the definitions of the aktionsarten given in (26) and (27), along with the simple indexing schema they presuppose.

As an aside, we note one curious thing about these definitions: They do not define a partition over the set of all possible propositions. By (20), a proposition is just any set of situations. Then in any reasonably situation-rich model we will be able to find a proposition which is true at some sub-situations of a given situation (or sub-intervals of a given interval), but not at all of them. Such a proposition will be neither telic nor atelic by (26) and (27). This property holds of Dowty's definitions of telicity and atelicity, as well, if we substitute intervals for situations. The propositions expressed by natural language utterances all seem to be either telic or atelic, however. It might be interesting to speculate about why this is so, but we will refrain here.

§4 A truth conditional account of the semantics of the *imperfecto* and *pretérito*

§4.1 *Imperfecto*

§4.1.1 Truth conditions for the *imperfecto*

Our truth conditions for the *imperfecto* involve a single core meaning, given in (32) below. What we offer is basically a modal interpretation of the *imperfecto*, involving universal quantification over situations. It has three subcases, involving three possible types of domain restriction on the universal quantification; these are given in terms of permissible modal accessibility relations R . Case (a) is a totally realistic interpretation, corresponding to the simple atelic reading of the *imperfecto*; case (b) captures the progressive interpretation, and case (c) the habitual. We will argue in §4.1.2 that the other purported senses of the *imperfecto* are in fact subcases of one of these. We initially ignore the issue of the *imperfecto*-internal scopes of temporal adverbials, discussed in §2 above, an issue which will be addressed further below.

First we define a couple of useful notions:

$$(30) \quad s <_t s' \text{ iff for all } t \in \text{Time}(s), t' \in \text{Time}(s'), t <_t t'.$$

$$(31) \quad \mathbf{ST} = \text{the Speech Time of an utterance, technically the situation which exemplifies its utterance, whose temporal dimension then corresponds to the Reichenbachian notion of Speech Time.}$$

Recall that in embedded tenses, ST may not be the same as the time of evaluation. Hence, as in fragments which deal with temporal deixis (*now*, etc.), we need to keep track of both ST and the situation of evaluation.

(32) **Meaning of the *Imperfecto***

$$\|\text{IMPERF}\phi\|^{s, \mathbf{ST}} = 1 \text{ iff } \exists s' \leq w_s[s' <_t \mathbf{ST} \ \& \ \forall s''[s'' \leq s' \rightarrow \forall s'''[R(s''', s'') \rightarrow \text{exemplify}(s''', \phi)]]],$$

where either:

- (a) Totally realistic case: $R = \{ \langle s, s' \rangle : s = s' \}$
- (b) Progressive case: $R = \{ \langle s, s' \rangle : s \text{ is an inertia-situation for } s' \}$, or
- (c) Habitual case: $R = \{ \langle s, s' \rangle : s \text{ is a characteristic sub-situation of } s' \}$

The core import of (32) can be paraphrased as follows: $IMPERF\phi$ is true in a situation s if and only if there is some situation s' (in the same world history as s) which is past with respect to the Speech Time (ST) and in every (possibly non-proper) sub-situation s'' of s' , ϕ is true in every situation s''' which is related to s'' in the appropriate fashion R .¹³ There are thus, in addition to the modal accessibility relation R , two parts of the meaning of the *imperfecto*: the Past tense, reflected in the requirement that s' be past relative to the Speech Time, and the atelic aspect, reflected in the second line of the formula, the subinterval property required of s' . Requiring that s' be past relative to the Speech Time makes the Spanish *imperfecto* an *absolute tense*, in the sense that its temporal location is always determined relative to the Speech Time, even in embedded clauses. Cf. Korean (Yoo 1996, Yoon 1996) for an example of a language where embedded clauses are interpreted relative to the event time of their embedding clauses instead; in such languages, we could use the EvalS, s , instead of the independent ST in the above.

(32a) is intended to capture the simple atelic interpretation. Since R is the identity relation on situations, (32a) reduces to the straightforwardly atelic (32a'):

(32a') Totally realistic case of the *Imperfecto*

$$\|IMPERF\phi\|^{s,ST} = 1 \text{ iff } \exists s' \leq w_s[s' \prec_t ST \ \& \ \forall s''[s'' \leq s' \rightarrow \text{exemplify}(s'',\phi)]]],$$

In (32b), we adopt a view of the progressive reading for the *imperfecto* modified from Dowty's (1979) treatment of the English progressive. Crucial to this definition is the notion of an inertia situation, modelled after his notion of an *inertia world*; cf. also Portner's (1994) *inertia events*. Intuitively, an inertia situation for a situation s is one which begins just like s , but continues in the way that s would continue were there no interference with the course of events as they have developed up to that point. Of course, in reality the course of events is often interrupted; e.g., Frida might be in the midst of baking a cake but receive a phone call and never finish it. So the progressive reading is in this respect like modality, in that it makes reference to possibly unrealized situations.¹⁴ Further, we require that an inertia situation for a given EvalS continue on beyond Time(EvalS), the interval at which the progressive is asserted to be true:¹⁵

(33) Situation s is a temporally final sub-situation of situation s' , $s \leq_{\text{final}} s'$, iff $s \leq s'$ and there is no $t' \in \text{Time}(s')$ such that for all $t \in \text{Time}(s)$, $t \prec_t t'$.

¹³We will not give a complete fragment for Spanish. We assume, as usual for tenseless ϕ , that $\|\phi\|^{s,ST} = 1$ iff ϕ is verified by s . E.g. for a basic formula, the arguments of the predicate must stand in the relation denoted by the predicate in s .

¹⁴Abusch (1985), Landman (1992), and Portner (1998) represent successive refinements of the intensional approach to the progressive in Dowty (1979). Portner argues that the problems which had been pointed out for Dowty's account by Parsons (1989), Landman (1992), and others can be handled fairly simply by assuming that what counts as an inertia situation is determined with the use of a contextually-given modal base and ordering source, of the sort utilized by Kratzer (1981) for modal semantics more generally. Although we will not take the space here to spell out how this works, this proposal is straightforwardly compatible with the truth conditions in (32), and with Kratzer's situation semantics more generally. The reader is referred to Portner's paper for details. What counts as habitual can be determined using the same pragmatically-determined parameters.

¹⁵The definition in (34) only works as desired if we assume that situations in different world histories are temporally comparable, an assumption which could prove problematic on the approach which constructs times from pairwise overlapping sets of situations.

(34) **Constraint on the Inertia-Situation Relation**

For all s , if s' is an inertia-situation for s , then there is an s'' such that $s'' \leq_{\text{final}} s'$ and $s <_t s''$.

Recall that by (20), if $s \leq s'$ then $\text{Time}(s) \subseteq_t \text{Time}(s')$, so that by (33) a final sub-situation of s' takes place at a subinterval of the event time of s' . Informally, (34) says that any inertia-situation for s has a temporally final sub-situation which properly temporally follows s .

Like the inertia-situation relation, the characteristic counterpart relation referred to in (32c) is modal, in the sense that these relations shift from one situation of interpretation to another. However, unlike inertia situations, characteristic sub-situations of a given situation are all in the same world; in this respect, the characteristic interpretation of the *imperfecto* has more in common with the simple atelic interpretation. The *realis* character of this interpretation follows from our definition because we assume, following Kratzer, that the sub-situation relation holds only over situations in the same world. But not all sub-situations of a situation s are characteristic sub-situations. The latter are sub-situations which are normal or usual in some sense, a sense given by the meaning of the utterance in question and its context. With respect to (32c), since s is a sub-situation of s' , and hence they are in the same world, habitual readings are about what someone has actually done on typical occasions, and not, as with the progressive reading, about what would have been the case if things had gone on as they were.

Given these assumptions, the subcases of (32) give rise to truth conditions which we can paraphrase as follows:

(32) a'. Totally realistic reading:

Imperfecto ϕ is true in a situation s if and only if there is an interval s' which is past relative to ST and ϕ is exemplified by every sub-interval of s' .

b'. Progressive reading:

Imperfecto ϕ is true in a situation s if and only if there is an interval s' which is past relative to ST and ϕ is exemplified by every inertia situation for s' , as well as by the inertia situations for all the sub-situations of s' . I.e., ϕ would have been true if things had gone on as they were.¹⁶

c'. Habitual reading:

Imperfecto ϕ is true in a situation s if and only if there is an interval s' which is past relative to ST and ϕ is exemplified by every characteristic sub-situation of s' , as well as by every characteristic sub-situation of the sub-situations of s' .

Since all the sub-situations of s' must be such that their sub-situations also exemplify, or have inertia situations or characteristic sub-situations that exemplify ϕ , this will guarantee atelicity under (26). Hence, (32) entails that the *imperfecto* will always yield atelic aktionsart (under the scope of the Past tense).

¹⁶By this, we intend no counterfactual implication. I.e., the truth of *imperfecto*(ϕ) is compatible with the subsequent truth of ϕ . On this understanding, case (a) is a sub-case of case (b), where the past situation s' is its own (unique) inertia situation.

We noted that (32) ignores the internal adverb problem. We offer a technical solution to this problem which involves leaving the translation of *IMPERF* ϕ open to the introduction of adverbials with scope under the Past tense but wider than the aspectual portion of its meaning. We do this by changing the logical type of *IMPERF* ϕ from that of a sentence, i.e. type t , to a function from adverbials to sentence-type objects.¹⁷ As usual in Montague Grammar, ϕ' is the translation of the constituent ϕ into a formula of intensional logic, its logical form:

(35) **Meaning of the *Imperfecto*** (internal adverbial version)

$IMPERF\phi' = \lambda Adv[PAST(Adv[ASP_{IMPF}\phi])]$, where $PAST$, Adv , and ASP_{IMPF} are of type t/t , and:

$\|PAST\psi\|^{s,ST} = 1$ iff $\exists s' \leq w_s [s' <_t ST \ \& \ \|\psi\|^{s',ST} = 1]$,

$\|ASP_{IMPF}\phi\|^{s',ST} = 1$ iff $\forall s'' [s'' \leq s' \rightarrow \forall s''' [R(s''',s'') \rightarrow exemplify(s'',\phi)]]$,

where either:

- (a) Totally realistic case: $R = \{ \langle s, s' \rangle : s = s' \}$
 (b) Progressive case: $R = \{ \langle s, s' \rangle : s \text{ is an inertia-situation for } s' \}$, or
 (c) Habitual case: $R = \{ \langle s, s' \rangle : s \text{ is a characteristic sub-situation of } s' \}$

Under this translation and interpretation, *IMPERF* ϕ is of type $(t/t)/t$, taking a sentential adverbial, such as *en una hora* or *por una hora*, to yield an expression of type t . We could impose further, sortal restrictions on the adverbials which can serve as internal adverbs in this translation, perhaps limiting these to the class of durative adverbials, but we won't investigate that here. In case the sentence takes no adverbials, we can use a dummy adverbial as argument to (35), basically an identity function. In such a case, the combined translation and interpretations of *PAST* and *ASP_{IMPF}* in (35) yield the same interpretation as the earlier (32). Note that the possibility of introducing adverbial meanings internal to the interpretation of the *imperfecto* does not preclude permitting the same adverbials to take narrower scope than the *imperfecto*.¹⁸

One final note: (32)/(35) do not guarantee that the situation s'' at which ϕ is true is itself in the past. The definition could be easily modified to ensure this. However, we have not done so because of intentional examples like (36):

- (36) Juan dijo que venía mañana.
 Juan said.PRET that come.3sg.IMPF tomorrow
 'Juan said that he was coming tomorrow.'

In (36), the intended event of John's coming corresponding to the complement clause is specified to be realized, if at all, after the speech time. We will argue in the following

¹⁷Dowty (1979:332ff) argues that aspectual adverbials like *in an hour* and *for an hour* should be VP adverbs, of type IV/IV. Notice that that is not open to us here: the scope of the tense portion of the meaning of the *imperfecto* is clearly sentential, type t in the translation offered, and hence that of the aspectual portion of its meaning must be too. Hence if adverbials take intermediate scope between these two portions, they must take type t arguments (the result of adding the aspectual meaning to the basic clause meaning) to yield a type t argument for the tense portion of the meaning, i.e. be of type t/t .

¹⁸ There are various other tricks one can play with the lambda calculus and types to iterate the application of internal adverbials, to prevent their taking wide scope over the *imperfecto*, etc. See Dowty (1979), Stump (1985) for detailed illustrations of the use of this sort of mechanism in a semantics for English tense and aspect with adverbials.

section that intentional readings of the *imperfecto* are a type of progressive interpretation, so that all readings of the Spanish *imperfecto* are covered by the cases given in (32)/(35) above. Given (36), then, we do not want to guarantee that s'' in these definitions is in the past with respect to the time of evaluation (for (36), the Speech Time).

§4.1.2 Accounting for available readings of the *imperfecto*

Now let us return briefly to review the data in the first section, and show how our truth conditions for the *imperfecto* account for them. We have already discussed how the aktionsart for the *imperfecto* are constrained to be atelic. We also see that the progressive and habitual readings of the *imperfecto* are straightforward examples of cases (b) and (c) of (32), respectively. It remains only to discuss how the intentional and iterative readings of the *imperfecto* arise, and to illustrate how the possibility of an internal adverbial helps to account for the data.

First, with respect to the intentional reading, note that we might try to derive it by adding a fourth clause to (32), as in (32d):

(32) d. Intentional:

R= {< s, s' >: s is a situation realizing the intentions in s' of the agent in s }

Intentions have a futurate flavor. If one has intentions in a situation, they generally haven't been fully realized yet. Hence, we might place the condition in (37) on the relation of being a situation which realizes an agent's intentions:

(37) Constraint on the Intentional Realization Relation:

For all s, s' , if someone has certain intentions in s and s' exemplifies the realization of those intentions, then there is $t' \in \text{Time}(s')$ such that for all $t \in \text{Time}(s)$, $t <_t t'$.

However, apart from the problem of trying to define what it is to be the agent of a situation (which would surely require relativization to a particular event-type realized in that situation), we believe that adding (32c) is neither necessary nor sufficient to capture all the relevant readings, and that it is preferable instead to treat them as subcases of the progressive interpretation of the *imperfecto*. First, to see that such an addition would not be sufficient, notice that there are examples of a reading which is very close to the intentional but which does not involve an agent. This is exemplified by (38) and (39):¹⁹

(38) El mecanismo de autodestrucción se detonaba en 30 minutos.
The mechanism of self-destruction detonate.IMPF in 30 minutes
'The self-destructing mechanism would be activated in 30 minutes.'

¹⁹In the case of example (38), even though the presence of an agent is not explicit, one can assume that there has been some agent involved in the programming of the mechanism. In (39), however, no connection to an agent can be established.

(39) Eran las 6. Los campesinos comenzaron a preparar el fuego.
 be.IMPF 6:00 the peasants start.PRET to prepare the fire

El sol se ponía a las 6:50.
 The sun 3-REFL set.IMPF at 6:50

‘It was 6 o'clock. The peasants started to prepare the fires. The sun would set at 6:50.’

This suggests that the reading in question may actually be more properly termed a *futurate* reading. It has often been noticed that progressives tend to have futurate interpretations (once again, see Dowty 1979). Under certain assumptions about what constitutes an event, (32d) is just a subcase of (32b), i.e. the existence of such readings would be predicted by our truth conditions for the progressive reading, so that (32d) is not independently necessary. The main assumption we require is that an event may consist not only of the changes in state typically associated with that type of event (see Dowty 1977), but also with what Moens & Steedman (1988) call a preparatory process: a subpart of the event before any culmination (of the change of state) occurs, during which the preparations for its occurrence are completed. If this assumption is made, then *IMPERF ϕ* might be true under the progressive reading if the preparatory phase of ϕ -ing is underway. In a similar though not quite identical fashion, Partee (1984) discusses the possibility that, in order to derive the correct semantics for temporal adverbial clauses in examples like (40), we might think of an event of throwing a party as including not just the actual party, but also the planning, sending the invitations, preparing the food, etc.:

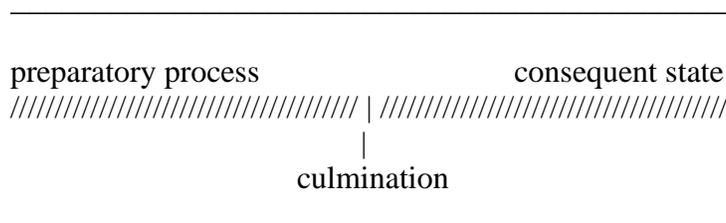
(40) When Juanita threw a party, she spent a long time preparing the food.

If we include the period during which one holds intentions to perform some act as part of the preparatory phase of an extended event, then the extended event is in progress during the preparatory phase, during the period when one holds those intentions. If one's intentions are carried out as planned, then in all the inertia situations corresponding to that period, the event itself will come about. As is usual with the progressive, there is no assumption that the eventuality is fully realized. And note that the preparatory phase need not involve the intentions of a planner, yielding the intentional reading, but may instead simply reflect the fact that all the wheels are in motion which would ordinarily lead to an event like the sun setting, as in (39). From this perspective, the intentional and futurate readings are a subtype of the progressive reading.

If intentional readings are subcases of the progressive interpretation of the *imperfecto* given in (32a), then we have to explain why the Spanish *progresivo* (progressive form) does not give rise to such readings, as illustrated by the lack of an intentional reading in the past *progresivo* counterpart to (3a) in (3b), discussed earlier. The fact that the Spanish *progresivo* does not have the intentional reading supports our contention that the intentional reading arises from the meaning of the *imperfecto* itself, rather than, e.g., being the result of combining the *imperfecto* with a progressive operator (cf. Dowty's 1979 compositional treatment of the English futurate progressive in this way). Our understanding of the Spanish *progresivo* is that in some sense it can only be used to refer to events when the change of state in question is actually in progress, though not yet complete.

To see what we mean, consider Moens & Steedman's suggested internal structure of telic events:

(41) Moens & Steedman's (1988) internal structure of a telic event ("Nucleus")



They argue that what the preparatory process involves might be interpreted differently for different examples, these differences arising, presumably, from real-world pragmatic knowledge plus the truth conditions of the examples involved. On one type of construal, this process comprises the actual beginning of the change of state which leads to the culmination, as in the progressive reading of the *imperfecto* in examples like (2b), repeated here:

(2) b. Ibamos a la playa cuando nos encontramos con Miguel.
 go-1plu.IMPF to the beach when RECP. meet-1plu.PRET with Miguel
 'We were going to the beach when we ran into Miguel.' (progressive)

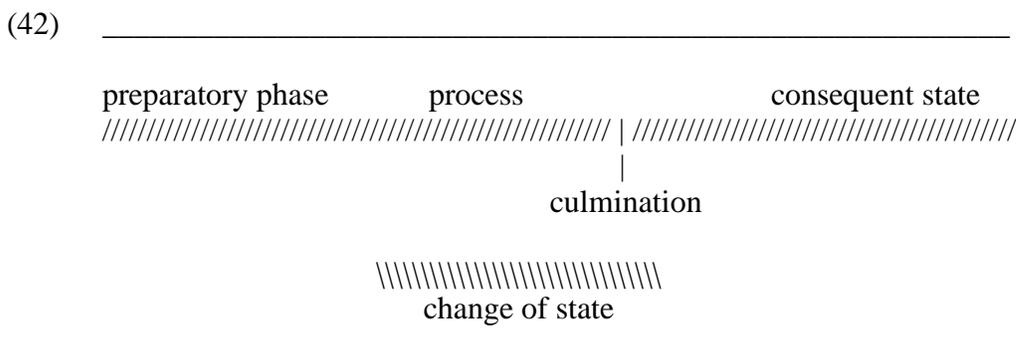
But on another, the preparatory process would comprise something like a planning phase, as in examples like (40) or, as we argued, the intentional readings of examples like (2d):

(2) d. Hasta ayer, íbamos a la playa de vacaciones,
 until yesterday go-1plu.IMPF to the beach on vacation

pero hoy Pepa dijo que no hay dinero para eso.
 but today Pepa say-3sg.PRET that not there is money for that

'Up until yesterday we were going to the beach on vacation but today Pepa said that there is no money for that.' (intention-in-the past)

But if the Spanish *progresivo* is only felicitous in examples like (2b), and not in those like (2d), then some differentiation must be made between the two types of preparation for change of state. We seem to need something more like (42):



The culmination is point-like, i.e. temporally non-extended. In the complex telics (i.e. accomplishments), the change of state is more than the culmination; it is extended. We capture this extended character of the change of state in complex telics by saying that there is a non-empty process leading to the culmination. In an achievement (simple telic), the process is empty. As a process of approaching the culmination, the pre-culmination portion of the complex telic change of state has a certain sort of homogeneity. But the preparatory phase is qualitatively different from the change of state (with its pre-culmination process), and hence isn't homogeneous with the process: In the preparatory process, nothing is going on which would concretely lead to the change of state. The Spanish *progresivo* may only refer to the pre-culmination process of the actual change of state associated with a telic eventuality, i.e. to a sub-event which takes place after the preparatory process, if any.²⁰

Note that this account of the intentional readings predicts that they may arise with achievements. This is confirmed by the acceptability of examples like the following:²¹

(43) María empezaba el régimen el lunes. Pero hoy se enteró
 Maria begin.IMPF the diet the Monday but today learn.PRET

que sus amigas le van a hacer una fiesta el lunes a la noche,
 that her friends dat-3 go.pres to make a party the Monday the evening

así que decidió no empezar hasta el otro lunes.
 so decide.pret not begin until the other Monday

‘María was going to start her diet on Monday. But today she learned that her friends are going to throw a party for her Monday evening, so she decided not to start until the following Monday.’

In fact, our preliminary evidence suggests that intentional readings of the *imperfecto* are most often encountered with achievement predicates. These simple telics have no inherent pre-culminative process, and hence the intentional reading, focusing on the preparatory (planning) process, is forced in order to make sense of an atelic interpretation. But there are examples which are ambiguous between the intentional and the true progressive readings, e.g. the two readings attested to for the examples in (4) above.

Since we are not principally concerned here with the *progresivo*, we will not explore how the ontology of event-parts sketched in (42) should be realized in the semantics. We only offer this by way of tentative explanation of the difference between the *imperfecto* and the *progresivo*.

²⁰It is interesting to note that English, with no distinct imperfective past tense form, uses the past progressive to indicate the intentional reading, as we see in the translations in the intentional examples in (2) - (4). This supports the idea that the restriction on the interpretation of the Spanish progressive is probably designed to take advantage of the *imperfecto* vs. past progressive split to make as many semantic distinctions as possible.

²¹We have chosen the complex achievement predicate *empezar el régimen*, with the inchoative aspectual verb *empezar*, because the intentional reading is generally easiest to get with agentive predicates, and, as Dowty (1979:124) notes, few, if any, simple achievement verbs involve agentivity.

Now let us consider the iterative interpretation often attributed to the *imperfecto* (cf. Binnick 1991) or considered as a subtype of the habitual (cf. Comrie 1976). English examples like (44) can only have iterative interpretations:

(44) Stephen kicked the door for ten minutes. (iterative)

(44) means that throughout a ten minute interval, Stephen repeatedly kicked the door. Spanish examples like (45) can have the same type of interpretation, even without the durative adverbial, in the appropriate type of context:

(45) Esteban pateaba la puerta.
 Esteban kick.IMPF the door
 'Esteban was kicking/used to kick the door.' (iterative or habitual)

We believe that the iterative interpretation of the *imperfecto* is a progressive interpretation, and furthermore, that the iterativity itself does not arise from the meaning of the *imperfecto*, but in another fashion. To see why, note that the obvious Spanish translation of the earlier English example (44) is (46), with the *pretérito*, not (47), with the *imperfecto*:

(46) Esteban pateó la puerta por 10 minutos.
 Esteban kick.PRET the door for 10 minutes
 'Esteban kicked the door for ten minutes.' (iterative)

(47) Esteban pateaba la puerta por 10 minutos.
 Esteban kick.IMPF the door for 10 minutes
 'Esteban used to kick the door for 10 minutes.' (habitual + iterative)

Standard accounts of the iterative interpretation of the English (44) assume that it comes not from the inherent meaning of *kick the door*, which is basically a simple telic (achievement), but from the necessity of reconciling this basic meaning with the durative adverbial *for ten minutes*, which only modifies an atelic event. Intuitively, since the duration of a kicking of a door is typically quite short and the associated event is telic, the only way to reconcile these two elements is to shift to an iterative interpretation of the main clause (resulting in atelicity) – something like 'kicked the door repeatedly'. A progressive interpretation would be odd because such an event ends almost immediately after it begins. Achievements do not typically involve a process leading up to the culmination of the change of state, and a progressive interpretation of a telic requires the existence of such a preparatory process. Similarly, we would argue, in (46) the iterative interpretation comes not from the *pretérito* itself, which is compatible with the basically telic aktionsart of the predicate, but is a zero-morphological shift necessitated by the need to reconcile that telicity with the durative adverbial. Then also in the *imperfecto* (47), which generally is taken to mean that Esteban habitually kicked the door (repeatedly) for 10 minutes, it is not the aspect which forces the iterative interpretation, but the same combination of a telic predicate and a durative adverbial. Since the iterative reading arises already with the *pretérito* in (46), the *imperfecto* in (47) adds another dimension to the interpretation, habituality. Another difference between the *pretérito* and the *imperfecto* with respect to iterativity is that an *imperfecto* example like (47) but without the adverbial, as in (45), can have a progressive iterative interpretation in the proper

context: ‘Esteban was in the process of repeatedly kicking the door’, whereas the *pretérito* (48) without the adverbial does not have an iterative interpretation.

- (48) Esteban pateó la puerta.
 Esteban kick.PRET the door
 ‘Esteban kicked the door.’ (default interpretation: telic)

Our treatment of the *imperfecto* as entailing atelicity predicts that the progressive interpretation of the *imperfecto* is like a durative adverbial in forcing a non-complex telic (achievement) to have an iterative interpretation in order to be atelic. So, though the iterative interpretation is forced by the *imperfecto*, it is not part of the meaning of the *imperfecto* itself, but is just another instance of a general strategy for reconciling the telicity of the main predicate with the atelic requirements of an element with wider scope, be it an atelic adverbial or the atelic aspect. In turn, this also would correctly predict that the iterative reading can arise with the past progressive construction, with the *progresivo* form, as well. But nothing in the meaning of the *pretérito* forces the shift to an iterative interpretation. That is, in general, it seems that such shifts must be forced, as in the *imperfecto* cases. Hence, the *pretérito* does not by itself yield iterative interpretations.

Note that the purportedly durative and continuous aspectual character of the *imperfecto* are accounted for by the subinterval property associated with its atelicity: It is durative in the same sense that the compatible durative adverbials are (see also the discussion of Reference Time in §4.2.2 below), continuous in that the subinterval property (here, more properly, a sub-situation property) entails that there are no gaps in the eventuality concerned. We believe that the purported indefiniteness is really just by way of contrasting the *imperfecto* to a perceived definiteness of the *pretérito*, and has no independent content that we can determine.

Finally, the examples in (15a) and (15b), repeated here, illustrate the utility of the various scopes for adverbials provided for with the truth conditions in (35):

- (15) a. Frida ensayaba el libreto por una hora.
 Frida rehearse.IMPF the libretto for an hour
 ‘Frida used to rehearse/was rehearsing the libretto for an hour.’
 (atelic: habitual or progressive)
- b. Frida ensayaba el libreto en una hora.
 Frida rehearse.IMPF the libretto in an hour
 ‘Frida rehearsed/used to rehearse/was rehearsing/intended to rehearse the libretto in an hour.’
 (telic: inchoative; or atelic: habitual, progressive, or intentional)

We will assume the following interpretation of *por una hora*, modelled after Dowty's (1979) truth conditions for English durative adverbials with *for*:²²

- (49) $\|por\ una\ hora\ \phi\|^{s,ST} = 1$ iff $\exists s' \leq s[\text{duration}(\text{Time}(s'), \text{one-hour}) \ \& \ \forall s''[s'' \leq s' \rightarrow \text{exemplify}(s'', \phi)]]$

²²As noted above, Dowty treats these aspectual adverbials in English as VP-modifiers, not sentential adverbials.

According to (49) *por una hora* requires distributivity of the proposition within its scope, and hence only combines with atelic propositions: If a proposition holds true in a situation for an hour, it is entailed that it holds true for all (long enough) sub-situations of that hour-long situation. When we combine the adverbial internally with the atelic proposition *Frida ensayaba el libreto* and take R to be the identity relation, the resulting reading reduces to (15a'):

$$(15a') \exists s' \leq w_s[s' <_t \text{ST} \ \& \ \text{duration}(\text{Time}(s'), \text{one-hour}) \ \& \\ \forall s''[s'' \leq s' \rightarrow \text{exemplify}(s'', \text{Frida_rehearse_libretto})]]]$$

We might paraphrase (15a') as 'there's a past situation of one hour's duration, and it and all its sub-situations exemplify Frida rehearsing the libretto'. This is one possible reading of the example, with an atelic activity understanding of the predicate: Frida needn't have finished the entire libretto in each such situation. If instead we combine the adverbial with *Frida ensayaba el libreto* before combining the result with the *imperfecto*, thus giving the adverbial narrow scope relative to the entire tense/aspect, we obtain (15a''):

$$(15a'') \exists s' \leq w_s[s' <_t \text{ST} \ \& \ \forall s''[s'' \leq s' \rightarrow \forall s'''[R(s''', s'') \rightarrow \\ \text{exemplify}(s''', \text{duration}(\text{Time}(s'''), \text{one-hour}) \ \& \\ \forall s^4[s^4 \leq s''' \rightarrow \text{exemplify}(s^4, \text{Frida_rehearse_libretto})]]]]]$$

Suppose that we take R here to give the characteristic sub-situations for s'' , the third case in (35). This is the habitual reading. It requires that there be a past situation such that all the (contextually relevant) characteristic sub-situations of all its sub-situations are ones in which Frida rehearsed the libretto for one hour (without necessarily completing it). Requiring this of all the characteristic sub-situations of all the sub-situations of s' guarantees that it was consistently Frida's habit throughout s' to rehearse the libretto for an hour.

To account for the readings of (15b), we offer the following interpretation of *en una hora*, again based on Dowty's interpretation of the corresponding English adverbial:

$$(50) \quad \|\textit{en una hora} \phi\|^{s, \text{ST}} = 1 \text{ iff } \exists s' \leq s[\text{duration}(\text{Time}(s'), \text{one-hour}) \ \& \\ \exists s''[s'' \subseteq_t s' \ \& \ \text{exemplify}(s'', \phi) \ \& \ \forall s'''[s''' \leq s'' \ \& \ \|\phi\|^{s''', \text{ST}} = 1 \rightarrow s''' = s'']]]$$

(50) requires that when *en una hora* ϕ is true in a situation, it is true by virtue of a ϕ -exemplifying situation which has no ϕ -exemplifying sub-situations. When a telic adverbial like this or a telic predicate combines internally with the *imperfecto*, which requires atelicity, the result is anomalous. This is shown in the logical form in (15b'), once again reduced on the assumption that R is the identity function:

$$(15b') \exists s' \leq w_s[s' <_t \text{ST} \ \& \ \text{duration}(\text{Time}(s'), \text{one-hour}) \ \& \\ \exists s''[s'' \subseteq_t s' \ \& \ \text{exemplify}(s'', \forall s'''[s''' \leq s'' \rightarrow \\ \text{exemplify}(s''', \text{Frida_rehearse_libretto})]) \ \& \\ \forall s'''[s''' \leq s'' \ \& \ \text{exemplify}(s''', \forall s^4[s^4 \leq s''' \rightarrow \text{exemplify}(s^4, \\ \text{Frida_rehearse_libretto})]) \rightarrow s''' = s'']]]$$

(15b') may be paraphrased, 'there's a past situation s'' of maximum one-hour's duration, and all of its sub-situations are ones in which Frida rehearsed the libretto, and moreover, s'' has no proper sub-situation such that it (and all of its sub-situations) are ones in which Frida rehearsed the libretto.' On either the activity or the accomplishment interpretation of the predicate, this is a contradiction in any reasonably rich model (where there are subsituations of s''). There is no non-anomalous atelic interpretation of (15b).

However, (15b) does have several interpretations. The telic inchoative interpretation is one in which the adverbial acts not as a durative adverbial pertaining to the Event Time of the rehearsal, but instead as a Reference Time adverbial like *soon*. The combination of the telic Reference Time adverbial, implicating that some unique eventually occurs at the end of an hour, with the atelic main clause implies that the rehearsal process *started* within one hour after some contextually given reference situation. This inchoative coercion is attested to in related examples in English (Dowty 1979, Moens & Steedman 1988). See §4.2.2 for more discussion of Reference Time and telicity. Though we will not technically address the way that these adverbials establish Reference Time in the present paper, it is a question of the adverbial restricting the domain of the PAST operator, rather than taking scope relative to the aspectual elements.²³ Hence, the telicity conflict which we see in (15b') does not arise in the inchoative interpretation.

The atelic interpretations of (15b) result from giving the adverbial narrow scope relative to the entire *imperfecto*. This yields a logical form like (15b''):

$$(15b'') \exists s' \leq w_s [s' \subseteq_t ST \ \& \ \forall s'' [s'' \leq s' \rightarrow \forall s''' [R(s''', s'') \rightarrow \text{exemplify}(s''', [\text{duration}(\text{Time}(s'''), \text{one-hour})] \ \& \ \exists s^4 [s^4 \subseteq_t s''' \ \& \ \text{exemplify}(s^4, \text{Frida_rehearse_libretto}) \ \& \ \forall s^5 [s^5 \leq s^4 \ \& \ ||\text{Frida_rehearse_libretto}||^{s^5, ST=1} \rightarrow s^5 = s^4]]]]]]$$

If R is taken to be the characteristic sub-situation relation, this captures the interpretation where Frida habitually rehearsed-the-libretto-for-one-hour, 'there's a period in the past such that all its characteristic sub-situations exemplify Frida's taking exactly one hour to rehearse the libretto.' This is the accomplishment understanding of this predicate, where the libretto was rehearsed in its entirety.

§4.2 *Pretérito*

§4.2.1 Truth conditions for the *pretérito*

Recall that the *pretérito* is indeterminate with respect to telicity: a clause in the *pretérito* may be either telic or atelic. This means that we must give its truth conditions in such a way that it is compatible with either (26) or (27) above, the characterizations of atelicity and telicity, respectively. Hence, we cannot require, but must permit such clauses to display the subinterval property. Further, the *pretérito* does not have the progressive-like readings we find in the *imperfecto*. The punctual, terminative, and definite character(s) attributed to the *pretérito* in the traditional literature seem to reflect the fact that the

²³ See Hinrichs' (1986) discussion of English *when-*, *after-* or *before-* clauses. See also Roberts (1994) for extended technical discussion.

events denoted have terminated (if atelic states or processes) or reached their natural culmination (if telic achievements or accomplishments).

(51) **Meaning of the *Pretérito***

$$\begin{aligned} \llbracket \text{PRET}\phi \rrbracket^{s, \text{ST}} = 1 \text{ iff } & \exists s' \leq w_s [s' <_t \text{ST} \ \& \ \text{exemplify}(s', \phi) \ \& \\ & \forall s'' [(s'' \leq s' \vee s'' \leq s') \ \& \ \text{exemplify}(s'', \phi) \ \rightarrow \\ & \forall t'' \in \text{Time}(s''), \forall t' \in \text{Time}(s') (t'' \leq_t t')]] \end{aligned}$$

We can paraphrase (51) as follows. *PRET* ϕ is true in a situation s if and only if there is a situation s' such that:

- (a) s' is prior to the Speech Time. This, of course, is the intuitive content of past tense.
- (b) s' exemplifies ϕ , entailing that ϕ is true in s' .
- (c) every ϕ -exemplifying situation s'' which is a sub- or super-situation of s' is such that it ends either before or at the same time as s' .

Unlike the truth conditions for the *imperfecto*, (51) doesn't require the sub-interval property (truth in all sub-situations), so that telic readings are possible as well, as we will illustrate below. Also, the *pretérito* lacks a modal accessibility relation, so that progressive and habitual readings do not arise. The other major difference between the truth conditions in (51) and those in (32) is what we call the **end-point requirement** of the *pretérito*, given in condition (c). The *pretérito* permits past truth in super- or sub-situations, thus permitting atelic readings; but all these situations must end at a certain point in the past (relative to the Speech Time): This end-point is intuitively the final moment of the largest ϕ -exemplifying situation. This rules out the possibility that the eventuality in question is still on-going. Contrast this with the *imperfecto*, which, like the English progressive, leaves open the possibility that the past atelic situation exemplifying ϕ is part of a super-situation which also exemplifies ϕ , with that super-situation encompassing the Speech Time. We can see this in the contrast between (52) and (28):

(52) María tomaba cerveza (cuando la vi hace unos minutos).
 María drink.IMPF beer when her saw ago some minutes
 'Maria was drinking beer (when I saw her a few minutes ago)'

(28) María tomó cerveza.
 María drink.PRET beer
 'María drank beer.'

(52) and its English counterpart can be true in a situation in which Maria is still drinking beer. But (28) is only true when the beer-drinking situation referred to is over, so that it does not extend uninterruptedly to the present.

As with the *imperfecto*, it is straightforward technically to permit adverbials to take intermediate scope between the PAST and the aspectual portions of the interpretation of the *pretérito*, should the data warrant it.

- (49) $\|por\ una\ hora\ \phi\|^{s,ST} = 1$ iff $\exists s' \leq s[\text{duration}(\text{Time}(s'), \text{one-hour}) \ \& \ \forall s''[s'' \leq s' \rightarrow \text{exemplify}(s'', \phi)]]$
- (50) $\|en\ una\ hora\ \phi\|^{s,ST} = 1$ iff $\exists s' \leq s[\text{duration}(\text{Time}(s'), \text{one-hour}) \ \& \ \exists s''[s'' \subseteq_t s' \ \& \ \text{exemplify}(s'', \phi) \ \& \ \forall s'''[s''' \leq s'' \ \& \ \|\phi\|^{s''',ST}=1 \rightarrow s'''=s'']]]$

According to (49) *por una hora* requires distributivity of the proposition within its scope, and hence only combines with atelic propositions: Thus when *por una hora* in (15c) combines with a clause in the *pretérito*, the interpretation of that clause must be atelic. The truth conditions for the *pretérito* in (51) are compatible with the definition of atelicity in (26), so long as the endpoint requirement is satisfied. At some point in the past, the rehearsing in question has stopped, so that it is no longer in progress. (50) requires that when *en una hora* ϕ is true in a situation, it is true by virtue of a ϕ -exemplifying situation which has no ϕ -exemplifying sub-situations. When a telic adverbial like this, or a telic predicate combines with the *pretérito*, the resulting aktionsart is telic. Nothing in the meaning of the *pretérito* forces an atelic reading, and the telicity of the adverbial would be incompatible with an atelic interpretation.

Similarly, the adverbial *a la tienda* with the *pretérito* in (17) suggests a goal which, once reached, defines a telic eventuality, leading to the default telic interpretation of (17). This contrasts with the *imperfecto* in (18), which can only have an atelic interpretation, and hence the habitual or progressive:

- (17) Juana corrió a la tienda.
 Juana run.PRET to the store
 ‘Juana ran to the store.’ (telic)
- (18) Juana corría a la tienda.
 Juana run.IMPF to the store
 ‘Juana ran/was running to the store.’ (atelic: habitual or progressive)

Again, our truth conditions predict that an atelic reading of (17) is possible, but this reading is not attested, due to the possibility of using instead an unequivocally atelic *imperfecto* (or the *progresivo*), as in (18).

We take it that the endpoint requirement in (51) is the source of the notion that the *pretérito* is aspectually terminative. The claim that it is definite, in the sense defined earlier where the entire event is referred to instead of only some indefinite subpart, will be true only when the *pretérito* has a telic interpretation. When it is interpreted atelically, then a progressive reading is possible, one which does not denote an eventuality which is intuitively “entire”, but only a subpart of the eventuality-type typically associated with the predicate.

We also noted that traditionally some authors have spoken of the *pretérito* as punctual in character when compared to the durative *imperfecto*. We believe that these characteristics derive from the different roles these aspects sometimes play in the management of Reference Time in discourse. There is now a substantial literature on the use of the Reichenbachian notion of Reference Time in interpreting tense in natural language discourse, and especially on how the aspect of an utterance both plays a role in the way in which the current Reference Time constrains its interpretation and also contributes to the determination of the Reference Time for subsequent utterances. For

example, in interpreting an utterance in the past tense in discourse, we quite often understand the speaker to be claiming not just that the eventuality in question occurred at some unspecified time in the past, but that it occurred in a contextually salient period, or following another eventuality just discussed, as in a narrative. The Reference Time for a given utterance is the contextually salient temporal anchor at that point in discourse.

Hinrichs (1981,1986), Partee (1984), and Dowty (1986) all argue convincingly that in Reference Time management across discourse in English the different aktionsarten of the propositions uttered play different roles. On this view, an utterance denoting an atelic proposition (call these *atelic eventualities*, for short) does not establish a new Reference Time (e.g., by advancing the Reference Time) but simply passes along the Reference Time which was current at the time of utterance. And in interpreting an atelic clause, its Event Time will generally be taken to be temporally inclusive of the current Reference Time. Further, atelics are often taken to also be temporally inclusive of the Event Time of a subsequently mentioned telic proposition. Atelics hence display duration. On the other hand, the Event Time of a telic proposition is taken to follow the Reference Time which was current at the time of utterance, and in turn to establish a new Reference Time for the following utterance. In short, telics tend to move the narrative forward; hence they act as indivisible eventualities.

Kamp (1981) ignores the issue of aktionsart in his closely related analysis of French, as do Kamp & Rohrer (1983). Kamp argues that the difference in the Reference Time functions for French correlates with the use of the *passé simple* versus the *imparfait*, and that this accounts for the often cited punctuality of French *passé simple* versus the durativity of the *imparfait*. However, at least in Spanish (and we suspect in French, as well), we would argue that the correct distinction as to whether or not a new reference time is established should be atelic versus telic, as in the Hinrichs/Dowty/Partee view just outlined, rather than *pretérito* versus *imperfecto*. Consider the following short narrative:

- (53) a. Los guerreros se enfrentaron.
the warriors RECP-3PL confront.PRET
- b. Corrió mucha sangre.
run.pret much blood
- c. Los victoriosos quemaron la fortaleza.
the victorious burn.pret the fortress
- d. Fue una tragedia.
be.PRET a tragedy

‘The warriors confronted each other. A lot of blood ran. The victors burned the fortress. It was a tragedy.’

All the verbs in this paragraph are in the *pretérito* but only sentences (a) and (c) advance the narrative, i.e., establish a new Reference Time. (a) and (c) are telic while (b) and (d) are atelic, reflecting the fact that the *pretérito* is compatible with both major classes of aktionsarten. But only those propositions which are telic may establish a new Reference Time, and it is precisely those cases in which the *pretérito* is interpreted as punctual: We take it that the burning of the fortress was after the confrontation, but the running of

blood was simultaneous with the confrontation, and the whole battle was a tragedy. Therefore, the punctuality of the *pretérito* does not come about every time this form is used, but only when the resulting utterance receives a telic interpretation.

The same phenomenon can be observed intrasententially, as Hinrichs observed. The aktionsart of a temporal subordinate clause plays a role in determining the relation between the subordinate clause Event Time and the main clause Event Time. Consider the examples in (54):

- (54) a. Claudia cruzaba la calle cuando la atropelló un camión.
 Claudia cross-IMPF the street when her-acc run over-PRET a truck.
 ‘Claudia was crossing the street when she was hit by a truck’
- b. Claudia cruzó la calle cuando la atropelló un camión.
 Claudia cross-PRET. the street when her-ACC run over- PRET a truck.
 ‘Claudia crossed the street after she was hit by a truck’
- c. Cruzó la calle cuando el semáforo se puso en rojo.
 Cross-PRET the street when the light REFLEX turn-PRET red
 ‘She crossed the street after the light turned red’

The verb in the subordinate clause of (54a) is in the *imperfecto*, and the event described by the main clause is taken to occur during the process of Claudia's crossing the street. We get the same interpretation if we substitute the *progresivo* form *estaba cruzando* for the *imperfecto*. But in (54b) we have substituted the *pretérito*, yielding telic aktionsart (recall that *pretérito* does not have a progressive interpretation). This leads to the sole, rather anomalous interpretation where Claudia was first hit by the truck and then somehow managed to cross the street. This is parallel to the behavior of the *pretérito* in the subordinate clause of the non-anomalous (54c).

We conclude that unlike the *imperfecto* and the *progresivo*, use of the *pretérito* entails the completion of the eventuality in question; it establishes a punctual Reference Time in discourse, moving narrative forward, rather than establishing background Reference Times. Hence, aktionsart is finally the key to the full range of aspectual characteristics of the Spanish *pretérito* and *imperfecto*, and the behavior of the *pretérito* in contexts such as (53) and (54) is predicted by our truth conditions and the definitions of telicity and atelicity in §2.

§5 Conclusion

We have argued that aktionsart and aspect are independent categories. Though Spanish has two aspectual variants in the past tense, the *pretérito* and the *imperfecto*, these do not display a one-to-one correlation with the two main types of aktionsart. Rather, both atelic and telic aktionsart may be displayed by the *pretérito*, though the *imperfecto* displays only atelic aktionsart.

We laid the foundations of a truth conditional account of these forms within the framework of situation semantics, showing how Dowty's earlier characterizations of the aktionsarten could be realized in this framework while retaining Kratzer's requirement of

persistence. Given these assumptions and Kratzer's notion of an *event which exemplifies a proposition*, we provided relatively simple truth conditions for the Spanish past tense forms. In contrast to traditional claims that the *imperfecto* is ambiguous, with as many as four meanings (the progressive, habitual, intentional, and iterative), we claim that it is unambiguous. It is the subinterval property of the *imperfecto* (with varying contextual restrictions), along with variants on the modal accessibility built into the truth conditions, which accounts for all the uses usually ascribed to it. In particular, what we have called the “intention in the past” reading of the *imperfecto* gets a principled explanation which was absent from traditional accounts in the Spanish literature. Whether the resulting interpretation of the *imperfecto* involves ambiguity or not seems to us to be a terminological matter: If we take the different types of modal accessibility which are permissible with the *imperfecto* to define distinct senses, then the form is ambiguous, but it is also clear that these senses are essentially the same in another sense, with the accessibility relation chosen constituting a relatively minor, contextually determined variation. We also offered truth conditions for the *pretérito* which capture the fact that it is compatible with atelic, as well as telic readings. Finally, the truth conditions plus an understanding of how aktionsarten influence Reference Time in discourse permitted us to elucidate the source of several traditional aspectual characterizations of the *imperfecto* and *pretérito*.

Do we need both events and situations in a model for natural language semantics? In the present analysis, situations which exemplify a proposition play the role of eventualities (events or states) in defining and determining telicity. The situations in our model can stand in various relations, instantiating the two basic types of lattices discussed by Bach and Link and utilized by Krifka: mass lattices (for the atelic aktionsarten) and count lattices (for the telic). Hence, it seems that one can capture the same generalizations about aktionsarten and parallels with the nominal domain discussed by those authors, without using events in the object language. Of course, it remains to be seen whether other phenomena pertaining to events will be amenable to this type of treatment.

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