

# THE FELICITY OF ASPECTUAL *FOR*-PHRASES

## PART 1: HOMOGENEITY

### ABSTRACT

This paper is the first in a series of two papers presenting recent developments concerning the interaction between aspectual classes of predicates and the semantics of aspectual *for*-phrases.

Aspectual *for*-phrases can felicitously modify stative and activity predicates, but not (basic) accomplishment and achievement predicates. Earlier literature proposed that this is because aspectual *for*-phrases must modify predicates which are *homogeneous* - meaning that the predicate spreads appropriately to subintervals - and it proposed a notion of homogeneity which is appropriate for stative predicates. We argue in this first paper that neither the earlier literature, nor later proposals have managed to come up with an adequate account of the felicity of aspectual *for*-phrases with eventive predicates, and that, in particular, accomplishment and achievement predicates with bare arguments and iterative constructions remain challenges that these accounts cannot properly meet.

We show that the problem lies in the notion of homogeneity for eventive predicates: the semantic tradition has provided us with static notions of homogeneity – insensitive to the arrow of time -, but what is needed is a dynamic notion.

# THE FELICITY OF ASPECTUAL *FOR*-PHRASES

## PART 1: HOMOGENEITY

### 1. Aspectual *for*-phrases and homogeneity: Bennett and Partee's subinterval property.

As early as Bennett and Partee 1972, Dowty 1972 and Verkuyl 1972 it was observed that expressions that we will here call aspectual *for*-phrases are sensitive to aspectual classes. Aspectual *for*-phrases are felicitous with stative predicates (as in (1)), and with activity predicates (as in (2)), but infelicitous with accomplishment predicates (as in (3)), and achievement predicates (as in (4)).

- (1) Stative predicates:
  - a. The garbage *stank* for a week.
  - b. Ronya *was in Amsterdam* for two years.
- (2) Activity predicates:
  - a. Fred and Susan *waltzed* for two hours.
  - b. Fred *pulled a sledge* for ten minutes.
- (3) Accomplishments predicates:

#Susan *ate a mango* for twenty minutes.
- (4) Achievements predicates:

#Fred *arrived at the hotel* for an hour.

Since aspectual *for*-phrases are used as a diagnostic for verb classes, we find in the literature, not surprisingly, the semantics of aspectual *for*-phrases linked to whatever the current theory decides is the difference between the relevant aspectual classes: like a distinction between predicates that are *homogeneous* versus *heterogeneous*, *cumulative* versus *quantized*, *simple event predicates* versus *complex event predicates*, *non-telic predicates* versus *telic predicates*, etc.

We want to show in these two papers that it is fruitful to assume that the semantics of aspectual *for*-phrases is sensitive to the first mentioned distinction, the opposition *homogeneous* versus *heterogeneous*.

Crucially, it is not our aim to propose that the *verb classification* be formulated in terms of this distinction rather than any of the others mentioned. Thus, we are perfectly willing to assume that lexical statives and activities denote, say, sets of simple eventualities, while accomplishments and achievements denote complex eventualities (telic events), and we would be perfectly delighted if your definition of telicity makes telic events heterogeneous in our sense.

There is a general concern here. We think that a characterization of verb classes in which all aspectual phenomena are sensitive to exactly the same two semantic oppositions is probably on the wrong track. We think that the verb classes are characterized by a cluster of semantic oppositions, several of which indeed make distinctions along the same lines. And different semantic phenomena can be sensitive to different aspectual properties. For instance, Rothstein 2004 makes a good case that a characterization in terms of telicity makes for an insightful semantics of aspectual *in* phrases (like *in an*

hour). But we do not see that stipulating that aspectual *for*-phrases require a non-telic input similarly provides an insightful semantics of *for*-phrases. And we want to show that homogeneity does.

We will argue that the case is subtle: we propose that homogeneity means something different for states and events: in both cases it means a *spread* of relevant properties over subintervals, but the spread is static for states and dynamic for events, meaning that it takes the arrow of time into account (*incremental homogeneity*). But we will argue that the gain is considerable: subtle, complex data concerning the aspectual *for*-phrases fall naturally into place. We will discuss the notion of homogeneity and the problems that arise when it is applied to activity predicates (both lexically simple and derived) in the first paper. In the second paper we show how these problems are met by the dynamic notion of incremental homogeneity.

We come back to the examples in (1)-(4).

Bennett and Partee 1972 did not give a semantic analysis of stative predicates, but they proposed that activity predicates satisfy the *subinterval property*, they are predicates that, when true at an interval, are true at all subintervals of that interval, including all the points in that interval. The idea is that *Fred pulled a sledge* is true at an interval if he pulled from the beginning to the end of that interval, and we can take that to mean that *Fred pulled a sledge* is true at every subinterval. The idea is that it is the subinterval property that licenses modification by the *for*-phrase. In contrast, if *Susan ate a mango* is true at an interval, then, while it is true at subintervals that Susan was engaged in mango-eating, *Susan ate a mango* itself is not true at those subintervals. And this is why the *for*-phrase is not licensed.

In Taylor 1977 and Dowty 1977 this strong version of the subinterval property was reinterpreted as a constraint on stative predicates. But Dowty shows that claiming that activities have the subinterval property is problematic. Dowty 1979 discussed two kinds of problems with this assumption. In the first place, activity predicates are never true at points, activities take time and need time to establish themselves as being of the predicate type. Thus activities like *waltzings* have *onsets*: enough needs to be going on of a waltzing before we call what is going on *waltzing* (in this Dowty follows Taylor 1977). Secondly, activities allow for *pauses*, intervals at which strictly speaking no activity goes on that shows the predicate characteristics. Thus, we continue to be waltzing, even if we stand still for a moment to catch our breath.

Onsets and pauses are characteristic of activities (and accomplishments), and both properties are incompatible with a strict interpretation of the subinterval property. Landman 1992, 2008 argues that pauses must be regarded as natural for activity predicates, but are resisted as unnatural for stative predicates. Look at (5):

- (5) a. I ran for ten minutes.
- b. I was in Tokyo for ten days.

I tell you that I ran for ten minutes. You have seen me stand still from time to time, once because of a stitch, once because of a traffic light. This doesn't lead you to challenge my claim and say that (5a) is false: such pauses are natural and quite expected in events in the denotation of activity predicates.

I tell you that I was in Tokyo for ten days. You tell me that you saw me in Kyoto on a day trip. I tell you that I meant the predicate *was in Tokyo* to be understood as *was staying in Tokyo*. In this explanation, I reinterpret the predicate as a predicate that *does* hold at *every* subinterval. This only makes sense if I accept your statement as a challenge for the truth of (5b), and I do this because, in contrast to the previous case, I agree that pauses are not natural for stative predicates.

In this paper we accept that the subinterval property is a lexical constraint on the interpretations of stative verbs, and also that it is constraint on the output of operations that form complex lexical predicates (like the copula construction in *be in Amsterdam*).

If we assume, with Dowty 1979, that  $\alpha$  *for an hour* is true at an interval if  $\alpha$  is true at every subinterval of that interval, and we assume that  $\alpha$  *for an hour* is felicitous if the semantics of  $\alpha$  is such that  $\alpha$  *for an hour* can in principle be true unproblematically, it follows, by the above discussion, that aspectual *for*-phrases can felicitously modify *stative* predicates. (We will propose a more sophisticated felicity constraint below).

The subinterval property is a general characteristic of stative predicates, and not just lexical predicates. If all stative predicates satisfy the subinterval property, it follows that the output of operations that form stative predicates can also be felicitously modified by aspectual *for*-phrases. Among the operations that are standardly assumed to form stative predicates are gnomic generics, habituals, progressives (*be – ing*), modals and negation (Mittwoch 1977). Indeed, all these can be felicitously modified by aspectual *for*-phrases:

- (6) a. *Dinosaurs inhabited* the world for 200 million years.
- b. Fred *smoked* for twenty years.
- c. Susan *was eating a mango* for twenty minutes.
- d. During the oil crisis, we were *we were allowed* to ride bicycles on the highway for a whole day.
- e. With utmost self-control, Fred *didn't eat a single mango* for a week.

## 2. The problem of homogeneity for activities: Dowty's analysis.

The intuition encoded in the subinterval property is that what is relevant for the felicity of aspectual *for*-phrases is the distinction between predicates that are temporally *homogenous* and predicates that are temporally *heterogeneous*. Intuitively, a temporally homogeneous predicate is a predicate that spreads homogeneously over the subintervals, while heterogeneous predicates do not spread over subintervals. The aspectual theory in general explains why accomplishments and achievements do not spread.

For instance, accomplishments like *build a house* are often taken to be complex eventualities consisting of a process (an activity of building) and an end state (the state of a house existing). If such an event is realized at an interval, the result state is typically only realized at the end of that interval, so while the building can be seen to be spread over the interval, the complex event of building that house cannot.

Achievements like *arrive at the station* are often taken to be changes of state, consisting of a state of not-being at the station and a state of being at the station (e.g.

Dowty 1979). Again, such complexes do not spread to subintervals: that would require constant changes.

The subinterval property obviously makes stative predicates temporally homogeneous in that the predicate (when true at an interval) homogeneously spreads over all subintervals. Activities, as we have seen, are a problem because, as Dowty argues, they do not seem to have the subinterval property. If we nevertheless want to call them homogeneous, we need to come up with a different notion of homogeneity. The problem then is the proper notion of homogeneity for activity predicates.

Dowty 1979's semantics of aspectual *for*-phrases, given above, lets the aspectual *for*-phrase quantify over *all* subintervals. This makes the subinterval property a felicity requirement on all predicates. But the extensive informal discussion in Dowty 1979 makes it clear that, while Dowty assumes the sub-interval property holds in the strong sense of stative predicates, he assumes a weaker version of the subinterval property for activities (Dowty 1979, p. 334): an activity being true at an interval requires the activity to be true at *every sufficiently large* subinterval. This means too that, informally, Dowty assumes a weaker version of the semantics of *for an hour*, one which quantifies only over *every sufficiently large* subinterval.

Dowty's idea is that activities allow for onsets and pauses to a reasonable degree: the universal quantifier can ignore them if they don't take too long. So we can accept that waltzing holds at an interval, even if what goes on at the beginning of the interval doesn't yet count as waltzing itself, and even though we pause now and then to catch our breath or avoid dizziness. On this view, the subinterval property constrains both stative and activity predicates, but the predicate modified determines *which* intervals are too small to be taken into account for the quantification, and this is especially relevant for activity predicates which have more tolerance for pauses than stative predicates. Temporal homogeneity then means that the predicate (when true) spreads over all sufficiently large subintervals.

Reasonable though it sounds, this proposal for the semantics of activity predicates is untenable. This becomes clear when we take into account two well-studied classes of predicates which are compatible with aspectual *for*-phrases: iterative predicates and heterogeneous predicates with bare arguments, mass noun arguments or bare plural arguments:

- (7) a. The tap *dripped* for three hours.
- b. Susan *ate mango* for three hours.
- c. *Guests arrived* at the hotel for four hours.

The problems with these examples were discussed in Rothstein 2007 and Landman and Rothstein 2010. If the drops are forming and falling fast, regularly, but not with great frequency, (7a) is true, but the maximal subintervals that show no dripping – the pauses – are much bigger than the subintervals that show actual dripping. Similarly in (7c) (from Rothstein 2007), the arrival events are achievements and can be assumed to be (semi) punctual; the intervals in between the arrivals are obviously much bigger than the actual arrivals. This means that Dowty's suggestion of weakening the quantification over subintervals from *every* subinterval to *every reasonably large subinterval* will not work

(without serious reinterpretation): (7a) and (7c) are true even though many (if not most) reasonably large subintervals contain no dripping/arriving.

So, we have a problem: the subinterval property gives us a reasonable characterization of the felicity of the modification of stative predicates by aspectual *for*-phrases, but generalizing this notion to activity predicates, and to the cases in (7) fails.

### 3. The problem of heterogeneous predicates: Krifka's analysis.

As we expressed above, we are not interested here in analyses that just stipulate that the licensing conditions are to be equated with, say, the telic-atelic distinction, unless the analysis provides some insight into why this would be the case, i.e. we ignore purely stipulative accounts here.

Krifka 1989's distinction between *cumulative* versus *quantized* predicates is not stipulative in this way. *Cumulative* and *quantized* are notions defined in Krifka 1989 for noun phrase denotations: *mangos* is cumulative, because the sum of two things that fall under the predicate *mangos* falls itself under the predicate *mangos*; *exactly thirty mangos* is non-cumulative, in fact, quantized: the sum of two plural entities that fall under the predicate *exactly thirty mangos* does not itself fall under the predicate *exactly thirty mangos* (*non-cumulative*) and in fact, no proper (plural) part of something that falls under the predicate *exactly thirty mangos* falls itself under that predicate (*quantized*). The nominal distinction is carried into the verbal domain for verbal predicates headed by verbs like *eat* that satisfy the property of *mapping to objects* (postulating, roughly, that you eat a plurality of mangos if you eat its constituting (plural) parts.) Roughly, for these predicates, the cumulativeness or quantization of the direct object is passed up via the thematic relation to the VP predicate as a whole.

However, assuming that it is the *cumulative/quantized* distinction that constrains the felicity of aspectual *for*-phrases is problematic, because there are many cases that come out as cumulative and non-quantized on Krifka's account – and, one would add, correctly so – that are not felicitous with aspectual *for*-phrases. For instance, upward entailing noun phrases like *some mangos* and *at least thirty mangos* are cumulative, and hence so are the predicates *eat some mangos* and *eat at least thirty mangos*. But these predicates are not compatible with aspectual *for*-phrases:

- (8) a. #Fred ate *some mangos* for eight hours.
- b. #Fred ate *at least thirty mangos* for eight hours.
- c. #Fred ate *many mangos* for eight hours.

Zucchi and White 2001 try to save Krifka's account by assuming that the indefinite noun phrase in, say, (8b) is semantically a predicate with a free variable  $x$ :  $\text{mango}(x) \wedge |x| \geq 30$ , while the existential quantifier binding this variable takes scope over the aspectual *for*-phrase. This way, Zucchi and White are able to assume that the predicate with the free variable is actually quantized: roughly, on their analysis the predicate gets reinterpreted (relative to the assignment to the free variable) as the predicate *eat a fixed sum of at least thirty mangos*, a predicate which is not quantized. Hence the case in (8a) comes out as infelicitous.

However, this will only work if you can maintain that in *all* infelicitous cases with upward entailing noun phrases the existential quantifier takes wide scope over the aspectual *for*-phrase. Otherwise, the predicates are once again cumulative.

Arguably, this is not the case. For instance, in (9) on the *de dicto* reading, the existential quantifier must take scope under intensional operator, and hence under the aspectual *for*-phrase. But the contrast in felicity is exactly the same. Vadim Vadimovich N. is the narrator of a novel by Nabokov:

- (9) a. ✓Fred looked on the internet for *books by Vadim Vadimovich N.* for three hours, but couldn't find any.  
b. #Fred looked on the internet for *at least eight books by Vadim Vadimovich N.* for three hours, but couldn't find any.

As Rothstein 2004 and Landman and Rothstein 2010 argue, when the predicates involved are clearly stative (or activity) predicates, the same indefinite arguments are perfectly felicitous with clearly narrow scope interpretations of the existential quantifiers:

- (10) a. Lady A: Do you have *a chauffeur* nowadays?  
Lady B: My dear, I've *had a chauffeur* for twenty years. Always very competent ones.  
b. This bicycle *carried three children* around Amsterdam for twenty years.

This suggests strongly that it is not the *cumulative/quantized* distinction that constrains the felicity of modification with aspectual *for*-phrases. A more systematic look at the data strengthens this conclusion.

#### 4. Iterative processes.

The *cumulative/quantized* distinction is a semantic distinction between noun phrase denotations, which becomes a distinction between verbal predicates with different noun phrase arguments. If we, for the moment, leave the bare noun phrase arguments out of the picture, then we observe that the differences between noun phrases actually doesn't make a difference for the felicity of the modification with aspectual *for*-phrases: all of the examples in (11) are infelicitous (we discuss an exception to the generalization with non-bare mass noun phrases in the second part of this paper):

- (11) a. #Fred ate *a/every/each* mango for an hour.  
b. #Fred ate *some/various/at least thirty/thirty/exactly thirty/at most thirty/all/most many/few* mangos for an hour.

Note that downward entailing arguments, like *few mangos* and *at most thirty mangos* are not felicitous either. This contrasts with negative noun phrases like *no mangos*, which *are* felicitous in the same context. As in the case of (6e), we assume that it is the negation that can create a stative predicate, and the stativity of the negative predicate that allows felicitous modification with the aspectual *for*-phrase.

Given this, the felicity of modification with aspectual *for*-phrases for predicates with bare noun arguments suggests that we should look for an explanation of the felicity in the specific semantic contribution of the bare noun argument construction. We propose:

**Iterative predicate proposal:**

Accomplishment/achievement predicates with bare nouns allow interpretations are like *iterative predicates* and the latter allow interpretations as complex activities.

Rothstein 2004, 2007 argues that predicates like *knock* and *drip* are ambiguous between a semelfactive reading (a single knock/drip) and an iterative reading, involving an *iterative operation* which turns a sequence of single knocks/drips into an *activity* or *process* of knocking/dripping. On the semelfactive reading, *knock* is an accomplishment predicate, as shown in the interrupted progressive in (12a). (12b) shows how an iterative interpretation of *knock* is formed in context, and (12c) shows that, on the iterative interpretation, aspectual *for*-phrases are felicitous, which is expected, if the iterative predicate is an activity predicate:

- (12) a. Fred was knocking hard on the door, when I arrived, which embarrassed him so much that he turned his knock into a light tap instead.
- b. *Fred knocked on the door*, a complex pattern: three fast knocks, a pause, another knock, another pause and once more three fast knocks. Nothing happened. He waited a while *and knocked again*, the same pattern. The door opened...
- c. Fred knocked on the door for an hour.

We think that the same iteration operation forming activity predicates is operative in cases with an explicit quantificational phrases, as in (13). Yom Kippur is a fast day from which pregnant women are partially exempt:

- (13) Susan drank half a glass of orange juice *every twelve minutes* for twenty five hours the Yom Kippur she was pregnant.

The quantificational phrase sets up a period for a sequence of iterations of drinking events. The same operation that turns semelfactive knocks into a knocking activity forms an iterative activity here.

When we come to cases with bare plurals, we observe cases that are analogous to the cases of semelfactives.

- (14) a. Tolkien invented *Hobbits* in three minutes.
- b. Tolkien invented *Hobbits* for three months.

*Invent* is an accomplishment verb, and the accomplishment reading is illustrated in (14a): Tolkien brought the kind *Hobbits* into existence within three minutes (say, when he wrote to himself the sentence *In hole under the ground there lived a...* and said to himself: *hm, what did there live?*). But *invent* with a bare plural object has a second interpretation,



where it is not the kind that is brought into existence in a single event, but *instantiations of the kind* (the characters Frodo Baggins, Sam Gamgee, Peregrine Took, Meriadoc Brandybuck...) which are brought into existence in what is plausibly an iteration of events of inventing individual hobbits. And this reading is a process reading, an activity reading that is compatible with aspectual *for*-phrases.

Bare plural arguments for achievement predicates provide independent evidence that what is involved here is a true activity interpretation. As is well known, in general the progressive doesn't felicitously apply to stative predicates or achievement predicates the progressive wants extended eventive predicates as input:

- (15) a. #Fred was knowing the answer.
- b. #Fred was recognizing the picture.

The situation is more complex for achievements than for statives: achievements can be felicitous in the progressive:

- (16) a. ✓Fred was arriving at the hotel.
- b. ?Fred was arriving at the hotel for ten minutes

Rothstein 2004 argues that the felicity of the cases in (16a) is due to a contextually licensed *shift*: the progressive wants an eventive predicate, it is fed a change denoting achievement predicate. This is a semantic mismatch. The mismatch is resolved by shifting from the semantically provided achievement, a change of state, to the pragmatically provided *process* leading up to the end state of that change (see Rothstein 2004 for details). With the reinterpretation, what is in progress in (16a) is the process leading up to being at the hotel. This process is a contextually given *small* stretch of activity, which brings Fred, say, from the taxi to the reception desk. Modification with an aspectual *for*-phrase of considerable duration is still a bit funny, because we continue to think of achievements as relatively punctual. That is, we may reinterpret the initial state of the change - *not being at the hotel* – in context as – *being a sidewalk's length away from the hotel* and let the relevant process be the one that brings you from there to the reception desk. But we prefer this reinterpretation of the initial state to be small, which explains the fact that (16b) needs quite a lot of context to be perfectly felicitous.

We compare these cases with (17):

- (17) a. ✓*Guests* arrived at the hotel for six hours
- b. ✓*Guests* were arriving at the hotel for six hours.

The crucial observation is that (17b) is *completely* felicitous, and doesn't need any context for that. Also, (17b) says nothing *at all* about the individual processes leading up to each arrival: (17b) is by and large just equivalent to (17a). Thus, for normal achievements the progressive is possible, but with a lot of contextual caveats and restrictions. But achievements with bare arguments occur in the progressive as easily as eventive predicates like activities. The obvious explanation for this is that, on the relevant interpretation, achievements with bare arguments *are* interpreted as (derived) activities.

We will sketch the semantics of iterative predicates and predicates with bare arguments in part two of this paper. With the iterative predicate proposal, we are back to the problem we started out with: what is the proper constraint on activity predicates that aspectual *for*-phrases are sensitive to. The answer is homogeneity, which, of course, is not particularly informative, until we explain what homogeneity should mean for activity predicates. This too is discussed in the second part of this paper.

What we have established in this part is that if homogeneity is what is relevant for licensing aspectual *for*- phrases, then it cannot be defined via the subinterval property if we are to explain the modification of either lexical activities or the 'derived' activities illustrated in (7), (12), (13) and (17).

We end the first part, by taking for the moment the undefined notion, homogeneity, and use it to specify in more detail the felicity constraints on aspectual *for*-phrases as definedness conditions.

## 5. The semantics of aspectual *for*-phrases.

We assume an event semantics based on a domain of eventualities sorted into a domain of states and a domain of events. We assume a domain of time intervals ordered by temporal inclusion  $\subseteq$  and temporal precedence  $<$ . The domains are connected by the temporal trace function  $\tau$ , a partial function from eventualities and worlds into intervals,  $\tau$  maps eventuality  $e$  in world  $w$  onto the time interval  $\tau(e,w)$ , if  $e$  goes on in that world. The interval  $\tau(e,w)$  is the running time of  $e$  in  $w$ .

Verbs, verb phrases, and sentences are interpreted as *event types*, sets of eventualities. Thus we interpret the verb phrase *eat a mango* as the event type:

*Eat a mango*

$\lambda e.EAT(e) \wedge Th(e) \in MANGO$

The set of all eating events whose theme is a mango.

We associate with the VP *eat a mango* not only its semantic interpretation – the above event type – but we keep track of the event type of the *verbal head* that the VP is based on, in this case, the event type of the verb *eat*:

*Eat*

$\lambda e.EAT(e)$

The set of all eating events.

If  $\alpha$  is a VP event type, we will write  $V_\alpha$  for the event type of the verbal head.

We turn to the semantics of aspectual *for*-phrases.

First we define the function **for an hour** from event types to event types:

**for an hour** =  $\lambda\alpha\lambda e. \alpha(e) \wedge \mathbf{duration}(\tau(e)) = \langle 1, \text{hour} \rangle$

The function that maps an event type  $\alpha$  onto the set of eventualities in  $\alpha$  that have a running time of an hour's length.

We make here the simplest assumption about the truth conditions of *for an hour*: when defined, *for an hour* is interpreted as **for an hour**.

The felicity requirement comes in as a definedness condition, and the latter is, not surprisingly, a homogeneity requirement:

*For an hour*  
 $\lambda\alpha \left\{ \begin{array}{ll} \mathbf{for\ an\ hour}(\alpha) & \text{if every eventuality in } \mathbf{for\ an\ hour}(\alpha) \text{ is non-trivially} \\ & \text{homogenous with respect to the event type } \alpha. \\ \text{undefined} & \text{otherwise} \end{array} \right.$

-If every eventuality in **for an hour**( $\alpha$ ) is (non-trivially) homogenous (with respect to  $\alpha$ ), then  $\alpha$  *for an hour* denotes **for an hour**( $\alpha$ ).

-If some eventuality in **for an hour**( $\alpha$ ) is not homogenous (with respect to  $\alpha$ ) or satisfies the definition of homogeneity only nominally, then  $\alpha$  *for an hour* is undefined.

We make the standard assumption concerning definedness conditions that they are felicity conditions:  $\alpha$  *for an hour* is infelicitous when undefined.

Obviously we need to explain what it means that an eventuality in the intersection event type is non-trivially homogenous with respect to event type  $\alpha$ . We have already indicated what we want this to mean if  $\alpha$  is a *stative* event type: the subinterval property, which we can define as follows:

Let  $\alpha$  be a set of states and **for a week**( $\alpha$ ) defined along the lines of **for an hour** above.

State  $s \in \mathbf{for\ a\ week}(\alpha)$  is homogenous with respect to  $\alpha$  iff if  $\tau(s,w)$  is defined then for every subinterval  $i \subseteq \tau(s,w)$  there is a state  $s'$  in  $\alpha$  with running time  $i$ .

Let  $\alpha$  be the set of states in the event type interpretation of the predicate *live in Amsterdam*. **For a week**( $\alpha$ ) is the set of states of living in Amsterdam that have a week's duration. The predicate *live in Amsterdam for a week* is defined if every state in **for a week**( $\alpha$ ) is homogeneous with respect to  $\alpha$ . This means that every state of living in Amsterdam for a week realized in world  $w$  must have a state of living in Amsterdam going on at every subinterval of its running time in  $w$ .

As we have indicated, we assume that stative predicates like *live in Amsterdam* satisfy exactly this condition. Hence, for stative predicates like *live in Amsterdam* the definedness constraint is generally satisfied, and by the above semantics of aspectual *for*-phrases, stative predicates can be felicitously modified by aspectual *for*-phrases.

We end this part with two brief comments and the above semantics.

In the first place, we stipulate in the semantics of the aspectual *for*-phrases that homogeneity must be satisfied *non-trivially*. The requirement of homogeneity for eventive predicates is going to be similar to the subinterval property in that it universally quantifies over subintervals of a certain kind, putting a conditional preservation requirement on them. As we know, it is always possible to satisfy such universal conditions trivially by not satisfying the antecedent of the conditional. The non-triviality constraint says that this is not good enough: for felicity, the constraint of homogeneity on

the relevant events must be satisfied without cheating. We will see in part two that this non-triviality constraint all by itself predicts the infelicity of some types of cases which are indeed infelicitous.

A second comment is that the semantics of aspectual *for*-phrases given here is for what we can call their temporally singular use. As already pointed out in Dowty 1979, aspectual *for*-phrases can have plural, cumulative interpretations:

(18) Fred was in Berlin for *altogether* three months over the last ten years.

In these cumulative cases, the relevant states are, obviously, not required to form a convex interval of three months. We assume that (18) involves a cumulative, i.e. plural, temporal interpretation, and that its semantics is derived as a plural generalization of the temporally singular semantics that we have given here. The details of that generalization go beyond the scope of the current papers.

With the semantics of the aspectual *for*-phrases specified, we turn, in the second part of this paper, to the two tasks remaining:

1. Define the notion of homogeneity for eventive predicates, and show that it fits the facts about activity predicates and accomplishment predicates.
2. Define the operation forming iterative activities, show that its output is homogenous in the required sense, and show how it applies to the cases discussed, like semelfactives and accomplishment/achievement predicates with bare arguments.

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