A Uniform Semantics for Aspectual *-ing*

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1. Normal Completions

The most successful semantic analyses of the English progressive make use of a notion of the 'normal completions' of an event. Example (1a) should intuitively get a treatment along the lines of (1b).

(1)　　(a)　John was building a house.

　　　　(b)　There was an event which was either an event in which John built a house or one which, had it been completed normally, would have been an event in which John built a house.

The most well–known such theory is Dowty's (1979). The concept of 'normal completion' comes in via that of INERTIA WORLDS. His analysis is framed within INTERVAL SEMANTICS. Within interval semantics, a sentence has as its meaning a set of pairs of an interval of time and a possible world, as illustrated by (2).

(2)　　(a)　Francis climbed the mountain from 12:00 to 1:00 o'clock.

　　　　(b)　The set of pairs <i,w> where i is the hour from 12:00 until 1:00 o'clock and w is a world in which Francis climbed the mountain during i.

　　　　Now for inertia worlds: (1a) expresses the proposition in (3). The definition of 'inertia world' in interval semantics is given by (4).

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(3)   *John was building a house* is true at a pair of a temporal interval and
        a world <i,w> iff i is in the past and for some interval i' which
        extends i, and for all worlds w' which are inertia worlds with
        respect to <i,w>, *John builds a house* is true at <i',w'>.

(4)   For any interval i and worlds w and w',
        w' is an inertia world with respect to <i,w> iff everything which is
        going on in w during i reaches its normal completion in w'.

These definitions tell us that (1a) is true at an interval and a world <i,w> iff John
built a house in all the worlds in which what is going on in i reaches its normal
completion.

For reasons that will become clear below, I'd like to recast this in terms of
events. In (5) and (6) the analysis of (3)–(4) is recast appropriately.

(5)   *John was building a house* is true at an event e iff e is in the past and
        for every e' which is an inertia event with respect to e, *John builds a
        house* is true at e'.

(6)   For any events e and e',
        e' is an inertia event with respect to e iff the initial part of e' is a
        duplicate counterpart e* of e and what is going on in e reaches its
        normal completion in e'.

The definition in (6) is represented graphically by (7).

(7)

e* is a duplicate of e

time

e   e'

e*

by here we have
a 'completion'
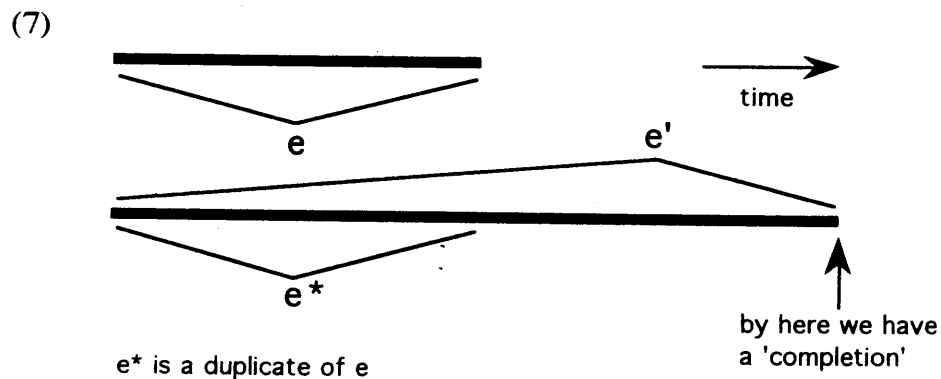
Here, e' is an inertia event with respect to e because it begins just like e (with e*)
and then continues on until it is completed. However, e itself need never be
completed. According to this event–based theory, the information conveyed by (1)
is that our world has as a part an event of the kind described by (5). This is to say
that it contains a past event which, were it to be completed, would be one in which
John builds a house.

What counts as a normal completion depends on the predicate. I will
assume that it is an unanalyzable, intrinsic fact about the events, though theories of

the aspectual classes of predicates seek to provide more of an analysis of the concept. See Dowty (1979) for further discussion.

For purposes of this paper, a sentence will be called 'imperfective' if it describes an event which need not be completed, and it is 'perfective' otherwise. Progressive sentences as analyzed above are thus imperfective. Dowty's theory gives us the beginnings of an theory of imperfectivity. The task of the next section will be to outline the aspectual properties of some other *-ing* forms in English, with the eventual goal of providing all the *-ing*'s with a uniform semantics. It is shown that the treatment of the concept of 'normal completion' must be sensitive to certain temporal factors concerning the event described by a clause, and it will thus become clear that the kind of analysis outlined in this section must be enriched. That task will be taken up in Sections 3 and 4. Finally, Section 5 will discuss the relevance of the ideas developed for aspects of the semantics of perfectivity not having simply to do with whether or not the event is completed.

2. Aspectual Variability in *-ing* Forms

Several of the other English *-ing* forms display an imperfectivity like that of the progressive.

    (9)   While climbing the mountain, we decided that we would only go part of the way up.

    (10)   Crossing Constitution Ave. frightened us so much that we turned back after getting only half way across.

    (11)   The children hated driving across the country so much that we had our vacation in Santa Fe instead.

The events described by the free adjunct in (9) and the gerunds in (10)–(11) need not be completed for the sentences to be true. In (9), we need not have climbed the mountain to the top; in (10) we need not have made it across Constitution Ave., and (11) can be true if we never made it across the country. However, this imperfectivity is not shared by other examples.

    (12)   ??After climbing the mountain, we found that we had only gone part of the way up.

    (13)   ??The children regretted driving across the country, though we stopped in Santa Fe instead.

Example (12) is anomalous because the adjunct is interpreted perfectively, and so requires that we have reached the top of the mountain. Likewise, the gerund in (13) entails that the cross–country trip has been completed. I will now go on to argue that it is possible to predict the aspectual values of these forms.

The difference is based on the *-ing* form's linguistic context. Setting aside the subject gerund in (10), embedding operators which have to do with past time

result in perfectivity, while those having to do with simultaneity or futurity give imperfectivity.

(14)   **Past Oriented**   **Present/Future Oriented**
         after, remember   while, before, hate,
         regret, celebrate   like, predict, see

Traditional analyses of aspect often make use of the notion of 'point of view'. In their spirit, one could say that past–oriented contexts give rise to a retrospective, external view of the event, while present/future–oriented contexts provide an internal view. The external vs. internal distinction is taken to be an analysis of perfectivity vs. imperfectivity. Unfortunately, the concept of point of view is itself extremely unclear. Furthermore, it is not obvious how the external/internal distinction relates to whether or not an event must be completed. As far as the intuitive notions go, one could have an internal perspective on a completed event or an external perspective on an uncompleted one. In order to have a true analysis, it will have to be explained how past vs. non–past orientation relates to a treatment of perfectivity which bears on whether an event is completed. In the next sections, it will be shown how Dowty's approach from Section 1 can be extended to incorporate these new facts.

3. The Reference Event

In order to incorporate into the meaning of –*ing* forms the relation between two events, I will make use of the Reichenbachian (1947) notion of REFERENCE EVENT. Example (15) illustrates the type of use, for the English perfect, that Reichenbach had in mind.

(15) $\|$ John had built a house $\|^r \subset \{e :$ for some event e', e' is an event in which John builds a house and e' precedes r and r precedes e$\}$

In (15), *John had built a house* is true in e with respect to a reference event r if and only if some event preceding r is one in which he builds a house. This is supposed to represent the intuition that a past perfect sentence indicates an event which is past with respect to some other past event; r provides the past time 'point of view' which follows the house–building.

An example incorporating the semantics I propose for –*ing* forms is given in (16). The reference event is simply introduced as relevant for determining the intertia event.

(16) $\|$ (their) driving across the country $\|^r = \{e :$ for every event e' which is an inertia event with respect to e and r, e' is an event in which they drive across the country$\}$

The definition of 'inertia event' in (17) shows how the reference event becomes relevant:

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(17)   For any events e, e', and r,
        e' is an inertia event with respect to e and r iff
        (i)   some initial part y* of e' is a duplicate counterpart of the part y
               of e which precedes the end of r, and
        (ii)   what is going on in y reaches its normal completion in e'.

In (18) I have provided an illustration of how (17) works: e' is an inertia event with respect to e and r because, first, e' starts out just like y, the part of e which precedes the end of r, and second, e' is eventually completed.

(18)

y* is a duplicate of y

by here we have a 'completion'
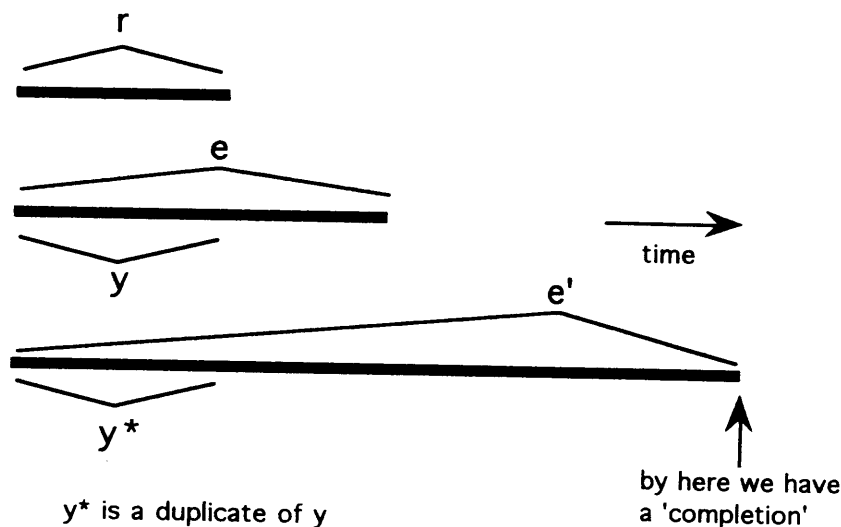
The significant difference between (6) and (17) is that the new formulation only requires that the part of e which precedes the end of r get a normal completion. The two definitions will amount to the same thing if r and e are the same event. This fact will let us keep Dowty's analysis of the progressive, if we simply say that progressive *be* identifies these two events (Portner (1992)).

Consider what happens with (16): .

(19)   ‖(their) driving across the country ‖^r = {e : for every event e' which is just like e up until the end of r, and which thereafter gets completed normally, e' is an event in which they drive across the country}

In (11), they hate the drive while it is still going on. If we make the hating event the reference event for the gerund, (19) will not require that the cross–country drive be completed. The diagram in (18) illustrates matters: e is the actual drive, which ends before it is completed; r is the hating event, and e' is one of the possible completions of e.

    In (13), in contrast, they regret the drive after it is over. If we make the regretting event the reference event for the gerund, (19) will require that the cross–country drive be completed. The situation is illustrated in (20): because r, the

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regretting event, follows e, the part of e which precedes r is all of e itself. So the
potential completions e' must duplicate all of e. Whatever end e meets will have to
hold for e' too, and so e' can end with a completion only if e itself is one. This
means that the gerund is required to be perfective.

(20)

y* is a duplicate of y
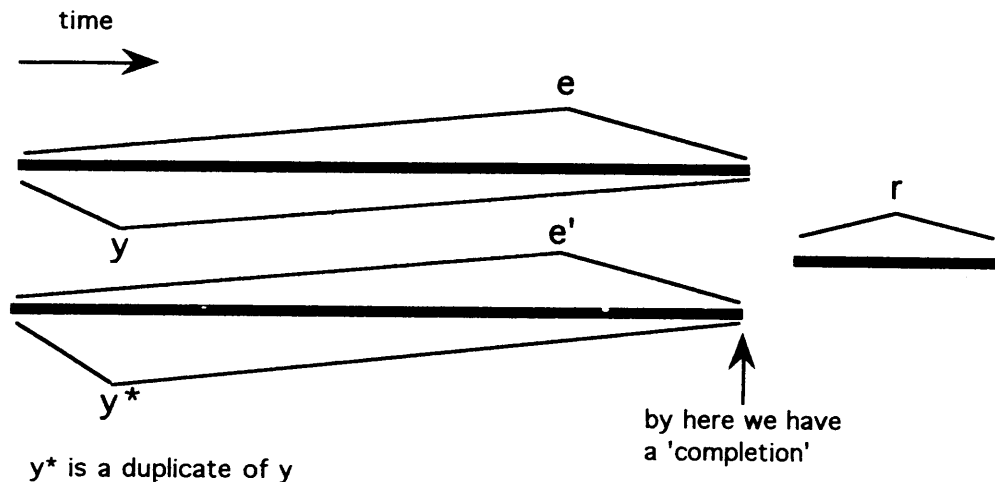
        Before going on, I should note that the reasoning concerning (13) depends
on the assumption that an event which ends cannot restart itself at a later time.
Consider again (20), and suppose that, though e' ends just like e does, later on—
sometime after r perhaps—it begins again and is completed. Then e' could be
completed even though e was not. For this reason, it is important for this approach
that temporally discontinuous events be ruled out as possible denotations for verbal
expressions.

        In this section it has been shown how the aspectual contrasts in Section 2
follow from the meanings of the subordinating operators, in particular from the
temporal relation they establish between their own evaluation event—the
subordinate reference event—and the –ing form's evaluation event. In the next
section more of the mechanics of the overall system are worked out, and it can be
shown how the free adjuncts fit into the picture.

4. Manipulating the Reference Event: Syntax and Semantics

How do we get the right reference event for each gerund or adjunct? I follow
Portner (1992, 1993) in claiming that all subordinate clauses and gerunds denote
not propositions but rather propositional functions. In (21), the complementizer *for*
abstracts over the reference situation, relativizing the clause to that parameter; *that*
would perform the same function in finite clauses.

(21)   ‖ for Mary to visit the Phillips ‖^S = that function f such that for any event r,

   f(r) = ‖ Mary to visit the Phillips ‖^r.

In (22) I suggest a zero element which plays the complementizer's role in gerunds, though this is not crucial. It would be possible to build the relativization into the meaning of *-ing* for instance.

(22)   ‖ [∅ [(their) driving across the country]] ‖^S =

   that function f such that for any event r, f(r) =
     ‖ (their) driving across the country ‖^r =

   that function f such that for any event r, f(r) =
     {e : for every event e' which is just like e up until the end of
     r, and which thereafter gets completed normally, e' is an
     event in which they drive across the country}

A complement gerund or clause is provided with a reference event by the higher verb; in (23), the verb *hate* feeds its own evaluation event e to its complement. Because of the meaning above for the gerund, e will end up being the subordinate reference event.
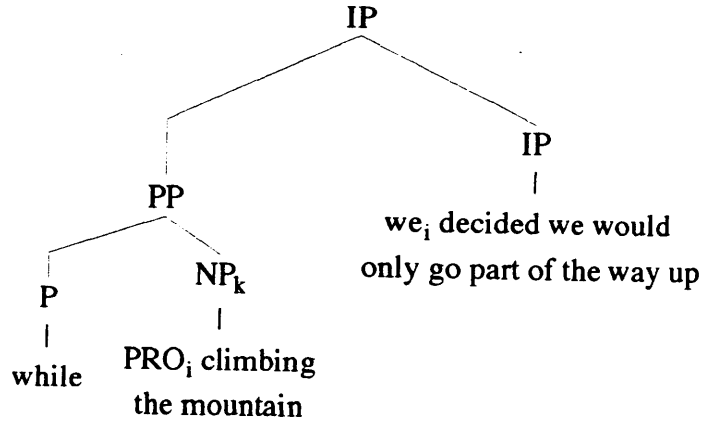
(23)   ‖ α hates φ ‖^S = {e : hate$_{\alpha,e}$ ⊆ ‖ φ ‖^S(e)}

In (23) hate$_{\alpha,e}$ is the set of events which α hates in e. This represents that content of α's hatred. The crucial thing to notice about (24) is that e ends up playing the role of r in (22).

(24)   ‖ They hate driving across the country ‖^S =
     {e : hate$_{them,e}$ ⊆ ‖ (their) driving across the country ‖^S(e)} =

     {e : hate$_{them,e}$ ⊆ {e' : for every event e" which is just like e' up
       until the end of e, and which thereafter gets completed
       normally, e" is an event in which they drive across the
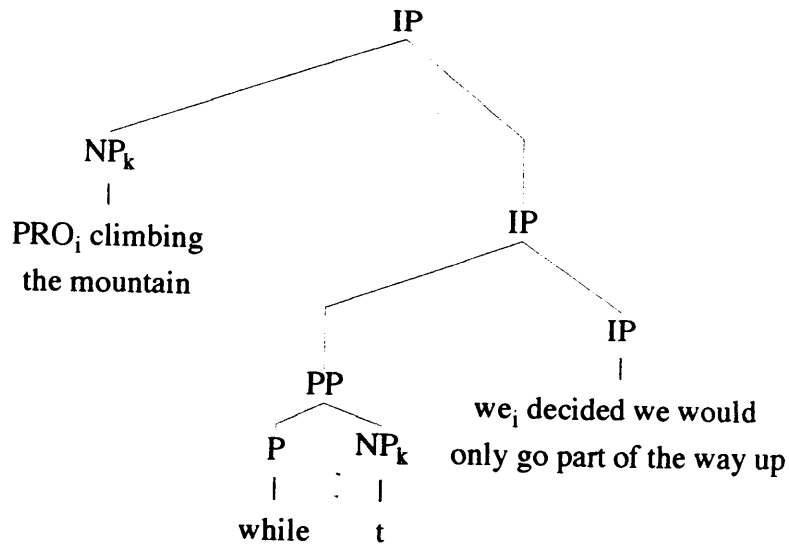   country}}

Let D be the set of driving–across–the–country events. These need not be completed, as discussed above. The meaning in (24) then says that the sentence is true in e if and only if all the events they hate in e are in D—in other words, if and only if the content of their hatred involves driving across the country (though it may be more specific than that).

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In order to understand the adjunct cases, we need to consider their syntax a bit. I will assume that the *–ing* forms are gerunds which undergo Quantifier Raising in the derivation of LF. Thus, (25)'s LF is (26).

(25)

```
                              IP
                    _____/    _____
                   /                      \
                  PP                        IP
               __/  \__                     |
              /        \              we_i decided we would
             P         NP_k           only go part of the way up
             |          |
           while      PRO_i climbing
                      the mountain
```

(26)

```
                              IP
                    _____/    _____
                   /                     \
                 NP_k                      \
                  |                         IP
            PRO_i climbing            ____/   \____
            the mountain             /             \
                                    /               IP
                                   PP               |
                                 _/  \_        we_i decided we would
                                /      \       only go part of the way up
                               P       NP_k
                               |        |
                             while      t
```

One argument for this derivation is that it makes it easy to deal with cases like (27a) below, whose LF is (27b) (cf. Partee (1984)).

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(27) (a) While climbing the mountain, we always decide to only go part of the way up.

(b)
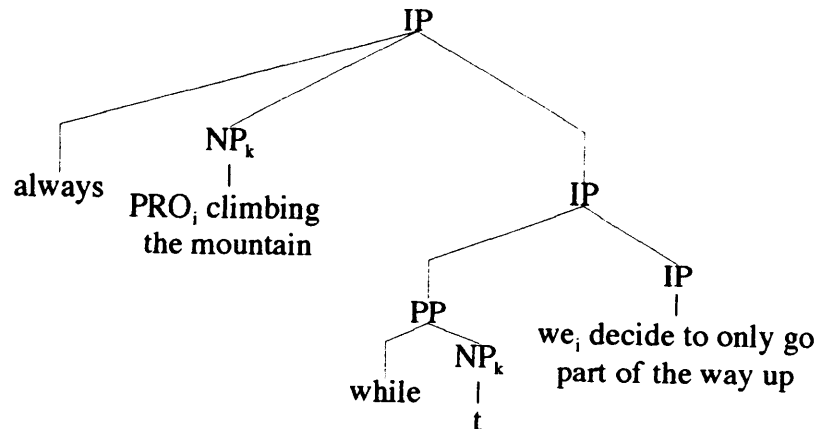
The adverb of quantification *always* is raised, and quantifies over events of us climbing the mountain. The P *while* relates two arguments, an event and a proposition. Thus, in a way completely parallel to Kamp's (1981a) or Heim's (1982) treatments of similar indefinites, this results in the meaning that, for each event e of our climbing the mountain, we decide during e to only go part of the way up.

Example (27) raises certain problems too tricky to go into here. In order to get the imperfective aspect seen in this example, *always* will have to manipulate the meanings of the gerund and the IP in such a way as to find the right reference event for each one of the climbing events. See Portner (1992) for discussion.

In (26) itself there is no quantificational adverb, so we have a thing which denotes a propositional function, the gerund, as a sister to a thing that denotes a proposition, the IP. There must be a semantic rule for that. In (28), ev is the type of events, t is the type of propositions, and g is a variable assignment function:

(28) For any G_i of type $<ev, t>$ and S of type t,

$\| [_{IP} G_i \ S] \|^{s,g} = \{e : g(x_i) \in \| G_i \|^{s,g}(e) \ \& \ e \in \| S \|^{s,g}\}$

The rule in (28) does two things: first it makes the current evaluation event be the gerund's reference event, and then it conjoins the resulting proposition with the S. According to this, (26) will denote the set of events e such that, for some contextually salient event e' of us climbing the mountain, during e' we decided only to go part of the way up the mountain. The reference event for the gerund is our decision, which temporally overlaps the climbing. Thus, there will not have to be perfectivity.

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5. Further Issues

This approach has made the reference event a crucial part of the analysis of
perfectivity. If doing this is correct, there are further consequences for the study of
aspect. In particular, these ideas must be extended beyond phenomena which
pertain exclusively to whether or not events are completed and be related to theories
of how the reference event (or reference time) acts in discourse (cf. Kamp (1979,
1981b), Hinrichs (1981), Kamp and Rohrer (1984), Partee (1984)). Some
principles of such theories are (29) and (31):

(29)   Eventive sentences introduce a new reference time, which just
follows the event.

(30)   Mary entered the room. She picked up a vase. She dropped the
vase.

Each sentence in (30) is eventive, and so the reference event is moved forward. If
we assume that each sentence's evaluation event is cotemporaneous with the
currently existing reference event (which it then changes), we get the observed
temporal sequencing. The situation is different in other cases.

(31)   Process and state sentences do not introduce a new reference time.
The process or state simply overlaps the currently existing reference
time.

(32)   Mary entered the room. She was eating a mango. She picked up a
vase.

The second sentence in (32) is a process sentence. It does not move the
reference event forward, and so the example means that she was eating a mango at
whatever reference event is introduced by the first sentence. Thus the example
indicates that she picked up a vase while eating the mango. Pragmatic factors, such
as the facts that her starting to eat the mango was not mentioned and that mango–
eatings typically take some time, presumably lead to the additional conclusion that
she was eating the mango as she entered.

Generally speaking, a progressive, imperfective, sentence falls under (31)
while its non–progressive, perfective, counterpart is treated according to (29). We
have defined perfectivity in such a way that the relations stated in (29)–(32) are then
entirely as expected. Our examination of perfectivity as it pertains to the
completed/uncompleted distinction shows that it should be analyzed as the case of a
reference event following the evaluation event. Likewise, imperfectivity turned out
to be the result of a reference event temporally overlapping its evaluation event.
Thus, there is at least some indication that the functioning of the reference event
argued for in this paper will mesh nicely with other usages. However, more work
must be done to see how well in general the contrast between predicates which
denote completed vs. uncompleted events lines up with that between those that do
vs. those that don't move the reference event forward.

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References

Dowty, D. (1979) *Word Meaning and Montague Grammar*. Dordrecht: Reidel.

Heim, I. (1982). *The Semantics of Definite and Indefinite Noun Phrases*. University of Massachusetts Ph.D. dissertation.

Hinrichs, E. (1982). Temporal Anaphora in Discourses of English. Paper presented a the Ohio State University Conference on the Semantics of Tense and Aspect in Discourse, May 16-17, 1982.

Kamp, H. (1979). Events, Instants, and Temporal Reference. In R. Bauerle, U. Egli, and A. von Stechow, eds., *Semantics from Different Points of View*, 376-417. Berlin: Springer-Verlag.

Kamp, H. (1981a). A Theory of Truth and Semantic Interpretation. In J. Groenendijk and A. von Stechow, eds., *Formal Methods in the Study of Language*. Amsterdam: Mathematical Centre.

Kamp, H. (1981b). Évènements, représentations discursives et référence temporelle. *Langages* 64.

Kamp, H. and C. Rohrer. (1983). Tense in Texts. In Bauerle, Schwarze, and von Stechow, eds., *Meaning, Use, and Interpretation of Language*, 250-269. Berlin: Walter de Gruyter.

Landman, F. (1992). The Progressive. *Natural Language Semantics* 1.1, 1–33.

Partee, B. (1984). Nominal and Temporal Anaphora. *Linguistics and Philosophy* 7.

Portner, P. (1992). *Situation Theory and the Semantics of Propositional Expressions*. University of Massachusetts Ph.D. dissertation.

Portner, P. (1993). The Semantics of Complementizers. In *The Proceedings of NELS 23*, GLSA, Amherst.

Reichenbach, H. (1947). *Elements of Symbolic Logic*. New York: Macmillan.

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