The Perfect, Contingency, and Temporal Subordination

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1.   Introduction

Much confusion has arisen from restrictions on adverbial use with the present perfect in English which don't seem to apply to the simple past or past perfect:

(1) a. Jake has watered the garden {today/recently/*yesterday/
      *on Sunday}.
  b. Jake watered the garden {today/recently/yesterday/on Sunday}.
  c. Jake had watered the garden {that day/recently/the day before/
      on Sunday}.

This has led to a number of proposals that single out the present perfect for special treatment, introducing new concepts specially devised to handle the contrast of the present perfect with the simple past and past perfect. For instance, two varieties of the EXTENDED-NOW theory (Bennett & Partee (1978), McCoard (1978), Vlach (1993)) propose that the present perfect introduces a timespan which contains the event and which either runs up to or includes *now*. Any adverbial modifier used with the present perfect must be able to modify this extended-now timespan. CURRENT-RELEVANCE theories (Twaddell (1968), Comrie (1976)) claim that the event must have some relevance to *now* in order for the present perfect to be used. These approaches in general make reasonable predictions about the present perfect, but they suffer from two problems: they are not easy to formalize, and they offer little in the way of explanation for the odd behavior of the present perfect or a connection between it and the rest of the language.

Two notable exceptions are Moens & Steedman (1988) and Klein (1992). Moens & Steedman suggest a general concept, which they call CON- TINGENCY, and associate it with a number of different constructs in the language, including the perfect. Contingency is essentially a logical dependency that can be asserted to hold between two eventualities or times. This relation can be indicated indirectly, as when we recognize a cause-and-effect sequence through world knowledge, or directly, as with a *when*-clause or the perfect. Their proposal is that events can evoke not only the time during which the event proper occurred, called the CULMINATION, but also the PREPARA- TORY PROCESS of the event, during which preconditions for the event may be

brought about, and the CONSEQUENT STATE, during which effects of the event may be located. The perfect in this analysis takes a culmination as input and yields its consequent state, which is contingent on the event. This approach is a variant of current-relevance, in that the consequences of the event must still hold, and therefore be relevant, at speech time, but it connects to a broader linguistic phenomenon and provides a mechanism for the effect.

Moens & Steedman assume that temporal adverbials here indicate that the time is part of the contingency base: that there is some relevant consequence to the event's having occurred at that particular time, and only under such circumstances will such an adverbial be felicitous. This would seem to indicate that the adverbial is interpreted at the VP-level rather than the sentence-level (as in Hitzeman (1993)). It is not entirely clear why it is required to be part of the input to the perfect, rather than, say applying to the consequent state, since after all, timespan and point adverbs can apply to states. No doubt it has to do with how *now* relates to the state, but this is not spelled out. This approach is a welcome one in that it proposes a general concept that handles cases other than just the present perfect, and in that it can explain many pragmatic elements of the perfect, but it appears to need a bit of fleshing out in order to address our adverb question.

Klein (1992) also proposes a general concept to handle the present perfect, though of quite a different sort. He proposes a constraint to hold across the board, which can account for the apparent idiosyncrasies of present perfect, as well as other linguistic constraints. This constraint assumes something similar to Reichenbach's (1947) reference time and event time, except that reference time is translated into TOPIC TIME, and represents the time for which a claim is made, rather than a time the event gets related to. Klein suggests that the present in general introduces *now* as the topic time, while the perfect locates the situation time before topic time. The P-DEFINITENESS CONSTRAINT prohibits having both topic time and situation time assigned to independent known timepoints. Since *now* is a known timepoint, then according to the p-definiteness constraint, no other known timepoint is allowed to modify the situation time in which the event occurs, for any present tense. Adverbials that do not contain a directly-known (i.e. not relativized or derived) point in time are admissible with the present perfect. These include relative temporal locations such as *recently* and *since March*. With the past perfect, a known topic time is not necessarily introduced; rather, the topic time may be derived from context outside of the clause. This means that if there is no overt modifier for the topic time in the sentence, the past perfect's situation time is free to be modified by known-time adverbials, as well as relativized temporal

adverbials. Thus, he can rule out

   (2) *At seven, Chris had left at six.

     I will give an account of the perfect which incorporates all the ideas
described above, and which generalizes beyond the perfect. The analysis uses
Spejewski & Carlson's (1992) fleshed-out variant of contingency, called TEM-
PORAL SUBORDINATION. The details of this account show how extended-
now, current relevance, and most of the effects of p-definiteness can all be
incorporated in one representation of the present perfect, all fitting within a
general theory of temporal relations, and with the adverbial constraints eas-
ily accounted for. The one thing that doesn't fall out from my analysis is the
badness of example (2) above, but Klein also offers a pragmatic explanation
for it, having to do with odd inferences that arise, and this seems to me to be
sufficient.[1] In addition, a set of pragmatic effects on adverbial modification
from Katz & Spejewski (1994) can be explained:

   (3) a. My house has blown up {??today/??this year}.
        b. ??Bill Clinton has been president.
        c. Wade has walked the dog {today/??this morning}.
            (if he usually walks her some other time of day)

     Further data, involving the relation of events in subsequent sentences
or clauses to those in the perfect sentence, is also predicted by the analysis.
     I will not spend a great deal of time on the differences between the
present perfect and the past perfect, because I assume that these are due to
the ambiguity of the past perfect form between a past-of-perfect and a past-
of-past reading (after McCawley (1973), 259–268). The distinction can be
illustrated by (4), where (4a) indicates a time in the non-adjacent past (past-
of-past reading) and (4b) is a past-of-perfect, indicating a timespan connected
to the past reference time. There are situations in which the past perfect can be
used felicitously, but the present perfect can not or gives a different meaning
(5) and (6).

   (4) a. Jake had not watered the garden the day before.
        b. Jake had not watered the garden since the day before.

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[1]According to Klein (1992), this sentence implies that there could be some time
other than seven at which Chris could have left at a time other than six.

(5) a. Jake regretted the events of the night before. He had called his
       boss a jerk and deleted some computer files.
    b. Jake regrets the events of last night. He called/??has called his
       boss a jerk and deleted some computer files.

(6) a. How had you broken your nose?
    b. ??How have you broken your nose? (both from Michaelis, 1994)

There are a number of possible sources for these differences; I as-
sume they are due to this being a past-of-past reading, and I will not inves-
tigate them further in this paper. The majority of this paper will concentrate
on the present perfect, since it is not ambiguous in this way; however, the
past-of-perfect reading can be handled by the analysis laid out in this paper.
       In the next section, I will briefly lay out a general theory of temporal
relations, which I refer to as a theory of temporal subordination. In section
3, I will show how the perfect can be accommodated by this theory and the
adverbial constraints accounted for, and in section 4 I will show how discourse
data is predicted by the theory.

2.   The Temporal Subordination Theory

The semantic theory of temporal subordination, as laid out in Spejewski &
Carlson (1992) and Spejewski (1994), proposes two general kinds of temporal
relation that can hold between two eventualities. The relation called TEMPO-
RAL SUBORDINATION indicates that two eventualities occur at approximately
the same time, and that there is some import to this temporal proximity. Ex-
amples are given in (7). The other relation, TEMPORAL COORDINATION, in-
dicates that the events either occur in distinct time periods or no import is
accorded to their occurring simultaneously, as in example (8). The relations
are discussed in more detail below.

(7) a. Jimmy filled the bucket with water. He used the garden hose.
    b. When Einstein wrote his first famous theory, he was working as a
       patent office clerk.

(8) a. Jimmy filled the bucket with water. He used it to water the gera-
       niums.
    b. Jimmy watered the flowers. Rosalyn walked the dog.

2.1. The Two Kinds of Relation

The temporal subordination relation incorporates Moens & Steedman's (1988) notion of contingency, which I have described as a perceived dependence between two eventualities. Temporal subordination applies to the cases in which there is *temporal* dependence, such that one event occurs within the time introduced for another event. Typical examples of subordination are events related by event decomposition, *when*, or sentence-final *then*, or non-discourse-initial states, but not necessarily cause-and-effect events.

      Since contingency is an asymmetric temporal relation, it is represented using an asymmetrical temporal structure. First, each event is inserted within a REFERENCE TIME (following e.g. Partee (1984), Hinrichs (1986), Kamp & Reyle (1994)). The reference time for an event will contain the event, and may extend beyond the event. We can represent this diagrammatically as in (9), so that if a temporal diagram is considered to be a tree,[2] the daughter relation indicates that the daughter is contained within the parent.

(9)
$$R$$
$$|$$
$$e$$

      In the subordination theory, the reference time is a discourse object which represents a hearer's interpretation of the time during which the event is likely to have occurred, given the context of the discourse, or a time throughout which the state is likely to have held, given the discourse. Because the reference time reflects the hearer's interpretation, it is dynamic and may be underspecified. A hearer may use world knowledge (for instance, how long a particular event typically takes), discourse knowledge (such as why two events would be mentioned in sequence), or linguistic knowledge (understanding of temporal terms) in setting up the reference times.

      For temporal subordination, the reference time for the subordinate event, here e_2, is inserted within the reference time for the superordinate event, e_1.

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[2]Technically, the diagrams used here are graphs.

(10) Jimmy filled a bucket with water. He used the garden hose.

R_1 e_1: Jimmy fill a bucket

e_1 R_2 e_2: Jimmy use a garden hose

e_2
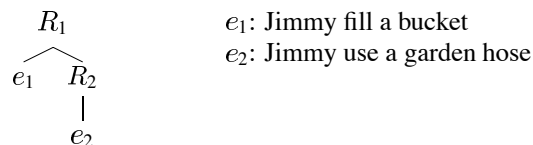
Notice that this structure does not require that the events themselves be overlapping; it simply says that the second event is constrained to be within the time introduced for the first event. The reason for this is illustrated by some *when* sentences from Ritchie (1979):

(11)   When they built the fifth bridge, . . .
    a. . . . they took several bids.
    b. . . . they used the best materials.
    c. . . . they had a gala opening.

Here there is a clear linguistic marker (*when*) indicating that two events are to be interpreted with temporal contingency, but we can understand the main-clause event as occurring before, during, or after the *when*-clause event. Moens & Steedman (1988) explain this effect by saying that this construction allows the events to introduce preparatory and consequent stages. The reference time in the temporal subordination approach could be considered as a vehicle through which this is possible.

The representation in (10) is equivalent to a Discourse Representation Theory (DRT) structure (Kamp & Reyle (1993)), and can be implemented with the same model. The set in (12) is a simplified set of predications that could represent the subordination structure for sentence (11c). Using the tree-type diagrams simply clarifies the relationship structure.
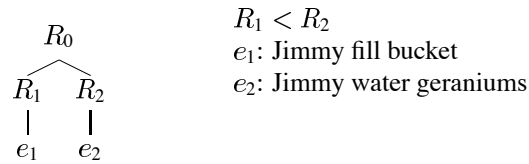
(12) e_1: Town build bridge
    $e_1 \subseteq R_1$
    $R_2 \subseteq R_1$
    e_2: Town have gala opening
    $e_2 \subseteq R_2$

For the coordination relation, one more assumption is introduced: that the discourse itself introduces a reference time R_0, which serves as the overall timespan for the events of the discourse to be contained within. The

coordination relation indicates that there is not temporal contingency between two eventualities, and this can be represented as in (14), where each reference time is inserted directly within R_0. The formula $R_1 < R_2$ indicates our understanding that the time containing e_1 is before the time containing e_2. The set of relations can also be represented in DRT formulas.

(13) Jimmy filled a bucket with water. Then he watered the geraniums with it.

$$R_1 < R_2$$
$$e_1: \text{Jimmy fill bucket}$$
$$e_2: \text{Jimmy water geraniums}$$

$$
\begin{array}{c}
R_0 \\
\diagup\diagdown \\
R_1 \quad R_2 \\
| \quad\ | \\
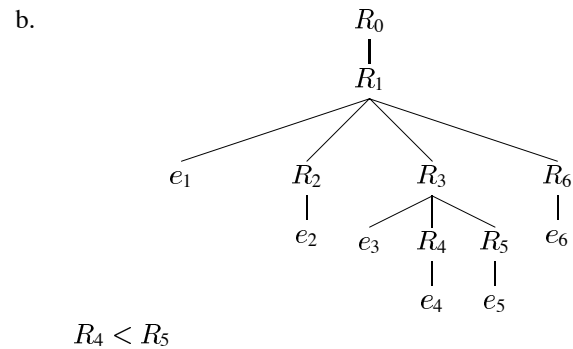e_1 \quad e_2
\end{array}
$$

The relations work just the same for states as they do for events, though states will surround their reference times, rather than being contained within them. Both kinds of relation specify the relationships among reference times, not eventualities, and so the general relations can be specified in the same way, independent of the type of eventuality.

2.2.   The Temporal Structure of Discourse

Entire discourses can be represented as combinations of subordination and coordination. In (14), the first sentence gives an overall event which the rest of the discourse describes in more detail, and so all of $e_2 - e_6$ will be subordinate to e_1. However, there is also a further breakdown of e_3, with the next two events directly subordinate to it.

(14) a. Edmond did a beautiful job of landscaping the yard (e_1). He put fruit trees in the back yard (e_2). In the front yard he made a flower garden (e_3). In it he planted both cultivated and wild roses (e_4), and then he installed a fountain in the middle (e_5). In the side yard he put a wonderful herb garden (e_6).

b.

$$
\begin{array}{c}
R_0 \\
| \\
R_1
\end{array}
$$

```
                    R_0
                     |
                    R_1
         ┌──────┬────┴────┬──────┐
        e_1    R_2       R_3      R_6
                |      ┌───┴───┐    |
               e_2    e_3  R_4  R_5  e_6
                             |    |
                            e_4  e_5
```

$$R_4 < R_5$$

The formula $R_4 < R_5$ indicating the actual temporal ordering of two reference times is specified by the word *then* relating events e_4 and e_5. For the rest of the event pairings, we have neither linguistic information nor world knowledge to indicate in what order any of the events were performed, so there are no other ordering formulas. However, we do have world-knowledge information indicating subordination/coordination distinctions, for instance that $e_2 - e_6$ are all subordinate to e_1.

This theory attempts to model how a hearer or reader processes temporal relationships among events as a discourse unfolds. The modeling task involves two kinds of relationships: the relationships of the way the events are understood to have occurred, and the order in which the events are presented in the discourse. In our model, eventualities and their reference times are incorporated into the tree left-to-right *as they appear in the discourse*, and not as they occur temporally. This manner of incorporation makes it very easy to make predictions about how a new eventuality may be related to existing ones. It turns out that the *right-frontier* idea from rhetorical relations (Polanyi (1988), Webber (1991), Lascarides & Asher (1991,1993)), works here as well. It claims that when a structure like the temporal trees is built for discourse relations, a new node may only be added as the daughter of a node that is on the right frontier. The right frontier in our case includes any reference time which is the rightmost reference time in the tree at its structural level. This turns out to be equivalent to any reference time which has not had a subsequent reference time coordinated with it or with any of its ancestors (other than the global reference time). In diagram (14), nodes R_0, R_1, and R_6 are on the right frontier, and therefore are possible insertion sites. This means that the next eventuality added to this discourse may be incorporated as a daughter of any one of these reference times. The next eventuality could thus elaborate

on s_6 or e_1, or it could begin a new independent temporal line as a daughter of R_0. The notion of insertion sites will be important in section 4 for predicting what kinds of discourse continuations are possible after an eventuality has been introduced in the perfect.

2.3.   Temporal Adverbs

There are three ways that temporal adverbials are incorporated into a discourse structure, according the kind of adverbial. A **frame** adverbial, such as *yesterday, next month*, or *within the hour*, introduces a timespan that contains one of the available reference times in the discourse.

(15) Yesterday, I took my niece to the playground.

$$R_{yesterday}$$
$$|$$
$$R_1$$
$$|$$
$$e_1$$
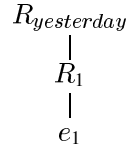
Durative adverbials, such as *for an hour* or *from midnight til two*, specify how long an eventuality lasted. Following Binnick (1991), duratives specify a feature of the event rather than the reference time. Durative adverbials do not seem to introduce a new site for future events to be located, and so they do not introduce a new reference time. Instead, they introduce a predication on the event, as shown in (16):

(16) Lizzy skated for an hour.

$$R_0 \qquad\qquad e_1\text{:Lizzy skate}$$
$$| \qquad\qquad\quad \text{one-hour}(e_1)$$
$$R_1$$
$$|$$
$$e_1$$
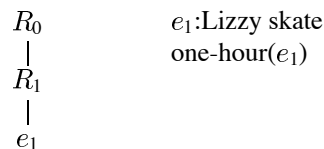
In a few cases, it is clear that an adverbial is not meant to locate the eventuality in a specific temporal location, but rather it may be considered a modifier on the event type itself. These are what I call **indefinite** adverbials, where it doesn't matter which particular date the event occurred on, but only a particular property of when the event occurred, such as the following example, similar to one in Klein (1992):

(17) Lucy was criticized by her pastor because she worked on (a) Sunday.

Here the adverbial is part of the event itself, so the event in the *because* clause is *Lucy work on a Sunday*.

Summarizing the main points of the theory of temporal subordination:

1) There are two temporal relations: subordination and coordination.
2) If a is subordinate to b, then a's reference time is within b's reference time.
3) If a is coordinated with b, then a's reference time is a sister of b's reference time.
4) Temporal orderings among reference times may be specified.
5) A new node may be inserted as the daughter of any reference time on the right frontier of the temporal tree for the discourse.
6) Frame adverbial reference times serve as parents of other reference nodes.

## 3.   Temporal Subordination and the Perfect

This basic theory of temporal relations applies fairly easily to the case of the perfect in English, handling both adverbial use and the semantics of the aspect, as well as making predictions about the effect that the perfect has on the introduction of subsequent eventualities in the discourse.

3.1.   Analysis of the Perfect

The perfect can be treated as a case of temporal subordination, where the event is subordinated to some time derived from the discourse. Years of research on the present perfect has made it clear that there is some dependence relation (current relevance) indicated by the present perfect between the time of utterance and the time of the eventuality introduced, and also that these times are temporally related (extended-now). This gives us temporal proximity and contingency, the two notions we need in order to identify temporal subordination. Analyses based on Reichenbach (1947) propose a three-time relation for the perfect. All these pieces are part of temporal subordination. Looking at the past perfect makes it clear that the event introduced in the perfect is subordinate to an already-established time. With the past perfect, a temporal reference has been set up independently beforehand, and the new eventuality is located only with respect to that time. Assuming parallelism, the present perfect event

must then be subordinate to the speech situation, which I call *now*, and which is introduced by the present tense.
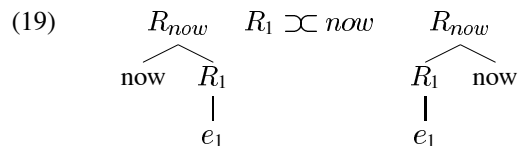
The representation of the perfect as subordination is fairly straight-forward, if we add one formula as the special contribution of the perfect. Taking the general scheme of temporal subordination, the past perfect could be represented as in (18), where e_{prev} is a previously-introduced event, whose reference time serves as the location for the event e_1 introduced by the past perfect.

(18)
$$R_{prev}$$
$$e_{prev} \quad R_1 \qquad\qquad R_1 \supset\subset e_{prev}$$
$$e_1$$
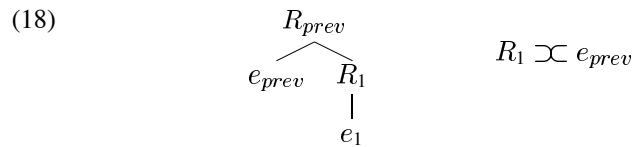
The symbol $\supset\subset$ means 'abuts' (from Kamp & Reyle (1993). The ordering formula $[R_1 \supset\subset e_{prev}]$ is added to the general structure of subordination as the special contribution of the English perfect. This specification will account for some of the constraints on adverbial use, and also part of the semantics of the perfect. Notice that the formula specifying the abutting does not add any new structure to the representation of discourse. The representation for the perfect relies on structure that has been established for the overall theory, which is meant to handle many different kinds of cases. The kind of information that is added by the perfect is exactly the same kind of information that is added by a temporal modifier such as *then*. *Then* picks out the coordination structure, rather than the subordination structure, and adds its own contribution that the new reference time come after the one it is coordinated with. The analysis of the perfect here exactly follows the analysis of other temporal specifiers under this theory. No new theoretical constructs are needed in order to handle this aspect.

With the present perfect, the event is subordinated to *now*, or the speech event. This is similar to Vlach's 'speech situation', which includes relevant properties of the speech time. The reference time introduced by *now*, which I have labelled as R_{now}, is a contextually-determined time that contains *now*. R_{now} is similar to some versions of the 'extended-now' as a timespan that includes *now* and also contains the event (Bennett & Partee (1978), Mc-Coard (1978)). Vlach (1993)) also allows for a time which contains the event and extends all the way up to *now* without containing it. With the constraint we have added that R_1 abut *now* for the present perfect, R_1 instantiates this
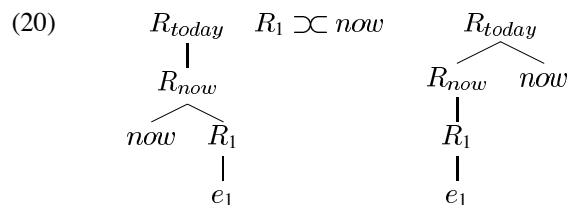
notion. The present perfect can be represented by either of the following diagrams, depending whether you prefer to follow the standard representation or to incorporate temporal iconicity. In this case, both items are introduced at once, so there is no necessary order to their inclusion, and some people may find it easier to think about the temporal relations by referring to the diagram on the right.

(19)
$$
\begin{array}{ccc}
R_{now} & R_1 \supset\subset now & R_{now} \\
\overparen{\quad} & & \overparen{\quad} \\
now \quad R_1 & & R_1 \quad now \\
| & & | \\
e_1 & & e_1
\end{array}
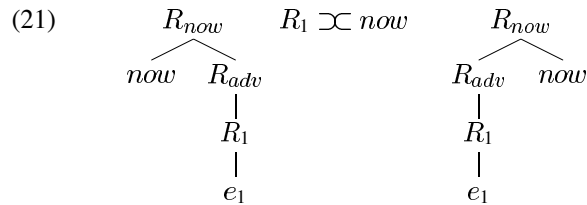$$

3.2.   Adverbials and Semantics

With the general structure identified for the perfect, we can look at the way adverbials are constrained by this analysis. Recall that under the theory of temporal subordination, frame adverbials surround a reference time. With the perfect, we have two reference times introduced, providing two possible locations for adverbial attachment. But each reference time has constraints built into it, and any adverbial that modifies that time must accord with the constraints.

Containing R_{now} Any adverbial that contains the reference node R_{now} will also have to contain *now*, since R_{now} contains *now*. There are a number of adverbials that can contain *now*, if they are uttered at appropriate times. These include *today, this morning, now, this year*, and so forth. All of these adverbials are acceptable with the present perfect, and their use is represented in (20):

(20)
$$
\begin{array}{ccc}
R_{today} & R_1 \supset\subset now & R_{today} \\
| & & \overparen{\quad} \\
R_{now} & & R_{now} \quad now \\
\overparen{\quad} & & | \\
now \quad R_1 & & R_1 \\
| & & | \\
e_1 & & e_1
\end{array}
$$

Containing R_e If an adverbial is to contain R_1 instead, then it must match the constraints on R_1, which are that they contain the event and also abut *now*. Any

adverbial time containing the event and not *now* must abut *now*. (If it contained *now*, then it would also contain R_{now}.) Any adverbial defined as abutting *now* (or the established past referent, for the past perfect) can surround R_1, and is acceptable with the present perfect. This class of adverbials includes *recently, just, ever, never, not yet, already, before (now/then), since Thursday, in the last hour* and so on, and their use is represented in (21)[3]:

(21)

$$R_{now} \qquad R_1 \supset\subset now \qquad R_{now}$$

$$now \quad R_{adv} \qquad\qquad R_{adv} \quad now$$

$$R_1 \qquad\qquad\qquad R_1$$

$$e_1 \qquad\qquad\qquad e_1$$

Unacceptable adverbials We now turn to an adverb that is not acceptable with the present perfect, and see how this analysis rules it out. Taking an adverb like *yesterday*, we recognize that it is defined as abutting the day containing *now* or speech time, but crucially not as abutting or containing *now* itself. Of the two candidate reference times, only R_1 does not contain *now*. But R_1 is constrained to abut *now*, and not *the day containing now*. The meaning of *yesterday* does not allow it to abut *now*, and so it cannot contain R_1. The same argument holds for any adverbial that picks out a specific time before *now*, such as *at noon, on Thursday, before yesterday*, or *this morning* if it is no longer morning. An adverbial like *this past week* will be acceptable or not, according to whether an individual interprets the phrase to mean 'the seven days prior to now' or only a calendar week.

(22) John has practiced {*yesterday/*today at noon/*two days ago/
    *after Sunday/since Sunday}.

Some adverbials that do not work with the perfect may be very similar to ones that do, except that they differ in whether they include the discourse-established time marker in their meaning, or whether they abut the marker. An adverbial like *after Thursday* is not acceptable, because it does not explicitly

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[3]A subset of this class has been discussed for Modern Greek by Psaltou-Joycey (1993). She describes a group of adverbials that indicate a more or less definite point in the past beginning a temporal interval which extends up to some reference point. The speech moment serves as the reference point for use with the present perfect.

relate to *now* or e_{prev}, while *since Thursday* is acceptable because it does. *Two days ago*, while explicitly related to *now*, does not indicate a time that abuts *now*, and so it can not be used with the present perfect, whereas *in the past two days* can. (*Two days before* can be used with the past perfect syntactic form, but only for the past-of-past reading, and not the perfect.)

<u>Indefinite adverbials</u> If an adverbial does not fit the constraints on the reference times, then it cannot be used to modify the reference time. This does not necessarily mean that it cannot be used in a present perfect sentence, but if it is, then it cannot modify either of the two reference times set up by the perfect. There are some cases, as noted in Klein (1992), in which an adverbial such as *on Sunday* appears in a present-perfect sentence but does not specify a definite time location for the event:

(23) 'Why is Chris in jail?' 'He has worked on Sunday, and working on Sunday is strictly forbidden in this country.'

This is one of those cases in which the adverbial does not anchor the event in time, but rather gives a specification on the *type* of timespan in which the event occurred. Here the adverbial would not take the usual meaning of the phrase *on Sunday* as being the most recent or upcoming Sunday, and it would not modify either of the perfect's reference times, but rather would be incorporated into the event at a lower structural level. It cannot take the definite referent that it would normally take, but must be interpreted as indefinite reference to **a** *Sunday* or **some** *Sunday*.

A similar constraint against definite reference is imposed on *when*-clauses that modify a perfect, for similar reasons. In order for a *when*-clause to felicitously modify an event carrying a perfect reading, the *when*-clause must indicate only a general *type* of eventuality (indefinite), as in (24), and not specify a particular actual event or time (definite), as in (25):

(24) a. I have driven in Toronto when it was snowing.
     b. I have been at the racetrack when a car overturned.

(25) a. ??I have driven in Toronto when they had that big blizzard.
     b. ??I have been at the racetrack when Numero Uno died.

This constraint is not derived from the *when*-clause itself, since these *when*-clauses are acceptable in a simple past sentence:

(26) a. I drove in Toronto when they had that big blizzard.
      b. I was at the racetrack when Numero Uno died.

Rather, it is the combination of the definite *when*-clause with the perfect. The *when*-clause is acting as an adverbial here and is ruled out just like the other types of definite adverbials, by failing to abut *now*. I believe that the examples in (24) are acceptable because the indefinite *when*-clauses can be incorporated into the event type as well as the adverbs above. This raises interesting questions about the difference between an event type and an actual event, or about indefinite versus definite events, and it is not possible to handle them satisfactorily here. What I have done here is to treat any mention of a necessarily unique event or time as definite reference, and potentially ambiguous event descriptions or times as indefinite.

This section has covered what kinds of adverbs can be used with the perfect in general, based on mainly semantic constraints, but also bringing in some world knowledge about uniqueness or repeatability of events. In the next section we will look at further constraints on adverbs, which rely on more intimate pragmatic knowledge about events and the perfect.

3.3.   Adverbials and Pragmatics

Something unusual happens when the present perfect is felicitously modified with a temporal adverbial. A presupposition seems to arise in these cases about the expected timeframe for the event. Without modification, the event may have happened anywhere in the past, as long as there is still some effect of it, although there may be an implied recency timeframe. With an adverbial, there has to have been a reason for specifying the timeframe within which the event occurred. The most obvious reason for this would be that the effects of the event can be voided, and we want to indicate that the event took place within a recent enough time that the effects are not yet voided. For instance, a dog should be walked every day, and the effects of walking the dog only last about a day, and then he needs to be walked again. Similarly, bills need to be paid every month, garbage needs to be taken out every few days, and so on. Part of the semantics of the perfect is that the speech time is in the 'consequent state' of the event, to use Moens & Steedman's term. In order to be in the consequent state of an event of dog-walking, we must be in a time less than a day after the event. The only adverbials, then, that will be appropriate for the present perfect with such an event will be ones that specify times of a day or less. For bills it will be a month.

Furthermore, if we have knowledge about where within that cyclic timespan the event typically occurs, that knowledge will also affect adverbial use. Suppose we know that John typically walks his dog every morning. Then we can say (27a) with *today* or *this morning*, but not with *this evening*, EVEN IF JOHN ACTUALLY WALKED HER IN THE EVENING TODAY, RATHER THAN IN THE MORNING. Similarly, we can say (27b) only with an adverb that is not smaller than our expectation time for the event (Katz & Spejewski (1994)). If we don't have particular knowledge about where in the month Kay pays her bills, then we cannot use a timespan smaller than a month.

(27) a. Wade has walked the dog {today/this morning/??this evening}.
 b. Has Kay paid her bills {this month/??this week/??today}?

Since the effects of a person being born or dying typically do not get voided, most sentential adverbials modifying a particular birth or death or similar singular event in the perfect will be odd. (28b-d) could be acceptable under unusual conditions, using the intensional reading of *President*, or in a situation where my house frequently blows up, but under normal circumstances they would be strange.

(28) a. Our first child has been born {??today/??this year/??recently}.
 b. The President has died {??today/??this year/??recently}.
 c. Someone has killed the President {??today/??this year/??recently}.
 d. My house has blown up {??today}.

The perspective taken in describing an event will affect its appropriateness in the perfect. An event often has a number of different effects, for instance one effect on the agent, another on the patient, and so on. These different perspectives may be considered in determining whether one is in the consequent state of an event. For instance, suppose we have an event of Juan walking Maria's very rambunctious dog. With respect to the dog, the consequent state may last only a day, but for Juan, it may last the rest of his life. The answer to the question *Has Juan walked Maria's dog?* may continue to be yes for far longer than the answer to *Has someone walked Maria's dog?* This is related to the well-known Einstein/Princeton examples, where the effects on Einstein cease to exist when he does.

(29) a. ??Einstein has visited Princeton.
     b. Princeton has been visited by Einstein.

3.4. States

States in the perfect are subject to the same adverbial constraints as events in the perfect: up-to-*now* and including-*now* adverbials are fine with states, and definite past adverbials do not work with states, nor do pragmatically-conflicting adverbials.

(30) a. Kent has lived in Prague {*for two years/since 1989*}.
     b. The telephone has been ringing *all morning*.
     c. I have been very happy {*this week/today/*
        *yesterday}.

(31) a. ?The president has been mortally ill *this week*.
     b. I have been with Frank *when he lost his temper*. [indefinite]
     c. ??I have been with Frank *when Kennedy died*. [definite]

     States in the perfect also seem to behave more like events than they do otherwise. Normally, states are considered to surround their reference times. Now if the state surrounds its reference time, and the reference time abuts *now*, then the state must also abut or surround *now*. But in the perfect the state is not required to abut or span *now*:

(32) I have been in the White House (before).

Unlike the simple aspect, the perfect aspect introduces a state with a bounded beginning, and a possibly-bounded end. This makes perfect sense, if the point of using the perfect is to inject the notion of a consequent state: if there is a consequent state, then the trigger has already happened, although states, being homogeneous, could continue on into the future and still have an effect now. Because of this and the adverbial effects, I assume that in the perfect the state is contained in its reference time. This means that the state may be ended by speech time, but it isn't prohibited from continuing on, since we could be talking about a subinterval of the state's duration. However, in using the perfect, the speaker implies a lack of knowledge of whether the state is still true.
     The interpretation of states in the perfect involves implicatures based on the containment structure. The state is contained in its reference time,

and the normal interpretation of this is strict containment, so that the state is normally inferred to have ended before *now*, or at least to be of unknown status. Adverbs can interfere with this inference: if an explicit frame adverbial is used, the state is contained within the adverbial time, which may either end at *now* or continue through it, with the state understood to have ended or not, respectively. If an explicit durative adverbial is used, then the state is understood to hold throughout that time, which must abut *now*. This leads to the inference that the state still holds at *now*. (33a) is fine with no adverbial, since Nixon's presidency is over, but (33b) is odd without modification while Clinton is still president, in which case the simple present is sufficient, whereas using the perfect implies that the state no longer holds. Given current history, the (ambiguous) adverbial in (33a) can only be read as framing the event, and in (b) as the duration of the event. (34a) with no adverbial makes no claim that anyone still is a member of the party, but when a durative adverbial is added, it does. If we use a state that is difficult to imagine ending, then its use in a perfect without adverbial modification is very strange, as with (35); for an intrinsic property of an individual, as in (35b), we also can't have it start after the individual came into being, although possibly at that point.

(33) a. Nixon has been president (since 1960). [frame only]
      b. Clinton has been president ??(since 1993). [durative only]

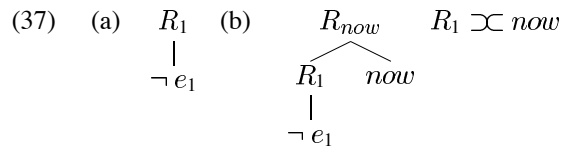(34) Everybody has been a member of the Communist Party (for the last 5 years). [durative]

(35) a. John has liked ice cream ??(since he was a baby).
      b. Jackie has been Spanish ??{??since 1990/??for two years/ since the day she was born}.

3.5.   Negated Perfects

A negated perfect has different implications from a negated simple past. Katz & Spejewski (1994) point out that (36a) implies that I still have the chance to see the movie, whereas (36b) carries no such implication, and may even imply the reverse.

(36) a. I haven't seen that movie.
      b. I didn't see that movie.

This is accounted for under a uniform interpretation of negation by the perfect having two reference times, and the simple past having only one. Event negation can be defined simply as that there is no event of the given type within the reference time introduced by mention of the event. For a simple past, there is a reference time strictly in the past of *now*, and the negation is interpreted as holding throughout the past reference time (37a). For a negated present perfect, illustrated in (37b), the event reference time abuts *now*, and negation will hold throughout that reference time. However, there are two reference times for a perfect, and both are relevant for the interpretation. With the reference time for *now*, which contains *now*, the event has not been negated, except for the part containing R_1. Since reference times are defined as times during which an interpreter believes that is possible for an event to occur, then it is still possible for the event to occur sometime within R_{now}, but only at a time which is after *now*.

(37) (a) R_1 (b) R_{now} $\quad R_1 \supset\subset now$

$$\begin{array}{cc} R_1 & \\ | & \\ \neg e_1 & \end{array} \qquad \begin{array}{c} R_{now} \\ \diagup\diagdown \\ R_1 \quad now \\ | \\ \neg e_1 \end{array}$$

3.6.   Other Modifiers

Besides the constraints on temporal adverbials, the perfect seems to shun most kinds of other event modifiers as well, unless the modifier is a particularly relevant part of the event:

(38) a. I have gotten married (??this morning).
b. I have gotten married (??in Tennessee).
c. Jill's baby has been born (?by Caesarean).
d. John has killed the President (?with a hand grenade)!
e. The President has been killed (?with a hand grenade)!

Under normal circumstances an utterance like (38b) would be infelicitous, even if I got married in Tennessee. However, if I have gotten married several different times, and the issue of weddings in Tennessee came up, then it could be felicitous. Similarly, if there were a particular reason, say a prophecy, to associate a hand grenade with the President's killing, then those sentences could be more felicitous.
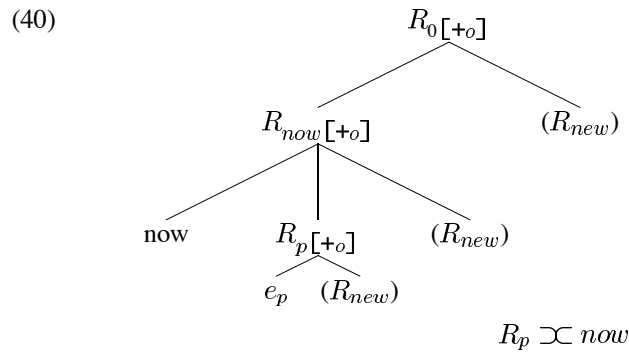
These examples illustrate a counterpoint to the examples of adverbs incorporated into event types. In those, an adverb like *Sunday* was considered to be part of the event type if it was relevant to the contingency relation. Here, it looks like we want to say that unless a modifier is relevant to contingency, it should not be part of the event type. In these cases, it seems to be the occurrence of the bare event that is relevant, and not its manner of execution, and so the manner adverbials should not be included in the event type. Since most of these modifiers have nowhere else to attach syntactically, they are not felicitous in the utterance.

4.   Discourse Predictions of the Analysis

Having looked at a number of sentence-internal issues, we move on to the bigger picture of the use of the perfect in discourse. The constraints on where to attach new events into a temporal discourse structure also hold for the perfect, and this allows us to predict what kinds of sequences we can have in a discourse subsequent to a perfect. Recall that the *reference* nodes along the right frontier are referred to as 'open nodes', and that a new event can only be attached as the daughter of an open node. (Since *now* is not a reference node, the ordering between *now* and R_p doesn't matter.) Suppose we have a discourse in which the most recently incorporated event was in the present perfect. We will then have just added two new reference nodes to the structure, and they will both be on the right frontier, since they will be descendents of a node on the right frontier. Leaving out any previous events, the structure would look like (39), with open nodes marked with '[+o]':

(39) $R_{0[+o]}$ $R_p \asymp now$

|

$R_{now[+o]}$

now $R_{p[+o]}$

|

e_p
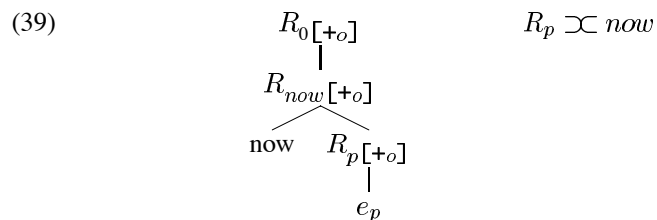
From this structure, we can predict what kinds of relations are possible for the next event introduced in the discourse. A new event's reference time must be the daughter of a currently-open node. The diagram below indicates the potential incorporation sites for the new event's reference node:

(40)

$$R_0[{}_{+o}]$$

$$R_{now}[{}_{+o}] \qquad (R_{new})$$

$$now \qquad R_p[{}_{+o}] \qquad (R_{new})$$

$$e_p \qquad (R_{new})$$

$$R_p \supset\subset now$$

      The interpretations for these different positions indicate how the new event is related to the present-perfect event. If the new reference time is a daughter of R_0 (or of any open reference node between R_0 and R_{now}), then the eventuality has been understood as being temporally independent from the eventuality that was introduced in the perfect; i.e. it is not subordinate to it, and it is also not subordinate to *now*. If the new reference time is inserted under R_{now}, then a special claim is being made: that the new event is subordinate to *now*; since I know of no other case of subordination to *now*, this event (probably) must be in the present perfect as well. Finally, if the new node is attached to R_p, then the new event is subordinate to the previous present perfect event, for instance as an event decomposition. An event which is in the present perfect must be attached at either R_{now} or R_p, because it will be subordinate to *now*, and an event which is not in the present perfect must not be attached to R_{now}. It is possible for an event that is attached to R_p not to be in the present perfect, as we see in (41d), because a reference node contained in R_p need not abut *now*. Each of these readings are predicted by the general temporal subordination theory, and below we can see examples of each reading, with the attachment site given after each.

(41) a. The president has insisted on his innocence all along. The committee decided it needed proof. [R_0]

      b. Jason has washed the dishes. He has put away the leftovers. [R_{now}]

      c. Sandy has prepared a feast for dinner. She has made crepes and souffle. [R_p]

      d. Sandy has prepared a feast for dinner. She made crepes and souffle. [R_p]

We can also see a case that is ruled out by the theory: a case in which the second event is subordinate to *now* but overtly sequenced with the first event:

(42) ??Josh has picked up the book. (Then/Next) he has carried it to the table.

Here both the first and the second perfect must introduce a reference time that abuts *now*. If they both abut *now*, then these reference times must thus be in some kind of containment relation with each other. However, the interpretation that the events are sequenced can only be represented by having the reference times be sequenced with each other, and this gives an incompatible set of constraints. This means that no adverbial may modify the second in a sequence of present perfects if it indicates any kind of relation other than containment between the reference times.

Because a present perfect structure contains *now*, there are also constraints on where a new present perfect structure can attach onto an existing discourse structure. It can be a sister to anything, but it can only be the daughter of a reference time that can contain *now*, which means it can only be subordinate to something in the present tense—either a simple present or another present perfect.

(43) a. When he gets/has gotten angry, Sam has put his fist through walls.
      b. *When he got angry, Sam has put his fist through walls.

Other, more obvious discourse sequences are ruled out by the meaning of the perfect rather than by discourse principles . For instance, since the present perfect must be used in the consequent state of the event, one cannot subsequently supersede that state:

(44) ??Bill has left for Paris. He is in his office.

5.   Summary

Interpreting the English perfect within the theory of temporal subordination accounts for a number of apparent idiosyncrasies of the English perfect as being instead predictable elements of a general theory of temporal relations in discourse. This analysis casts the perfect as a case of temporal subordination,

where subordination forces the reference time of one event to be interpreted within the time introduced by another event or situation. For the present perfect, the event being introduced is subordinate to *now*, which means that the event is understood to occur within a timespan containing *now*, and for the past perfect the event occurs within a timespan introduced by a previous event in the discourse. The unique contribution of the English perfect is that the reference time containing the event must abut *now* or the previously-established time. This constraint appears to be missing in some other languages, even when the perfect seems to require subordination, as with Spanish.

The interpretation of temporal frame adverbials as containing a reference time, along with the perfect's interpretation, account for many constraints on temporal modification of the perfect. A frame adverbial must contain the event and also either contain or abut *now*. Another facet of adverbial constraint is accounted for by the pragmatic nature of reference times as times during which events are expected to occur.

The theory of temporal subordination also predicts what kinds of discourse sequences can occur before or after a perfect, and what kinds of interpretations they can have, based on both linguistic and pragmatic factors.

Elements of other analyses of the perfect fall out directly from the analysis given here. For instance, the two different forms of the 'extended-now' are manifest as the reference time of the event and the reference time for *now*; the idea of 'current relevance' is inherent in the subordination dependency structure between the event and *now*; Klein's p-definiteness constraint falls out from the containment relation between the two reference times; and the Reichenbachian **E, S,** and **R** are present as e, *now*, and R_1.

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