

A Modal Account of the English Present Perfect Puzzle

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1. Introduction

The subtlety of the English present perfect is the bane of many who must learn the language. Semantically, there appears to be little difference between the present perfect and the simple past tense. Sentences such as (1a) and (1b) appear to have precisely the same truth conditions.

- (1) a. Uli went to the exhibit.
- b. Uli has gone to the exhibit.

Both sentences are true if and only if there was an event of Uli going to the exhibit which took place at a time prior to the time at which the sentence is uttered. They might, therefore, each be given the semantic analysis in (2), in the style of Davidson (1967).

- (2) $\exists e [e < \text{now} \ \& \ \text{go}(e, \text{Uli}) \ \& \ \text{to}(e, \text{the-exhibit})]$

There is, however, a pragmatic distinction between (1a) and (1b), which is sometimes described as (1a)'s having a sort of "current relevance." In contrast to simple past tense sentences, present perfect sentences are used, it is said, when the occurrence of the past event is somehow relevant to present concerns. It has never been clear, however, exactly what this means, or even how to investigate the contrast.

Fortunately, in addition to this pragmatic distinction, there are a number of distributional differences that allow for more direct comparison. One of the most well-studied of these was dubbed the "present perfect puzzle" by Klein (1992). It concerns the fact that in contrast to simple past tense sentences, present perfect sentences cannot felicitously be modified by "past-time" adverbials. The contrast is illustrated in (3).

- (3) a. Uli went to the exhibit last week.
- b. *Uli has gone to the exhibit last week.

One might have expected that, given the synonymy between (1a) and (1b), (3a) and (3b) would also be synonymous, both having the semantic analysis (4).

- (4) $\exists e [e < \text{now} \ \& \ \text{go}(e, \text{Uli}) \ \& \ \text{to}(e, \text{the-exhibit}) \ \& \ \text{last-week}(e)]$

But, in fact, although present perfect sentences are used to indicate that a past event of a certain type has occurred, they cannot, as simple past tense sentences can, be embellished with a temporal adverbial to locate this event more precisely in time.

The goal of this paper is to account for this contrast, and, by so doing, to shed some light on the notion of current relevance.

Typically, accounts of the infelicity of (3b) tie it to the temporal semantics of the English perfect, associating it with restrictions on the modification of certain temporal parameters (Klein 1992; Hitzeman 1995; Giorgi and Pianesi 1998). While many aspects of these analyses are appealing, they have never been wholly successful, and have often been highly stipulatory. In this paper I will derive the present perfect puzzle from an entirely different source. The restriction on temporal adverbs will be seen to be part of a more general presupposition associated with the present perfect. As McCawley (1971) noted long ago, the present perfect conveys a sense of current possibility. If the Monet exhibit is still running, one utters (5a) rather than (5b), for example.

- (5) a. Have you been to the Monet exhibit?
 b. Did you go to the Monet exhibit?

Once the exhibit has closed for good, however, (5a) is no longer felicitous. The incompatibility of the present perfect with past adverbials will be shown to follow directly from the presupposition associated with this infelicity.

2. The present perfect puzzle

The basic fact we would like to account for is the infelicity of sentences such as (6a) and (6b).

- (6) a. *Zach has gone to Boston yesterday.
 b. *Austin has built a deck last summer.

This is not part of a general restriction on the modification of present perfect clauses, as quantifying adverbials can be used to provide information about the number of events that occurred, as in (7a), manner adverbials and locative adverbials can be used to provide information about how and where the event occurred, as in (7b) and (7c).

- (7) a. Steven has gone to Boston several times.
 b. Steven has gone to Boston by car.
 c. Steven has eaten fish in Boston.

Even certain temporal adverbials can be used to locate the event in time. These are either temporal adverbials that relate to times that overlap the time of speech, as in (8), or those that have a kind of indefinite interpretation, as in (9).

- (8) a. Katrin has read her email today.
 b. Austin has built a deck this summer.

- (9) a. Uli has drunk beer on Sunday.
 b. Peter has been in Harvard Square at 6am.

In (8) the adverbials locate the email reading and deck building on the day of the utterance and the summer of the utterance, respectively. Note that here the temporal adverbial must relate to a time interval that includes the time of speech—(8b), for example, is not felicitous unless it is uttered in the summer—and it locates the event described within that definite time interval. In (9), on the other hand, the temporal adverbial need not relate to a time that overlaps the speech time, but it must have indefinite reference. In (9a) we learn only that Uli has engaged in Sunday beer-drinking, and in (9b) that Peter has engaged in early morning visits to Cambridge. Note that adverbs such as *on Sunday* and *at 6am* typically have definite interpretations when they appear in simple past sentences:

- (10) a. Uli drank beer on Sunday.
 b. Peter was in Harvard Square at 6am.

(10a) relates to a specific Sunday and (10b) to a specific 6am.

The restriction, then, appears to be that the present perfect cannot be modified by temporal adverbials that relate only to past times. There are a number of things that make this restriction puzzling. First of all it appears to be particular to the English-like present perfect and is not evident in parallel constructions in closely related languages. In German, for example, both simple past tense sentences and present perfect sentences can be modified by past-time adverbials, as illustrated in (11).

- (11) a. Uli besuchte letzte Woche die Ausstellung.
 Uli visited last week the exhibit
 b. Uli hat letzte Woche die Ausstellung besucht.
 Uli has last week the exhibit visited
 “Uli went to the exhibit last week”

The semantic analysis suggested in (4) appears to be adequate for both (11a) and (11b).¹ For English-like languages, however, this is clearly not the case. Furthermore, the restriction appears to be limited to the **present** perfect. As has oft been noted, in non-finite contexts there is no restriction on the temporal modification of perfect clauses. In sentences such as (12a) and (12b) definite past-time temporal adverbials are perfectly acceptable.

- (12) a. Steven must have gone to Boston yesterday.
 b. Peter believes Steven to have gone Boston last summer

There also appears to be no restriction in past perfect sentences. Sentences such as (13a) and (13b) are also perfectly acceptable with past time adverbials:

- (13) a. (Mary made it to Boston on Thursday, but . . .) Uli had left on Tuesday.

- b. (We went to return books at 12:30, but . . .) the library had closed at noon.

This might suggest that the adverbial restriction has something to do with the “presentness” of the present perfect. Klein’s insight, however, was that when the data are properly arrayed, it can be seen that past perfect sentences are subject to a similar restriction, thus making the present perfect puzzle look to have more to do with the perfect, and less to do with the present tense.

Let me explicate this briefly. Temporal adverbials can modify past perfect sentences in two ways. They can locate the event described, as we saw in (13). They can also be used to specify the time with respect to which the event is being viewed, as in (14).

- (14) a. On Thursday, Uli had (already) left.
b. At noon, John had been to the canteen three times.

To describe these two aspects of the temporal semantics of the perfect, Reichenbach (1947) introduced the terminological distinction between the event time—the time at which the described event takes place—and the reference time—the time from which it is viewed. In past perfects, the event time and the reference time can each be specified by a temporal adverbial, as in (13) and (14), respectively. What Klein noted was that the event time and the reference time cannot both be specified in the same clause:

- (15) a. *On Thursday, Uli had left on Tuesday.
b. *At 12:30, the library had closed at noon.

Interestingly, this restriction has very much the same character as the restriction associated with the present perfect. If the event time modification is indefinite, as in (16a), or relates to a time span that overlaps that denoted by the reference time modifier, as in (16b), double modification is possible.

- (16) a. In 1990, Uli had already been to Boston in the summer.
b. In July of 2001, Steve had already given three lectures that year.

It appears, then, that a definite specification of the reference time plays the same role in the past perfect as the present tense itself plays in the present perfect.²

On the reasonable assumptions that tense specifies the reference time of the perfect and that the present tense is definite and the past tense indefinite, the restriction on the temporal modification of the English perfect appears to be characterizable as a restriction on the definite specification of **both** the event time and the reference time, when the former does not include in the later. In essence this is the proposal that Klein (1992) made (although he does not include the overlap condition). While he attempted to provide a Gricean explanation for why such a constraint might hold, he did not derive it directly. In what follows we will take up this task, deriving the restriction from a modal presupposition associated with (certain uses) of the perfect.

3. The modality of the English perfect

As already mentioned, McCawley (1971) noted that the present perfect in English conveys a sense of current possibility. One utters (17a) rather than (17b) if one presumes that it is still possible for the addressee to attend the exhibit.

- (17) a. Have you been to the Monet exhibit?
b. Did you go to the Monet exhibit?

This presupposition has sometimes been characterized as having to do with whether the event described could be repeated in the future (Inoue 1979). Since it is no longer possible to eat lunch at the Russian Tea Room in New York, for example, (18a) is infelicitous (to those in the know), while (18b) is fine.

- (18) a. *I have eaten lunch at the Russian Tea Room three times.
b. I ate lunch at the Russian Tea Room three times.

Following this line of reasoning, one might think that “one time” predicates such as *to be killed* or *to eat the last sandwich*, which by their very nature can never be repeated, should be restricted from appearing in the present perfect. Clearly this is not the case; sentences such as (19a) and (19b) are perfectly fine.

- (19) a. John has been killed.
b. Peter has eaten the last sandwich.

They illustrate, however, the significant contextual parameterization and qualification that this presupposition is subject to. It is clearly not just absolute future repeatability that is relevant, but rather what the speaker and hearer take to be possible. To utter (19b) the speaker must assume that the hearer doesn’t know that the sandwich has already been eaten. In a context in which we are looking at an empty plate wondering where all the food went, (19b) would be quite odd, but (20) would be acceptable.³

- (20) Peter ate the last sandwich.

Likewise, if you didn’t know that the Russian Tea Room had closed, you would have no reason to think (18a) odd. And, as McCawley noted, even if the Monet exhibit is still open, if it is common knowledge that the addressee is injured and will be held up in the hospital until the show closes, then (17a) is odd.

It appears, then, that using the present perfect is felicitous only in a context in which the speaker can assume that the hearer takes it to be possible for an event of the type indicated in the perfect clause to occur at some time in the future. It is difficult to specify exactly how speakers determine what is being taken to be possible (see Kratzer’s (1981) work on the context dependency of modal interpretation). Nevertheless it is usually fairly clear what is appropriate in a particular context. For example, when calling home from Europe one might utter (21a), but when one is already home (or on the way home), one would utter (21b).

- (21) a. We have been to Paris and Rome.
 b. We went to Paris and Rome.

(21a) seems to presuppose that we might still travel around, (21b) that we are done with the trip. Using (21b), however, doesn't rule out a future trip, of course, nor does (21a) suggest that we will return to either of the cities. The relevant sense of future possibility is clearly not absolute possibility or future likelihood, but something contextually specified. We will have nothing more specific to offer on this front, however.

The presupposition of future possibility is, of course, closely related to the lifetime effects discussed by Musan (1997), in which the status (living or dead) of the individual denoted by the subject of a sentence plays a role in determining what tense is appropriately used in the sentence. So since my great aunt is still alive, but my grandmother is not, (22a) is fine, but (22b) is odd.

- (22) a. My great aunt is from New York.
 b. ??My grandmother is from New York.
 (cf. My grandmother was from New York.)

In fact, there is significant overlap between the two issues in the literature. One of the most famous lifetime-effect contrasts—that in (23) noted by Chomsky (1970)—was analyzed by McCawley (1971) as being a violation of the future possibility condition on perfects:

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

Since Einstein can no longer make visits, but Princeton can still be visited, (23a) is awkward but (23b) is acceptable. As McCawley noted, in contrast to true lifetime effects, the presupposition of future possibility is tightly tuned to the semantic content of the event predicate being used, and not just the status of the subject NP. So, for example, although my mother is still alive, she is past her childbearing years. Given this, (24a) is odd, since it is no longer possible for her to give birth, while (24b) is perfectly acceptable.

- (24) a. *My mother has given birth to two children.
 b. My mother gave birth to two children.

It may seem odd that an element of the temporal/aspectual lexicon, the perfect, should have a modal aspect to its meaning. It turns out, however, that it is not uncommon for present perfects to have a kind of epistemic modal interpretation (Izvorski 1997). Examples are given in (25).

- (25) a. Gel -mis -im. Turkish
 b. Az sâm doşâl. Bulgarian

- c. Jeg har kommet. Norwegian
 “I have come” OR “I apparently came”

Whether the modality of the English perfect is related to this kind of modality, and whether only present perfects have these kinds of readings is a subject for future research.

In English, at least, the modal presupposition also appears to arise for certain past perfects as well. An utterance of (26), for example, presupposes that it was possible for Mary to go to the exhibit at a time after the time at which we met her, the “future” here being with respect to this meeting time and not the time of speech.

(26) When we met Mary last week, she had not been to the exhibit.

Continuing the discourse in (26) with (27) results in infelicity, indicating the real presence of the presupposition.

(27) ... ??It had closed the week before.

Note that when the past perfect is not modified, as in (28), there is no infelicity (and no presupposition of future possibility).

(28) We met Mary last week. She had not been to the exhibit. It had closed the previous week.

In fact, the presupposition of future possibility appears to arise in exactly those uses of the perfect that are subject to the restriction on adverbial modification: the present perfect and the modified past perfect. There is no presupposition in unmodified past perfects, and none in infinitival perfects. (29a) and (29b) are perfectly natural, even in a context where it is known that the Tea Room is closed for good and that the kids are back from their trip.

- (29) a. Peter believes John to have eaten at the Russian Tea Room.
 b. The kids seem to have gone to Paris and Rome.

We might utter (29b) after helping the kids unpack from the trip and noting what they brought back with them; there is no presupposition of future possibility here.⁴

We might note in addition that the presupposition of future possibility is entirely absent from the interpretation of the perfect in languages such as German and Italian which do not evidence the restriction on adverbial modification. That these two properties of the perfect—the modifier restriction and the presupposition of future possibility—appear so closely related would seem to call for a unified account. In the next section we provide one, deriving the former from the latter.

4. Deriving the adverbial restriction

We will focus on the present perfect, leaving the extension to the past perfect to another occasion. The basic idea is this: The present perfect takes as complement

an event predicate and introduces the presupposition that it is possible for this event predicate to hold at a time after the time of speech. Since an event predicate which is modified by a past-time adverbial can only hold in the past, such modification will necessarily violate this presupposition. Let me illustrate this briefly with reference to the contrast in (30).

- (30) a. *John has eaten lunch yesterday.
 b. John has eaten lunch today.

In (30a) the event predicate is one that holds of events of John eating lunch that are on the day before the day on which the sentence is uttered, while in (30b) it is a predicate that holds of events of John eating lunch that are on the day on which the sentence is uttered. These two predicates might be represented as in (31a) and (31b) respectively.

- (31) a. λe [eat(e,john,lunch) & yesterday(e)]
 b. λe [eat(e,john,lunch) & today(e)]

Clearly the presupposition associated with the present perfect—that the predicate it applies to can hold of an event that occurs after the time of utterance—is one which (31a) cannot satisfy but (31b) can: An event of eating lunch yesterday cannot, so to speak, occur at some time after the time of speech, but an event of eating lunch today can. It is this simple relationship between the presupposition of future possibility and temporal modification that I take to account for the restriction on temporal adverbials and for the correlation between this restriction and the presupposition.

Let us now give a somewhat more formal treatment. We assume the interpretation function $\llbracket \cdot \rrbracket^c$ assigns meanings to elements of the language with respect to a context c . Contexts will be taken to include a specification of speech time and location, speaker, addressee, common ground, etc. (Lewis 1980). We will only be concerned here with the time of the context and the world of the context, which we will call t_c and w_c respectively, and with the context set (the set of worlds compatible with the public beliefs of the conversational participants), which we will call cs_c (Stalnaker 1984). Meanings will be taken from the following domains: The basic types D_e (the entities), W (the possible worlds), D_i (the intervals of time), D_{ev} (the events), and D_t (the truth values) as well as the functional types, defined in the usual way. We assume that there is a function τ mapping events to their run times, that times are ordered by the relation $<$ and stand in the inclusion relation \subseteq . Predicates will also be taken to have implicit index arguments—here world and time arguments—in the style of Gallin (1975). We will use standard logical formulae to abbreviate meanings. Elements that give rise to presuppositions will be taken to have denotations which are partial functions, in the tradition of Karttunen and Peters (1979). Let $\phi;\pi$ indicate that ϕ presupposes π , in the sense that ϕ only has an interpretation if π is true.⁵

We assume that the “untensed” part of a sentence denotes an event predicate with meaning in $D_{\langle ev \langle s,t \rangle \rangle}$. Temporal adverbials will be treated as modifiers of event predicates which restrict the times with respect to which the predicate holds

(much as in Parsons (1990)). They have meanings in $D_{\langle\langle ev \langle s,t \rangle \rangle \langle ev \langle s,t \rangle \rangle}$. Indexical temporal expressions such as *yesterday* and *this week* are interpreted with respect to the context of utterance, thus the interpretation for the adverbial *this week* will be that given in (32):

$$(32) \quad \llbracket \text{this week} \rrbracket^c = \lambda P \lambda e \lambda w [P(e)(w) \ \& \ \tau(e) \text{ is in the week of } c]$$

Operators such as the modal and the perfect will be functions from event predicates to sentence meanings. The future-oriented epistemic modal *might*, for example, can be given the interpretation in (33) (in the style of Enc (1996)).⁶ Because it is an epistemic modal, the relevant modal base is provided by the context set.

$$(33) \quad \llbracket \text{might} \rrbracket^c = \lambda P \exists t \exists w [w \in cs_c \ \& \ \tau(e) \subseteq t \ \& \ P(e)(w) \ \& \ t_c < t]$$

Essentially this says that the modal takes a predicate of events, and returns true only if it is possible that this predicate holds of an event that occurs subsequent to the time of speech. We can abbreviate this by introducing the relation POSS that holds between an event predicate, an interval, and a context that indicates that with respect to the context it is possible, given what the discourse participants take to be agreed upon, for the event predicate to hold at the interval:

$$(34) \quad \text{POSS}(P,t,c) = 1 \text{ iff } \exists w \exists e [w \in cs_c \ \& \ \tau(e) \subseteq t \ \& \ P(e)(w)]$$

Assuming that the temporal orientation of *might* is a presupposition, the interpretation of this modal verb can now simply be indicated as in (35), with “;” separating assertion from presupposition.

$$(35) \quad \llbracket \text{might} \rrbracket^c = \lambda P \exists t [\text{POSS}(P,t,c); t_c < t]$$

Now consider the analysis of (36), in which the event predicate is modified by a temporal adverbial:

$$(36) \quad \text{Katrin might take out the trash this week}$$

(36) is true iff there is a $w \in W$ that is part of the context set of c in which there is an event $e \in D_{ev}$ of Katrin taking out the trash that occurs in w after the time of c and on the week of c , in other words, if it is compatible with what is commonly believed that Katrin might take out the trash sometime in the remaining days of the week of utterance. This seems to be right.

We can now already account for the fact that it is quite odd to utter something like (37).

$$(37) \quad * \text{Katrin might take out the garbage last week.}$$

The adverbial *last week* is an event-predicate modifier that locates events on the week before the week on which the sentence is uttered.

$$(38) \quad \llbracket \text{last week} \rrbracket^c = \lambda P \lambda e \lambda w [P(e)(w) \ \& \ \tau(e) \text{ is in the week prior to } c\text{'s week}]$$

Since *might* can only apply to an event predicate that can hold at a time after the time of utterance—only future times satisfy the presuppositions of *might*—and the event predicate *Karen-take-out-the-trash-last-week* only holds of events that take place on the week before the utterance, it is not possible to satisfy the presupposition of *might* in (37).

Let us now turn to the present perfect. As we have seen, the present perfect appears to presuppose that it is possible that the event predicate it applies to hold at a time subsequent to the speech time. Making this explicit, the present perfect will be interpreted as a partial function from event predicates to truth values that is only defined for those event predicates which satisfy the presupposition and only returns true if an event of the appropriate type has occurred. The definition is given in (39), where, again, the “;” separates assertion from presupposition.

$$(39) \quad \llbracket \text{PRES-PERF} \rrbracket^c = \lambda P \exists e [\tau(e) < t_c \ \& \ P(e)(w_c)]; \exists t [t_c < t \ \& \ \text{POSS}(P,t,c)]$$

This says that the present perfect presupposes that it is possible for an event of the given type to occur in the future, and asserts that one has occurred in the past. Note that we have adopted the Kaplanian assumption (Kaplan 1989) that a sentence is true in a context only if it is true in the world of that context. For convenience we have folded the application to the context world w_c into the meaning of the perfect.

Let us illustrate again with a simple example. (40a) is taken to have the logical form of (40b), and an interpretation such as that in (40c).

- (40) a. Katrin has taken out the trash.
 b. $\llbracket \text{PRES-PERF} [\text{Katrin take out the trash}] \rrbracket$
 c. $\exists e [\tau(e) < t_c \ \& \ \text{take-out}(w_c, e, k, \text{trash})];$
 $\exists t [t_c < t \ \& \ \text{POSS}(\lambda e \lambda w [\text{take-out}(w, e, k, \text{trash})], t, c)]$

(40a) is only assigned a meaning if there is a $w \in W$ that is part of the context set of c for which there is an event of Katrin taking out the trash that occurs after the time of c , i.e., if it is possible for Katrin to take out the trash in the future. If this presupposition is satisfied, then the sentence is true if there was an event of Katrin taking out the trash before the time of c and false otherwise. Note that the content of the event predicate *Mary-take-out-the-trash* shows up in two places, once in the asserted content and once in the presupposition. This, along with the context dependence of the modal presupposition, makes it difficult to pull the assertion and presupposition apart in sentences such as (40).

In the case of negative sentences, however, the presupposition and the assertion have distinct content. Take (41a), for example, which I take to have the logical form of (41b), and to be interpreted as in (41c).

- (41) a. Katrin has not taken out the trash.
 b. $\llbracket \text{NEG} [\text{PRES-PERF} [\text{Mary take out the trash}]] \rrbracket$
 c. $\neg \exists e [\tau(e) < t_c \ \& \ \text{take-out}(w_c, e, ka, tr)];$
 $\exists t [t_c < t \ \& \ \text{POSS}(\lambda e \lambda w [\text{take-out}(w, e, ka, tr)], t, c)]$

Here the negation is—as is usual—applied to the assertional content, but not to the presupposition. What is presupposed in (41a) is exactly the same as what is presupposed in (40), namely that it is possible for Katrin to take out the trash at some time following the time of utterance. What is asserted, however, is that she has not done so yet, i.e., that no event of Katrin taking out the trash occurred before the utterance time.

Turning to the present perfect puzzle, we can now straightforwardly derive the infelicity of (42).

(42) *Katrin has taken out the trash last week

Presumably (42) has the logical form of (43a) with the perfect taking scope over the temporal adverbial, which is interpreted as in (43b)

- (43) a. [PRES-PERF [Katrin take out the trash last week]]
 b. $\exists e [\tau(e) < t_c \ \& \ \text{take-out}(w_c, e, ka, tr) \ \& \ \tau(e) \text{ is on the week before } c\text{'s week}]; \exists t [t_c < t \ \& \ \text{POSS}(\lambda e \lambda w [\text{take-out}(w, e, ka, tr) \ \& \ \tau(e) \text{ is on the week before } c\text{'s week}], t, c)]$

(43) thus presupposes that it is possible for there to be an event of Katrin taking out the garbage that takes place both after the time of utterance and on the week before the week of the utterance. This is a presupposition that can never be satisfied. Thus sentences such as (42) will always be infelicitous, and we have an account of why past-time adverbials are incompatible with the present perfect.

What remains is to account for why present-time and indefinite adverbials are not incompatible with the present perfect. If the proposal made above is correct the account should simply be that they do not give rise to non-satisfiable presuppositions, and this seems to be the case. Consider (44a) and (44b).

- (44) a. Katrin has taken out the trash this week.
 b. Katrin has taken out the trash on Sunday.

Intuitively, in (44a) the presupposition is that it is possible for Katrin to take out that trash on the week of the utterance at a time after the time at which the sentence is uttered, while in (44b) it is that it is possible for her to take out the trash on a Sunday in the future. It appears that the semantics we gave for *this week* in (32) gives us the right result; with (44a) having the interpretation in (45).

- (45) $\exists e [\tau(e) < t_c \ \& \ \text{take-out}(w_c, e, ka, tr) \ \& \ \tau(e) \text{ is in the week of } c];$
 $\exists t [t_c < t \ \& \ \text{POSS}(\lambda e \lambda w [\text{take-out}(w, e, ka, tr) \ \& \ \tau(e) \text{ is in the week of } c], t, c)]$

Clearly the presupposition here can be satisfied whenever the conversational partners jointly believe that it is possible for Katrin to take out the trash at some time on the remainder of the week. The negation of (44a) also comes out right. Thus (46a) has the interpretation in (46b).

- (46) a. Katrin has not taken out the trash this week.

- b. $\neg \exists e [\tau(e) < t_c \ \& \ \text{take-out}(w_c, e, ka, tr) \ \& \ \tau(e) \text{ is in the week of } c];$
 $\exists t [t_c < t \ \& \ \text{POSS}(\lambda e \lambda w [\text{take-out}(w, e, ka, tr) \ \& \ \tau(e) \text{ is in the week of } c], t, c)]$

Here the presupposition is the same as in (44a), but the assertion is simply that there was no event of Katrin taking out the trash prior to the time of utterance on the week of utterance.

For the treatment of (44b) we need to provide an analysis of the indefinite interpretation of *on Sunday*. Presumably this is something like that given in (47):

- (47) $[[\text{on Sunday}]^c = \lambda P \lambda e \lambda w [\tau(e) \text{ is on a Sunday} \ \& \ P(e)(w)]$

A sentence such as (43b), then, presupposes that it is possible for Katrin to take out the trash on some Sunday in the future, and claims that she has done it on some Sunday in the past:

- (48) $\exists e [\tau(e) < t_c \ \& \ \text{take-out}(w_c, e, ka, tr) \ \& \ \tau(e) \text{ is on a Sunday}];$
 $\exists t [t_c < t \ \& \ \text{POSS}(\lambda e \lambda w [\text{take-out}(w, e, ka, tr) \ \& \ \tau(e) \text{ is on a Sunday}], t, c)]$

Note that the indefiniteness of *on Sunday* only plays a contributing role to its acceptability in the perfect. What is crucial is that there are presumed to be Sundays after the time of utterance on which Mary could take out the trash. When this is not the case, as in (49), the perfect is infelicitous.

- (49) Mary has been to Paris on a Sunday in the twentieth century.

Here the temporal adverbial is clearly indefinite, but since it is not (now) possible for Mary to go to Paris on a Sunday in the twentieth century the sentence is odd. The crucial semantic fact about adverbials such as *this week* and *on Sunday* that allows them to combine with the present perfect is that when they modify an event predicate, the resulting event predicate is one that can hold both in the past and in the future.

That, then, is the account of the present perfect puzzle. Clearly there are important issues that I have not discussed, in particular concerning the treatment of the past perfect. This we will leave for another occasion. As appealing as this account is, there are a number of problems that arise directly in connection with this type of analysis that we should address before concluding.

5. Computing the presuppositions of a present perfect

One of the problems with an analysis of the type just outlined is raised by Chomsky's Einstein-sentences, repeated here as (50).

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

The account of this contrast should go something like this: Since Einstein can no longer visit Princeton (50a) is awkward, but since Princeton can still be visited, (50b) is fine. The presuppositions of the perfect are violated in (50a) but not in (50b). For this account to go through, however, the modifier *by Einstein* in cannot be part of the event predicate that the perfect operator applies to in (50b), since Princeton can no longer be visited by Einstein. If it were part of the event predicate, there would be a presupposition violation in (50b) as well. This fact raises important questions, because it suggests that the presupposition associated with the perfect cannot be computed directly from the syntactic structure of the sentence.

As McCawley (1971) already suggested, and Inoue (1979) discussed at length, the acceptability of a perfect sentence appears to be sensitive to not only the content of the event predicate, but to the topic/focus structure of the perfect sentence and the pragmatic context that it appears in. With focus on the subject NP, the Einstein-sentence appears to be acceptable:

(51) EINSTEIN has visited Princeton.

Likewise, as part of a list answer, it is also fine:

(52) Which Nobel laureates have visited Princeton?
Einstein has, Friedman has, . . .

While these facts raise questions about how exactly to compute the content of the presupposition for a perfect sentence, they do not show that the presupposition of future possibility disappears in these sentences. Rather, they show that the content of the presupposition is not exactly what we might expect it to be from looking at the surface form. (51) may not presuppose that Einstein can still visit Princeton, but it does presuppose that it is possible for someone to visit Princeton, i.e. that Princeton is not unvisitable. Contrast (51), for example, with the infelicitous (53).

(53) ??EINSTEIN has eaten lunch at the Russian Tea Room.

It appears that in (51), focus has allowed the lexical content of *Einstein* to escape the presupposition and be existentially interpreted, likewise in (53). But since it is not possible for anyone to eat at the Russian Tea Room anymore, (53) is odd. In a similar vein, the entire discourse in (52) seems to have the presupposition that it is still possible for Nobel laureates to visit Princeton. If all the prize winners were to die off, (52) would be odd as well.

It is not clear to me exactly how to compute the content of the presupposition, although a number of options seem to be available. In the analysis presented above, the presupposition is computed directly from the syntactic structure of the sentence. While it appears that this is not always the case, it seems to be a good default assumption. There are many factors beyond just the syntax and the topic/focus structure that go into determining what the presupposition is, however, and it is not at all clear what exactly goes into this computation. The presence of negation, for example, appears to restrict the presuppositional content to being that which is directly computed from the syntax. In contrast to (52), for example, the negative answer in (54) is significantly less acceptable:

- (54) Which Nobel laureates have visited Princeton?
 ??Einstein hasn't, Friedman has, ...

When negated, (50b) also becomes much more awkward.

- (55) ??Princeton has not been visited by Einstein.
 (cf. Princeton was not visited by Einstein)

Investigation of the various factors at play here promises to be a fruitful domain for future research.

In recent work, Portner (2000) tries to derive both the kind of topic/focus-based variability mentioned above and the presupposition of future possibility from the pragmatic notion of current relevance, which he takes to be the fundamental semantic/pragmatic contribution of the perfect. On his account the modal and temporal components of the meaning of the perfect are kept quite separate. In the analysis presented here I have done things quite differently, deriving the temporal restriction from the modal presupposition. In fact, I think we can derive the notion of current relevance from the modal presupposition as well, at least as evident in the "hot news" reading.⁷ We will conclude with a brief discussion of this.

When someone utters (56) they seem to be implying that the victory was recent, and that it is news to the hearer.

- (56) The Dodgers have won the World Series.

I would like to suggest that it is the association of the presupposition of future possibility with the conversational common ground that is the source of this "hot news" implicature. The relevant pragmatic context for a hot news perfect is one in which the speaker assumes that the hearer is aware that an event of the given type might occur, but he doesn't know that it has occurred, and the speaker exploits this presupposition to create the "hot news" effect.

The fact that (57a) is a felicitous "hot news" perfect, but (57b) is not, no matter how relevant for our present concerns a Lincoln assassination might be, follows directly from such an account.

- (57) a. George W. Bush has been assassinated.
 b. ??Abraham Lincoln has been assassinated.
 (cf. Abraham Lincoln was assassinated.)

We all know that Lincoln is dead, and so his assassination is not a future possibility. The perfect in (57b) is, therefore, infelicitous. But to inform someone who didn't already know it that Bush was killed, however, the perfect would be fine. It would further convey that what is being said is news, i.e., that the speaker takes it NOT to be part of the common ground that Bush's death is not a future possibility. The "hot news" effect, then, comes from simultaneously asserting that an event has happened and presupposing that the hearer takes it to be possible that such an event might still happen in the relevant future. Clearly more work is required here as well. Nevertheless I hope I have made plausible a particular conception of how the modal presupposition might underly the interesting and mysterious properties of the English perfect.

6. Conclusion

I have argued that the restriction on the temporal modification of the present perfect is a consequence of the temporal modal presuppositions associated with the perfect. In particular, the present perfect presupposes that it is possible for the described event to occur at a time after the utterance time, given what the speaker and hearer take to be the case. The assertional content of the perfect is that such an event occurred before the speech time (or, in the case of a negation, denies this). Temporal adverbials are taken to be event-predicate modifiers which locate the event in time, and therefore this presupposition is violated by temporal adverbials which do not relate both to times in the past and to times in the future.

The conclusions argued for here receive significant support from the observation that the adverbial restriction appears to go hand in hand with the modal presupposition. This is true both cross-linguistically and within English. In languages such as German and Italian in which the perfect does not have modal presuppositions, there is no adverbial modification restriction. Additionally, in contexts in which the perfect loses its modal presupposition, such as the infinitival and certain past perfects, the restriction on temporal adverbials is lost as well. What remains to be worked out is an account of the interaction of tense with the perfect, a more precise account of how the content of the presupposition is computed from the surface form, and a more thorough treatment of the relationship between future possibility and current relevance.

Endnotes

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1. There are minor contrasts between preterite and perfect, however. See Klein (1999) and von Stechow (1999).

2. Indefinite specification of the reference time appears to be impossible. *On Sunday, Peter had already left* cannot mean that viewed from an indefinite Sunday there was an event of Peter leaving that was before it.

3. Of course predicates such as *eat the last sandwich* don't always refer to unique events. One can say *John has eaten the last sandwich several times*. On this reading, of course an utterance like *John has eaten the last sandwich again* is perfectly fine, even in the empty-plate context.

4. In this context, however, (i) could not be used, although (ii) would be fine.

(i) It seems that the kids have gone to Paris and Rome.

(ii) It seems that the kids went to Paris and Rome.

5. This is simply different notation for the $\phi_{\langle\pi\rangle}$ of Beaver and Krahmer (2000), and

I intend it to have the same interpretation.

6. Note that this analysis of *might* is primarily for illustration and is not intended to be a complete. It, for example, ignores the fact that temporal parameter of *might* can be shifted, as in *He said he might come*. See Condoravdi (2001) for extensive discussion.

7. As Kiparsky (2002) notes, this kind of current relevance must be distinguished from that associated with resultative perfects.

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