

PAUL PORTNER

## THE (TEMPORAL) SEMANTICS AND (MODAL) PRAGMATICS OF THE PERFECT

**ABSTRACT.** The English perfect involves two fundamental components of meaning: a truth-conditional one involving temporal notions and a current relevance presupposition best expressed in terms drawn from the analysis of modality. The proposal made here draws much for the Extended Now theory (McCoard 1978 and others), but improves on it by showing that many aspects of the perfect's meaning may be factored out into independent semantic or pragmatic principles.

### 1. INTRODUCTION

#### 1.1. *Readings of the Perfect*

Perhaps the one thing that current analyses of the perfect agree upon is that a present perfect sentence like (1) indicates some type of connection between a past event, of Mary eating breakfast, and the time indicated by the sentence's tense, the speech time:

- (1) Mary has eaten breakfast already.

We will see below how the various approaches attempt to make precise this connection. However, the literature has been plagued by having to account for the numerous "readings" of the perfect, for example:

*Resultative Perfect:*

- (2) Mary has read *Middlemarch*.

*Existential Perfect:*

- (3) The Earth has been hit by giant asteroids before (and it probably will be again).

*Continuative Perfect:*

- (4) Mary has lived in London for five years.



- (5) John has been in Baltimore since yesterday.

The continuative perfect is also referred to as the “universal” perfect.

*“Hot News” Perfect:*

- (6) The Orioles have won!

We also find terms used like “experiential perfect” and “current relevance perfect” applying to some of the same data. A core experiential perfect might be (1), since it says something about an experience of Mary; a good example of a current relevance perfect would be (3), on the understanding that the potential for asteroid impacts is relevant to our decisions today.

In this set of data, we see a wide variety of temporal relations between the event *e* described and the speech time *s*. In (2), *e* probably precedes *s* by no more than a few years; in (3) eons may have intervened, while in (6) *e* precedes by only moments. Contrasting with all of these cases, in (4)–(5) *e* may either overlap or precede *s*, the case where they overlap being labeled the “continuative perfect”. The most obvious puzzle here is what accounts for the contrast between continuative and non-continuative readings, that is what allows for *e* and *s* to overlap in some cases but not others.

We also see in (2)–(6) a wide variety of non-temporal relations. While (2), like perhaps (6), seems to indicate a current result of a past event, (4)–(5) do not have this character. They simply indicate the continuance of a past event into the present. Example (3) does not indicate a result state either, but rather points to the need to consider a fact about the past (that asteroids fell) while contemplating what may happen in the future. If it describes a victory which has just occurred, (6) seems to suggest that this event is especially noteworthy.

This variety of temporal and non-temporal relations compatible with the perfect poses a challenge for any theory of its meaning. Nevertheless, I will claim that a precise, uniform analysis is possible, characterizing the meaning of the perfect in terms of a semantic and a pragmatic component:

*Semantic Component:* The truth-conditional contribution of the perfect is temporal in nature. This aspect of its meaning is more limited than has previously been supposed, however, and crucial contrasts like that between continuative and non-continuative readings are not based in the meaning of the perfect, or in an ambiguity, but follow from independently needed principles.

*Pragmatic Component:* The pragmatic contribution of the perfect is a presupposition which unifies all of the non-temporal relations observed in (1)–(6). It is to be stated in terms of the theory of epistemic modality, allowing a precise development of such informal notions as “current relevance” and “result state”.

I will also argue that a proper understanding of the present perfect requires us not to ignore the semantics of the present tense. The present tense, I will claim, has some significant semantic properties which are revealed in a comparison between the present perfect and the past perfect, and which have, in some previous analyses, been misattributed to the perfect.

## 1.2. *The Central Phenomena*

An adequate theory of the English perfect must account for a variety of important phenomena previously noted in the literature. I present a number of these in what follows.

### 1.2.1. *Continuative vs. Non-Continuative Readings*

As is illustrated in (1)–(6) above, some perfect sentences receive a continuative interpretation, with the past eventuality overlapping the reference time (i.e., the speech time in present perfects), as in (4)–(5), while others are incompatible with such a temporal relation. Note that something grammatical is at the root of the continuative/non-continuative contrast, not mere “plausibility” of some sort. Example (7a) disallows a continuative reading, although there is nothing wrong with the temporal relations that would be required (that her eating began in the past and continues at the speech time); the continuative reading becomes possible if we merely switch the embedded verb form to the progressive, as in (7b).

- (7)a. Mary has eaten dinner.
- b. Mary has been eating dinner.

Another way to look at the issue is to ask why (7b) fails to require that the eating event be completely past, in contrast to (7a). If the perfect form entails that the event described under its scope be completely past in some examples, one would expect that this would also hold when that event happens to be described by a progressive.

Aspectual class appears to be at the root of the continuative/non-continuative distinction. As pointed out by Bauer (1970, see also Dowty 1979, Mittwoch 1988, Vlach 1993, Iatridou et al. 2000), an eventive present perfect always requires that the event time precede the speech time,

as in (8a), while in many cases a stative allows the two to overlap, resulting in the continuative reading as in (8b):<sup>1</sup>

- (8)a. Mary has run a mile.  
 Mary has run for twenty minutes.  
 Mary has reached the finish line.  
 Mary has slept today.
- b. Mary has been running for twenty minutes.  
 Mary has understood the issue.  
 Mary has been angry all day.

Note, by the way, that the subinterval property is not at the root of pattern, as shown by the fact that *Mary has slept today* only has a non-continuative reading, even though *Mary slept today* has the subinterval property.<sup>2</sup> This argues against the proposal of Iatridou et al. (2000) that “unboundedness” is at the root of the contrast, given that they take activities to be unbounded.<sup>3</sup> It also argues against the Spejewski’s (1997) claim that, in effect, there are no continuative perfects. She proposes that examples like those in (8b) in fact require that the event described be completely past, and claims that the apparent temporal overlap due to the fact that this completely past event can be a mere subevent of a larger event. This predicts, wrongly,

<sup>1</sup> Note that there are stative sentences which fail to produce a continuative reading in the present perfect. We’ll come back to this phenomenon in more detail in Section 3.2.1.

<sup>2</sup> As pointed out by Dowty (1979), verbs like *stand* and *lay* are ambiguous. Note that (i) has a continuative reading, but (ii) does not:

- (i) The obelisk has stood in the piazza for over a thousand years.  
 (ii) The protestors have stood in the lobby for an hour. (cf. “. . . have been standing . . .”.)

<sup>3</sup> Iatridou et al. (2000: 23) discuss the Greek example (i):

- (i) Exi kivermisi apo to 1990 mexri tora.  
 has-3sg. governed from the 1990 until now  
 “S/he has governed from 1990 until now”.

(i) is not a contradiction, leading the authors to conclude that activities can give rise to continuative perfects. The data appears to be identical with the English translation, but in English at least, it seems that *govern* has a stative usage (for example, it takes simple present tense with no habitual reading). Note that the ability of the activity to overlap the speech time depends on an explicit assertion *until now*, something which differentiates it from true continuative perfects like those in (8b); therefore, it is probable that this example is actually just an existential perfect, with the adverbial locating the past eventuality just before the momentary “now”. Moreover, if it is known that no election inauguration has just occurred, a hearer would be likely to infer that the same person still governs the nation.

that any situation in which the perfect is formed from a clause with the subinterval property would allow the continuative reading. Rather, it seems that what is at issue is a concept of stativity which includes progressives and individual-level predicates like *understand* and *be angry*. The relevant concept of stativity excludes all (non-progressive) stage-level predicates, including non-dynamic ones like *sleep*. In what follows, I use the term “stative” in this sense.

### 1.2.2. *Variability of Result State*

A second significant fact in need of explanation is the variable importance of what is often called the result state. An example like (2) presents initial justification for the relevance of this concept, as it seems to indicate not just that Mary read *Middlemarch*, but also that this reading has affected Mary in some relevant way. There are other examples which may argue in a more concrete, less merely intuitive, way that a result state is a crucial component of the perfect’s interpretation. For example, suppose that Mary moved to London five years ago, and hasn’t left. During this time, she became ill only once, three years ago. With this lead-in, the second sentence of example (9) is quite odd.

- (9) Mary has lived in London for five years. (??)She has become ill.

In contrast, suppose that Londoners who have developed illnesses during the last five years are advised to go see their doctors, as their illnesses are likely due to some dangerous pollutants which were inadvertently released into the air. In that case, someone who is concerned for Mary’s health may utter (9) without problem. The acceptability of (9) in this richer scenario might be attributed to the fact that the sentence supports the idea that Mary’s illness has a significant current result, her need to visit her doctor.<sup>4</sup>

<sup>4</sup> One can doubt that we actually are dealing with a result state here. One might say that her need to see her doctor is a result of her exposure to the pollutants, not of the illness, and that the illness stands in an evidentiary relationship to her need to see the doctor, not a causal relationship. I find such an objection plausible, and indeed the analysis presented in this paper can easily account for the example in the way indicated. Nevertheless, if we exclude examples of this sort, I don’t know of any convincing motivation for including a notion of result state as a formal part of the perfect’s meaning, as so many contemporary analyses do. While there are plenty of other examples which generate a strong intuition that a current result is somehow relevant (such as (2)), in none of them does the proposal that a result state is part of the semantics generate testable predictions. The case of (9) at least purports to confirm a testable prediction, namely that the sentence is acceptable if the entailment that there is a relevant result state is plausible in the context, and unacceptable otherwise.

In contrast to (9), example (3) (repeated as (10)) can be used felicitously even in a context in which it fails to imply any significant result state.

- (10) The Earth has been hit by giant asteroids before (and it probably will be again).

The point of (10) does not seem to be that those past impacts had any lingering effects, such as the presence of craters or the extinction of certain species. Nor is the prospect of future impacts a result of the previous ones; the trajectories of whatever asteroids will hit us in the future are independent of those that hit in the past. One might propose that the result state is the speaker's belief that the earth was hit in the past, but this doesn't seem right either. One would never say: "The ancient impacts of giant asteroids on the earth caused her to believe that asteroids hit the earth in the past". What caused the speaker's belief was most likely reading a textbook, watching a report on television, or something similar, not the impacts. The real point of (10) is that it provides evidence for something, not that it indicates any results.

### 1.2.3. *Variability of Lifetime Effects*

Chomsky (1970) pointed out the following contrast:

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

Example (11a) is odd because it suggests that Einstein is still alive. As pointed out by Inoue (1979), however, this effect is dependent on context, as witnessed by (12) (based on Inoue's (65): 576):

- (12) A: Which Nobel Laureates have visited Princeton?  
 B: Let's see, Einstein has (visited Princeton), Friedman has, . . .

We will examine Inoue's explanation for this in more detail in Section 2.

### 1.2.4. *The Gutenberg Example*

A crucial, but often overlooked, piece of data was presented by McCoard (1978, based on Dietrich 1955):

- (13) ??Gutenberg has discovered the art of printing.

This example describes an event which took place entirely in the past and which has significant current results. Thus, the fact that it is unacceptable

makes two important points: that there is more to the perfect than simple temporal anteriority, and that a past event's having a significant current result is not enough to license a present perfect. As we will see, a number of contemporary analyses of the perfect cannot deal with this example, wrongly predicting it to be acceptable.

#### 1.2.5. *Incompatibility with Past Time Adverbials*

Perhaps the most famous property of the English present perfect is its incompatibility with past time adverbials:

(14) \*John has arrived yesterday.

(15) John has arrived today.

Klein (1992, 1994) argues that the incompatibility is limited to definite past time adverbials, citing examples like the following:

(16) I know St. Thomas has Saturday evening mass. I have attended mass there on (a) Saturday.

Here, *on (a) Saturday* is taken to be acceptable because it is indefinite. However, it seems to me rather odd to describe *on (a) Saturday* as a past time adverbial in the first place. In and of itself, it can describe past, present, or future intervals, and the pastness evidenced in (16) comes from the perfect, not from the semantics of the adverbial itself. Note also that (16) becomes bad if the adverbial is *on a Saturday last month*. For this reason, it is preferable to stick with a description of the relevant phenomenon as precluding any use of past time adverbial with the English present perfect, understanding "past time adverbial" to refer only to adverbials which themselves entail pastness, not any adverbial which may be used to describe a past event.

I would note at this point that the contrast in (14)–(15) is absent in many languages. Though I do not attempt to explain the cross-linguistic patterns in this paper, I will return to the matter briefly in Section 3.2.5.

#### 1.2.6. *Asymmetries between the Present Perfect and Other Perfect Forms*

The contrast in (14)–(15) is restricted to the present perfect. As pointed out by McCawley (1971), it has no analogue in tenseless or past perfect forms:

(17) Having arrived yesterday, Mary can answer our questions.

(18) Mary had arrived the day before.

This point suggests that the incompatibility between present perfect and past adverbials is tied to the present tense or the interaction between the present tense and the perfect.

### 1.2.7. *Relevance Effects with Adverbials*

Spejewski (1997) points out contrasts like that in (19):

- (19) Has Kay paid her bills this month/??this week/??today?

Given normal assumptions about one-month billing cycles, *this week* and *today* are odd because the result state identified by general knowledge (that she is up-to-date with her bills) is dependent upon her having paid her bills within the past month, not upon the more specific information that she paid in the last week or day. That is, her having paid her bills in the past week is not relevant to predicting the current result the speaker has in mind, that she is up to date with her bills.

### 1.3. *Outline of the Paper*

The paper is organized as follows. In Section 2 I sketch three previous theories of the perfect, indicating the strengths and weaknesses of each in relation to the central phenomena outlined above. Section 3 presents the analysis, beginning with theoretical background in Section 3.1, continuing with a focus on the perfect's temporal semantics in Section 3.2, and then turning to its modal presupposition in Section 3.3. Section 4 then shows how the analysis is able to explain the crucial phenomena which have proven to be problematical for previous accounts.

Before moving on, I would also like to remind readers of the difference between the perfect, what will be analyzed here, and perfective aspect. The latter has to do with notions like the completion/non-completion of events, or whether they are viewed as an unanalyzed whole (e.g., Comrie 1976, Smith 1992, Kamp and Reyle 1993, Singh 1998). While the English perfect is perfective, it shares this characteristic with the simple past, and I will not be concerned with perfectivity here.

## 2. SOME PREVIOUS ANALYSES OF THE PERFECT

The main goal of this section is to evaluate existing approaches to the perfect in light of the phenomena listed in Section 1.2. Perhaps the best existing survey is McCoard (1978). Of the approaches which he discusses and critiques, two still have contemporary supporters. Thus, I will divide this section into three parts. Sections 2.1 and 2.2 discuss these two approaches, which I will call the Indefinite Past theory and the Result State

theory. Then Section 2.3 discusses McCoard's Extended Now theory and its descendants. Section 2.4 summarizes the survey.

### 2.1. *The Indefinite Past Theory*

A number of scholars have proposed theories of the present perfect which are equivalent, or nearly so, to the statement that the clause under the scope of the perfect is true at some past time, though they may admit additional pragmatic factors as also relevant. Reichenbach's (1947) analysis is the earliest formal theory with this character; he proposes that a perfect requires that the *event time* precede the *reference time*, which in the case of a present perfect must be the time of utterance. Similar ideas are presented by Montague (1973), Inoue (1979), Klein (1992, 1994), Giorgi and Pianesi (1998), and others, and though some analyses are given in terms of event structures rather than in purely temporal terms, the truth-conditional consequences appear to be the same. Stump (1985) has a slightly different view: he takes the present perfect to describe an event which is non-future, but which may be either past or present. Nevertheless, his approach is subject to some of the same difficulties as the others'.

Except for Stump's formulation, the indefinite past theory has difficulty with continuative perfects like (4), repeated below:

- (20) Mary has lived in London for five years.

Here it seems that the utterance time does not follow the time when Mary lives in London. Klein attempts to explain (20) by saying that the adverbial *for five years* must be taken to have scope under the perfect, so that the event being described is not Mary's full life in London, but rather a Mary-lives-in-London-for-five-years event. This event, it is claimed, is fully past, since (20) can only be true if she is already into her sixth year in London. However, this explanation does not seem applicable to the continuative reading of (21), as pointed out by Kuhn and Portner (1997):

- (21) Mary has lived in London since 1966.

Here, it seems that the Mary-lives-in-London-since-1966 event is still ongoing, and so the utterance time cannot follow it.

Another significant problem for the indefinite past theory is the fact that the perfect interacts differently with eventive and stative clauses. Specifically, eventive clauses disallow continuative readings, while stative ones typically allow them. This contrast argues that it will not do to say simply that the temporal meaning of the perfect is either "past" (like Klein) or "non-future" (like Stump). The theory must provide an

avenue for aspectual class to become relevant to the temporal relationship expressed.

The indefinite past theory also has difficulties with the fact that in English the perfect may not cooccur with a past time adverbial. The fact is illustrated again in (22):

- (22)a. \*Mary has arrived yesterday.  
 b. Mary arrived yesterday.

The reason for this cannot simply be that, in Reichenbachian terms, the adverbial must modify the reference time; adverbials can also modify event time, as illustrated by the examples in (23):

- (23)a. On Tuesday I learned that Mary had arrived two days before.  
 b. Mary has arrived only recently.

In (23a), *two days before* clearly modifies the event time, since *on Tuesday* modifies the reference time. In (23b), one cannot be asserting the reference time is recent, since this implies it is past; rather, (23b) says that the event time is recent.

Given that adverbials can modify the event time, both Klein and Stump provide alternative, implicature-based explanations for the pattern in (22). Stump's account is based on the idea that the perfect is a more marked construction than the simple past, and so the use of the present perfect implicates that it would have been inappropriate to use the past. However, noting that (22a) and (22b) are equivalent on his analysis (due to the contribution of *yesterday*, which is more specific than either the perfect or past), this implicature could never be true in the case of (22a). Thus the sentence is anomalous. Klein's explanation is similar. His idea is that, given that the adverbial in (22a) explicitly locates Mary's arrival during last week, it entails that the utterance time falls into its "posttime". Thus, the use of the perfect is ruled out, since the job it does (of locating the utterance time into the event's posttime) has already been accomplished by the adverbial. Klein expresses this reasoning as a constraint, the P-Definiteness Constraint; as stated in his Reichenbachian framework, the requirement is that the event time and reference time cannot both receive a definite temporal specification. In the case of a present perfect, the reference time is equated with the speech time, so the event time may not be definitely specified as well. The adverbial in (22a) specifies the event time, violating the constraint. The asymmetries with the tenseless and past perfect sentences illustrated in (17)–(18) would then follow if tenseless and past tense sentences are temporally indefinite (a difficult proposal to

make, given the pronoun-like nature of the past tense (Partee 1984)). One difficulty for Klein's account is that it is unclear in just what sense past time adverbials are "definite"; it would appear that the past event is given a more "definite" location in *John has arrived within the last hour* or *John has just now arrived* than in *\*John has arrived in the 1980s*. Moreover, as discussed in Section 1, it appears that the relevant constraint is against past time adverbials in general; definiteness doesn't really seem to have a role to play.

Another point is that the indefinite past theories have great difficulties with the Gutenberg example, repeated here as (24):

(24) ??Gutenberg has discovered the art of printing.

There is no reason why an indefinite past interpretation of the present perfect should not be fine here. Gutenberg's discovery of printing did occur before the present time. Since the sentence does not have an offending past adverbial like (22a), the theory doesn't give us a reason why it should be counted as pragmatically anomalous.

Finally, I cannot see that the indefinite past theory in this form has anything to say about the relevance effects illustrated by (25):

(25) Has Kay paid her bills this month/??this week/??today?

In light of these difficulties, a supporter of the indefinite past theory might argue that the core indefinite past semantics should be maintained, but augmented with some additional pragmatic constraint. Inoue (1979) does just this, combining an indefinite past semantics with a pragmatic analysis based on the idea of "current relevance". She proposes that the present perfect indicates a relation of "mutual entailment" between the proposition expressed by the perfect sentence and the "discourse topic", a contextually given proposition (p. 574ff.). For example, recall (12), repeated as (26).

(26) A: Which Nobel Laureates have visited Princeton?

B: Let's see, Einstein has (visited Princeton), Friedman has, . . .

Inoue paraphrases the topic for B's utterance as *Talking about the Nobel Prize winners visiting Princeton*. Moreover, Inoue suggests that, in order for the topic to be *currently* relevant, a situation of that kind be "repeatable" at the speech time.<sup>5</sup> According to this, (26) is acceptable because it is possible for Nobel Prize winners to visit again. I find the core of Inoue's

<sup>5</sup> This differs from the repeatability condition noted by Yeh (1996) for Mandarin *guo*. According to Yeh, *guo* requires that an event of the kind described by the perfect sentence itself be repeatable, a requirement clearly too strong for the English perfect.

intuition to be quite attractive: The proposition expressed by the perfect sentence is “relevant” in that it is in a logical relation to another which is at issue in the conversation. My own proposal below will develop this intuition. In addition, the repeatability condition allows an explanation of the lifetime effects mentioned above. The implicit discourse topic for (11a) (*Einstein has visited Princeton*) would be something like *Talking about Einstein’s visits to American universities*. Since the perfect requires that “situations of this kind” be repeatable, this would imply that Einstein is alive. Since he is not, the sentence is odd. In the context given by (26), however, (11a) is fine because the discourse topic there does not specifically have to do with Einstein. Presumably the passive (11b) is natural out of context because it suggests an implicit topic similar to that in (26) and unlike that of (11a), due to the correlation between subjecthood and topichood in English.

A similar explanation might be suggested for (25). Assuming that the topic here is *Talking about whether Kay is up-to-date with her bills*, it seems that the logical relation between this topic and *Kay paid her bills this month* is different from that it bears to *Kay paid her bills this week*. Specifically, that Kay is up-to-date contextually entails the former, but not the latter. This difference could be attributed to the mutual entailment requirement proposed by Inoue.

Despite these advantages, there are a number of problems with Inoue’s formulation of the current relevance requirement. At the most basic level, it is not clear what proposition she intends to indicate with *Talking about the Nobel Prize winners visiting Princeton*. It does not seem plausible to take the conversation’s topic to be “we are talking about the Nobel Prize winners that have visited Princeton” – the topic has to do with the fact that certain individuals have visited Princeton, not the fact that somebody is talking about them (the latter is more a topic for a linguistics paper). A more plausible candidate is something like “some Nobel Prize winners have visited Princeton”, and *Einstein has (visited Princeton)* does contextually entail this; however, what Inoue proposes is a relation of mutual entailment, and even adding in background assumptions from the common ground, the proposition that some Nobel Prize winners have visited Princeton will certainly not entail that Einstein has visited Princeton. The requirement of mutual entailment itself seems questionable in any case, as this would mean that the topic proposition and the sentence itself are informationally equivalent, given background assumptions. If the two are equivalent, why would the perfect sentence be asserted at all?

Like the other indefinite past theorists, Inoue’s approach also has problems with the continuative/non-continuative contrast, the adverbial facts,

and the Gutenberg example (24). With regard to the latter, there are plenty of plausible discourse topics to which (24) would be relevant that don't specifically relate to Gutenberg, for example *Talking about important discoveries by Germans*. Nevertheless, such a context fails to rescue (24). I therefore conclude, following McCoard (1978), that we need to abandon the simple temporal semantics of the indefinite past theory.

## 2.2. *The Result State Theory*

Another major family of theories takes a sentence in the present perfect to assert the present existence of a state which results from the past event described under the scope of *have*. The problem here is to identify the right result state. Any past event will have many current results and if we take the perfect to simply indicate the existence of *some* result state, it will be truth-conditionally equivalent to an indefinite past (as pointed out by Kuhn and Portner 1997). This would be a bad consequence, given the problems just noted for the Indefinite Past theory. The same point goes for the suggestion, which has been made to me numerous times in conversation, that (2) simply asserts the present existence of a state of "Mary having read *Middlemarch*". Clearly this state, if there is such a state, will hold at any time following the reading event. This approach therefore makes exactly the same predictions with regard to the temporal properties of perfect sentences as the Indefinite Past theory.

For these reasons, some supporters of the Result State analysis have elaborated upon it in various ways, developing the idea that a perfect sentence doesn't just assert the existence of some result, or a very weak one like a state of having read *Middlemarch*, but rather picks out a particular, relevant result. Smith (1992), who very clearly demonstrates the need for this kind of elaboration, identifies the result state with the denotation of the subject having some relevant property, while Moens and Steedman (1988) appeal to "general knowledge", with the idea that the perfect is only acceptable if one can identify a current state which is both relevant and "contingent" upon the past event described under the scope of the perfect.

Spejewski (1997) attributes the contrast in (27) to Moens and Steedman's notion of contingency:

(27) Has Kay paid her bills this month/??this week/??today?

According to Spejewski, *this week* and *today* are odd because the result state identified by general knowledge (that she is up-to-date with her bills) is contingent upon the bills having been paid during the past month, not on their having been paid in a more specific time frame. However, contingency is the wrong tool for explaining this phenomenon. Contingency,

as utilized by Moens and Steedman, is a relation between eventualities (e.g., events and states). Note that if she paid her bills only once in the past month, and it was this morning, the same event of bill-paying would be described by the tenseless phrase *Kay pay her bills this month/this week/today*, whichever adverbial is chosen. If the current state of being up-to-date on her bills is contingent on this event, contingency will hold no matter which adverbial was used as part of its description. I conclude from this that a relation between eventualities is not the right tool for explaining (27); rather, some relation between propositions, as on Inoue's account, is. In effect, what differentiates the adverbials in (27) is the fact that *Kay didn't pay her bills within the past month* would allow the inference that she's not up-to-date, while *Kay didn't pay her bills within the past week* would not.

Another problem for Moens and Steedman's view comes from the Gutenberg example (24). As pointed out by McCoard, the fact that it is not acceptable seems devastating for a relevance-based result state theory. It is obvious that the past event of Gutenberg discovering printing has easily identifiable results which are quite relevant to our lives today. Even highlighting those results ("Isn't printing great!") doesn't help the sentence's acceptability.

Smith is in a better position with this example. Since she identifies the result state with the subject's referent having some property, she can appeal to the fact that Gutenberg is dead, and so lacking in relevant properties, to explain the unacceptability. In this way, Smith's analysis straightforwardly handles the lifetime effect in (11). As a consequence of its success with (11), though, Smith's theory has problems dealing with the contexts in which the lifetime effect doesn't hold, such as (12). One way of looking at this would involve modifying her view to identify the relevant result with some property of the topic of the sentence, rather than its subject (cf. McCawley 1971).<sup>6</sup> If we take the topic in (12) to be *Princeton*, it does seem that the point of the sentence is to indicate some property which Princeton has. Unfortunately, modifying Smith's theory in this way removes the explanation of why the Gutenberg example (24) is bad, given that even explicitly marking another entity as topic (*Speaking of the printing press . . .*) fails to improve it. In addition, (28) below is problematical for any approach along these lines:

(28) It has already snowed quite a bit.

<sup>6</sup> This possibility was brought to my attention by Manfred Krifka. As mentioned above, Inoue (1979) relates the use of the perfect to the discourse topic, but takes topics to be propositions, not entities. The intuition that topicality is relevant to lifetime effects is shared by these two approaches, but the implementations are quite different.

Sentence (28) contains no referential terms which could function as the topic. This approach would thus have to allow the topic of a sentence (here perhaps an implicit location) not to be overtly represented in the sentence. However, allowing unrealized topics to play a role in the perfect's meaning leaves us with no explanation for why such an implicit topic is unable to save the Gutenberg example.

In a similar way, the Result State Theory appears to have difficulties explaining the continuative/non-continuative contrast. At first glance, the idea that an event must have a significant current result would seem to predict that the eventuality must be completely past. This would rule out continuative readings altogether. If, on the other hand, we were to allow that eventualities which began in the past but which are still on-going can have current results, there's no reason why eventive sentences should always lack continuative readings. What would be needed is a principle to the effect that states which partially precede and overlap a time *t* can have results at *t*, while an event must be completely finished before *t* in order to have results at *t*. I can't see any justification for distinguishing the causal powers of events and states in this way.

When it comes to explaining the incompatibility of present perfect with past time adverbials, the Result State theory is in worse shape than the Indefinite Past theory. The Result State theory implicitly makes reference to two times, the speech time (when the state must hold) and some past time (when the eventuality which caused this current state occurred). As with the Indefinite Past theory, the obvious approach to the incompatibility of the present perfect with past adverbials is to say that adverbials are only permitted to modify the time at which the result holds. But as noted above, this fails in light of data like (23). Nor is it possible to adopt Stump's or Klein's analyses, since they rely on the specifics of their own (Indefinite Past) semantic proposals.

Finally, I turn to the most direct argument against result state analyses. The relevant data are existential perfects like (3), repeated here as (29):

- (29) The Earth has been hit by giant asteroids before (and it probably will be again).

As was discussed at some length in Section 1.2.2, there need not be any current, relevant results of the Earth's being hit by giant asteroids for (29) to be acceptable.<sup>7</sup>

<sup>7</sup> Of course this example may be used to indicate concrete results of the ancient impacts. My point here is simply that it need not. The adverb *before* and parenthetical *it probably will be again* tends to favor the type of context I wish to focus on.

### 2.3. *The Extended Now Theory*

McCoard (1978) argues that the meaning of the perfect places the event described within the “Extended Now”, an interval of time which begins in the past and includes the utterance time (see also Bennett and Partee 1978, Dowty 1979, Vlach 1993, Spejewski 1996, 1997, Anagnostopoulou et al. 1998,<sup>8</sup> Iatridou et al. 2000). The intuitive idea of the Extended Now is that we typically count a longer stretch of time than the momentary “now” as the present for conversational purposes. Its exact duration is contextually determined, since what we count as “the present” in this sense may vary depending on the conversational topic. The Extended Now theory seems to be in a reasonable position to explain the Gutenberg example (13)/(24), since an interval extending back to the time of Gutenberg’s discovery is plausibly not a reasonable Extended Now in any conversation in which it would naturally be uttered.

While I will follow the general idea of the Extended Now theory, it is not sufficient as it stands. First of all, it has difficulty explaining the incompatibility of the present perfect with past time adverbials. The situation here is quite similar to the Result State theory. If the adverbial has scope over the perfect, so that the adverbial modifies the Extended Now (in effect the “speech time”), the example is correctly predicted to be unacceptable. However, if the adverbial modifies the “event time” (the scope relation is reversed) there should be no problem. We know that it must be possible for adverbials to modify event time from examples like (23).<sup>9</sup>

In general, the variability of result state implications are not problematical for the Extended Now theory, since it denies the relevance of result states altogether. Nevertheless, some of the data which we considered in terms of result state implications are problematical. Recall (9), repeated here as (30):

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<sup>8</sup> Anagnostopoulou et al. talk about the “perfect interval”, but this seems to be another name for the Extended Now. They focus on deriving continuative vs. existential readings from the underlying Aktionsart and the nature of the adverbials present.

Spejewski’s paper, confirmed by personal communication, suggests that she might support incorporating some type of “result state” idea into the Extended Now approach. However, her analysis does not do this as it stands, so I will discuss it along with the other Extended Now analyses.

<sup>9</sup> The theory of Spejewski (1998) postulates two reference times for present perfects: one containing *now* and the event, and the other containing just the event. This latter reference time is required to abut *now*. Spejewski is able to predict that a past time adverbial cannot modify either of these, but this still leaves open the question of why an adverbial cannot modify the time of the event. Note that allowing the sentence-final adverbial to modify the second reference time will not provide an adequate semantics for (23), and this is why she adopts the proposal that the past perfect is ambiguous.

- (30) (i) Mary has lived in London for five years.  
 (ii) (??)She has become ill.

Since (30)(i) is acceptable, the contextually provided Extended Now must be able to be at least five years long. So (ii) should be fine (and true), but it is unacceptable. The only way out of this difficulty, as far as I can tell, would be to claim that the Extended Now for (i) is not maintained for (ii), but then the question is how and why it changes. At first glance, (i) would appear to add confidence to the idea that the Extended Now is five years long, and not suggest that it should be shortened.

The Extended Now theory has little to say about the other phenomena we have been concerned with. It doesn't address the connection between aspectual class and continuative readings. Nor does it explain the variable lifetime effects or the relevance effects that show up with adverbials, although it might adopt Inoue's explanation in terms of a current relevance requirement. And finally, it fails to explain the asymmetries with tenseless and past perfects; the best it can do is postulate an ambiguity, offering past perfects an extra interpretation not available with the present perfect (e.g., Spejewski 1997).

#### 2.4. *Summary*

Table 1 summarizes how each of the theories discussed fares with respect to the phenomena outlined in Section 1.2. An indication of "maybe" means that, in my judgment, an explanation by theory in question is possible but problematical for reasons given above.

### 3. A TEMPORAL-MODAL ANALYSIS OF THE ENGLISH PERFECT

This section presents a theory of the present perfect which can explain the facts outlined in Section 1. Before turning to details, I would like to elaborate a bit on how I will approach the full range of data. Among the phenomena discussed in Section 1, most will be explained in terms of temporal properties of sentences in the perfect. The most novel feature of this aspect of the analysis is that the relevant temporal properties will be shown not to be based in the meaning of the perfect itself, but rather to follow from other components of the sentence. Specifically, the continuative/non-continuative contrast falls under a general principle pertaining to aspectual class which is also implicated in sequence of tense phenomena and temporal interpretation in discourse. The Gutenberg example will be explained in a way parallel to the Extended Now theory, but will be linked to a unique

TABLE I

|   | Indefinite past theory                   | Result state theory                                | Extended now theory   |
|---|--|--|---|
| Continuative/non-continuative contrast    | NO                                       | MAYBE  | NO  |
| Variability of result state               | YES (result state is irrelevant)         | NO   | YES (result state is irrelevant, but problems remain with (9)/(30)) |
| Variability of lifetime effects           | MAYBE (Inoue's version of the theory)    | MAYBE (if we accept Smith's approach)              | NO (but we might adopt Inoue's explanation)                         |
| Gutenberg example                         | NO                                       | MAYBE (if we accept Smith's approach) <sup>a</sup> | YES   |
| Incompatibility with past time adverbials | MAYBE (if we accept Klein's explanation) | NO   | NO  |
| Asymmetries with tenseless/past perfects  | MAYBE (if we accept Klein's explanation) | NO   | NO  |
| Current relevance                         | MAYBE (Inoue's version of the theory)    | NO (but we might adopt Inoue's explanation)        | NO (but we might adopt Inoue's explanation)                         |

<sup>a</sup> But Smith cannot simultaneously explain the Gutenberg example and the variability of lifetime effects.

TABLE II

|  | Temporal semantics<br>(not specific to perfect) | Modal presupposition<br>of perfect |
|--|---|------------------------------------|
| Continuative/non-<br>continuative contrast   | ✓   |                                    |
| Variability of result state                  |   | ✓                                  |
| Variability of lifetime effects              | ✓   | ✓                                  |
| Gutenberg example                            | ✓   |                                    |
| Incompatibility with<br>past time adverbials | ✓   |                                    |
| Asymmetries with<br>tenseless/past perfects  | ✓   |                                    |
| Relevance effects                            |   | ✓                                  |

proposal concerning the semantics of the present tense. The interactions with adverbials (in both the present and past tenses) are attributed to details of the semantics of the adverbials in combination with ideas about the present tense.

The variable importance of result states to the meaning of the perfect and the relevance effects will follow from the secondary aspect of the meaning of the perfect, a current relevance presupposition best framed in terms of modal semantics. The lifetime effects will be explained in terms of both semantic and pragmatic factors. To summarize, see Table 2.

### 3.1. *Background Assumptions*

#### 3.1.1. *Temporal Semantics*

With regard to the temporal semantics of the perfect, I make two main background assumptions: a neo-Davidsonian event semantics and Reichenbachian semantics for tense. Concerning the former, it is possible to do everything needed here with very conservative assumptions about what eventualities are like: The set of eventualities is divided into events and states. As mentioned above, I include the eventualities described by progressive sentences among the states, and exclude stage-level predicates, including non-dynamic ones; if one doesn't like this use of the term state, the class consisting of progressives and individual-level states may be given some other name (cf. Smith 1999, for example). Eventualities have a part/whole structure paralleling that of ordinary objects (cf. Bach

1986). In order to avoid unnecessary debates, and to make things simpler, I will assume that eventualities are concrete objects with common-sense identity criteria. If John walks across the street to the store quickly, there is one overall event, not a multiplicity as some theories of events would have it (e.g., John's crossing the street, John's walking to the store, John's walking quickly, and perhaps more), though this event of course has spatio-temporally defined subevents. A more elaborated theory of situations or events would not be incompatible with what I say below, but would not add anything to it either.

The primary purpose for assuming an event-based semantics is that it makes it easy to incorporate the relevance of aspectual class to the continuative/non-continuative contrast. If the analysis were given in terms of an event-free framework, it would be necessary to adopt specific definitions of the aspectual classes in terms of the temporal properties of sentences. Moreover, the event-based semantics allows one to work within a close analogue of Reichenbach's semantic framework, simply exchanging "speech event" for "speech time", and so forth. Since Reichenbach's analysis is so well-known, this will allow the essential ideas of the present theory to come through most clearly.

For the sake of completeness, I would like to draw out a few basic ideas made by the Reichenbachian approach to tense semantics. Tense relates the speech time to a reference time. The reference time may be either provided by extralinguistic context or fixed through some overt, compositional means. In addition, I take from the Reichenbachian tradition the idea that the perfect is labeled an "aspectual" construction because it concerns the relationship between the sentence's reference time and its event time. Note that the term "event time" is actually a bit inaccurate, because it will be applied to stative sentences as well, but I will stick with the familiar terminology.

Reichenbach's model has one feature which is often glossed over, but which for my purposes it is important to bring out. In his theory, not only do linguistic forms like the perfect have meaning; their absence can also have meaning. Thus, consider Reichenbach's interpretation of several forms:

|                             |                           |
|-----------------------------|---------------------------|
| Present: $e, r, s$          | Past: $e, r < s$          |
| Present Perfect: $e < r, s$ | Past Perfect: $e < r < s$ |

Obviously the perfect indicates  $e < r$ , and the past indicates  $r < s$ . But it should also be noted that the absence of the perfect indicates  $e, r$ , and the absence of the past indicates  $r, s$ . While the absence of the past is,

of course, typically called “the present”, morphological evidence may be taken as suggesting that the present is mere lack of past; as we’ll see below, Giorgi and Pianesi take such a view with regard to Italian. When we turn to the aspectual part of the paradigm, matters are more striking. There is no generally accepted positive category which is seen as occurring in all non-perfect sentences, but clearly we do not want to say that the non-perfect forms are unspecified for the *e/r* relation. The non-perfects in the paradigm consistently imply coincidence between event and reference time (i.e., *e, r*) as part of their meaning. We can represent this idea compositionally within Reichenbach’s framework by proposing a null [-perf] morpheme whose semantics is to assert that *e* and *r* coincide.

### 3.1.2. Modality

For the purposes of this paper, I need only make use of a fairly simple theory of modality. I adopt the analysis of modals as dependent on a contextually-supplied parameter of interpretation, the *conversational background* (also known as the *modal base*) discussed by Kratzer (1977, 1981, 1991). We will see how this works momentarily. The ideas that will be presented in this paper could be formalized within a variety of other contemporary frameworks for the analysis of modality as well. In fact what I will present is a simplification of Kratzer’s views, in that she also makes use of a second parameter of interpretation, the *ordering source*. A fairly simple analysis is adequate for understanding the semantics of the perfect, so for clarity I will stick with the analysis in terms of conversational backgrounds alone. In general, an approach to modality will be useful for dealing with the issues discussed here to the extent that it makes explicit the ways in which information present in the conversation contributes to the semantics of epistemic modals.

A conversational background is a function which provides, for each index, a set of propositions. This set of propositions determines the set of accessible worlds relevant for the interpretation of modals. For example, taking indices to be world-utterance situation pairs, a deontic modal like that in (31) utilizes a conversational background that maps each world-situation pair  $\langle w, u \rangle$  onto the set of propositions ideally true according to the law in *w* and *u*:

- (31) Twelve-year-olds must not buy beer.

This set might look something like the following:

- (32)  $L_{\langle w, u \rangle} = \{ \dots, \text{Children under the age of nineteen do not buy beer}, \dots, \text{there is no murder}, \dots \}$

(I will refer to the set returned at a particular index, e.g., (32), as a “conversational background” as well.) Sentence (31) is true at  $\langle w, u \rangle$  because in every world in  $\cap L_{\langle w, u \rangle}$  twelve-year-olds do not buy beer. With an epistemic modal like that in (33), we use a different conversational background, one representing the set of propositions mutually accepted by the speaker and his or her hearer(s) at  $\langle w, u \rangle$ :

(33) It must be raining.

Let us call the relevant set of propositions  $CG_{\langle w, u \rangle}$  (for “Common Ground”). The sentence (33) is true iff in every world in  $\cap CG_{\langle w, u \rangle}$ , it is raining. Conversational backgrounds may be categorized but not listed: while there appears to be no limit to the variety of conversational backgrounds that may be utilized in particular discourse situations, they fall into various broad classes which go by the well-known names “deontic”, “epistemic”, and so forth.

The function of an *if* clause within this framework is to add a proposition to the conversational background. Consider (34):

(34) If Joey is twelve years old, he must not buy beer.

According to Kratzer, here we consider the conversational background  $L_{\langle w, u \rangle} \cup \{\text{Joey is twelve years old}\}$ . Sentence (34) is true because this set entails that Joey does not buy beer.<sup>10</sup> There are a couple of ways to formally implement this function of *if*. One might take its contribution to be pragmatic, so that the modality indicated by *must* here is sensitive to the presence of the *if* clause only indirectly, though its effect on the pragmatically supplied background. Alternatively, one might take the modal to be a two-place operator, so that (34) has a logical structure like (35):

(35) MUST(Joey is twelve years old, Joey does not buy beer)

Context continues to supply  $L_{\langle w, u \rangle}$  as the conversational background. *Must* then quantifies over worlds in  $\cap(L_{\langle w, u \rangle} \cup \{\text{Joey is twelve years old}\})$ , saying that (34) is true iff in every world in this set, Joey does not buy beer. If *must* is taken to be a two-place operator in this way, examples like (31) and (33) may be taken as cases with the trivial proposition  $W$ , the set of all possible worlds, as a default first argument. They thus quantify over the worlds in the intersection of the conversational background, with no additional restriction.

<sup>10</sup> Things become more difficult when the *if* clause proposition is incompatible with the conversational background. See the literature cited for details on the solutions one might pursue.

### 3.2. *The Temporal Interpretation of the Present Perfect*

#### 3.2.1. *Aspectual Class and the Temporal Value of the Perfect*

In this section I concentrate on showing that the “pastness” indicated by the perfect is not encoded in the perfect’s meaning, but rather follows from independent principles. The approach I propose is motivated by the contrast in (36):

- (36)a. Mary has read *Middlemarch*.  
 b. Mary has been upset (lately).

In (36a), the event of Mary reading *Middlemarch* precedes the speech time. In (36b) the state of Mary being upset may either precede or overlap the speech time, the latter case being what we have labeled the “continuative perfect”. As was shown in Section 1.2.1, the required “pastness” of the perfect exemplified in (36a) correlates with the nonstative nature of the phrase under the scope of the perfect, while the availability of the continuative reading illustrated by (36b) correlates with a stative phrase. Abstracting away from irrelevant features the temporal relations at issue may be summarized with some Reichenbachian terminology as follows:

- (37)a. Mary has read *Middlemarch*.  
 Reference time  $r$  = speech time (contribution of present tense)  
 Event time  $e < r$ .  
 b. Mary has been upset.  
 Reference time  $r$  = speech time (contribution of present tense)  
 Event time  $eOr$  or  $e < r$

(Here, “ $eOr$ ” indicates that  $e$  and  $r$  overlap.) The goal of this section is to argue that the difference between (37a) and (37b) follows directly from the difference in aspectual class, and so does not need to be part of the perfect’s meaning.

In what follows I will show that this correlation between aspectual class and temporal relation holds in two separate contexts other than the perfect. The phenomenon seen in (36) is the same as one observed with ordinary sentence embedding verbs in the context of sequence of tense phenomena and with the discourse semantics of tense. To begin with the former case, consider the fact that a simultaneous reading of the embedded past in (38) is possible, but not in (39):

- (38) John said that Mary was upset. (stative complement)

- (39) John said that Mary read *Middlemarch*. (eventive complement)

In these sentences, the time of John's saying represents the reference time for the embedded clauses. Observe that when the embedded clause is stative, that state may overlap the reference time (a "simultaneous reading") or precede it (a "shifted reading"), but when it is nonstative, the event must precede it.

According to contemporary theories of sequence of tense (Abusch 1988, 1997 and Ogihara 1989, 1995), this contrast is due to whether the embedded past tense contributes to the semantics of its clause. For example, Abusch (1997) proposes that an embedded past tense may be interpreted as providing information about the temporal location of either the local or embedding verb's event time. In (38), for example, the past of *was* may indicate either that the upset is past (relative to the saying) or that the saying is past (relative to the speech time); in the latter case, the state of being upset is interpreted as simultaneous with the saying. Ogihara (1989) gets a similar effect through a tense-deletion operation; he proposes that a past tense may be deleted when it is in the scope of another. Thus the simultaneous reading of (38) occurs when the embedded past is deleted, while non-simultaneous readings of (38) and (39) occur when it is not. However, neither variety of sequence of tense theory explains why (39) is unambiguous, and only gets a non-simultaneous reading. Abusch's approach does not explain why, in this case, the embedded past tense cannot be interpreted as constraining the temporal location of the non-local saying event. Or, in terms of Ogihara's formulation, there is no reason why its embedded tense should not be deleted, giving rise to a simultaneous interpretation. This issue has not, to my knowledge, been addressed within sequence of tense theory.<sup>11</sup>

The pattern in (38)–(39) is similar to that observed with the perfect, in that an eventive clause is interpreted as past with respect to the reference time, while a stative one is interpreted as either past or overlapping. Based on this, I would like to propose that the existence of an overlap (simultaneous) or a non-overlap (shifted) reading is not due to the presence or absence of a semantically active tense morpheme, but rather that it follows from independent factors. Let us maintain the general assumptions of

<sup>11</sup> The difference cannot be explained by simply claiming that a simultaneous reading is implausible with eventive complements. With *Mary realized that John built a boat*, the duration of the embedded clause's reference time (Mary's realization) is quite short in relation to the duration of its event time (John's building the boat). Thus, it would certainly be possible for the two to be in the same kind of relation as *Mary realized that John was sick*. However, the simultaneous reading is only possible in the latter case.

Ogihara's theory, but propose that whenever a past tense morpheme is embedded under another, it deletes.<sup>12</sup> If this is correct, the apparent "pastness" (with respect to the time of John's saying) in the embedded clause in (39) cannot be due to the past tense morpheme. In other words, the embedded clauses in both (38) and (39) are taken to be semantically tenseless, just as a phrase embedded under the perfect operator is. Instead, the precedence relation in (39) and the overlap relation in (38) must follow from some more general principles for establishing temporal relations among eventualities. We can state this temporal sequencing principle explicitly. Let

<sup>12</sup> The system of von Stechow (1995) seems to assume that embedded tenses always delete. Specifically, he says that the tense of a subjunctive clause always deletes, and suggests that all embedded clauses are subjunctive. However, he makes assumptions about the interpretation of tense similar to Ogihara's. It is not clear to me, then, how shifted readings are supposed to arise. If they arise due to the lack of deletion, he would have to say that the subjunctive is typically optional in English. At that point it is unclear what advantage accrues to appealing to the subjunctive, as opposed to simply saying that deletion is optional.

While its usefulness for dealing with the English facts can be called into question, there is evidence that subjunctives do correlate with simultaneous readings. Consider the following from Italian:

- (i) Gianni sapeva che era incinta (nel 1995).  
Gianni knew that was-indic. pregnant in-the 1995.  
"Gianni knew that she was pregnant (in 1995)".
- (ii) Gianni pensava che fosse incinta (\*nel 1995).  
Gianni thought that was-subj. pregnant in-the 1995.  
"Gianni thought that she was pregnant".

Example (ii), with a subjunctive complement, has only a simultaneous reading, in contrast to the indicative in (i), which has both the simultaneous and shifted readings (the latter clearest with the past adverbial "in 1995"). This supports von Stechow's idea, at least for Italian. However, further consideration shows that it is not the subjunctive in (ii) which forces the simultaneous reading. If we trigger a subjunctive with the adjective *contento*, a shifted reading is still possible:

- (iii) Gianni era contento che il tempo fosse bello nel 1995.  
Gianni was happy that the weather was-subj. pretty in-the 1995.  
"Gianni was happy that the weather was pretty in 1995".

Similarly, triggering a subjunctive by negating the matrix clause in (i) continues to allow a shifted reading. Thus, the contrast between simultaneous and shifted reading cannot be attributed to mood choice. It is likely, however, that the two phenomena are sensitive to some of the same factors, and that this explains their partial correlation.

Thanks to Raffaella Zanuttini for the above data. One reviewer disagrees with the judgment in (ii), a point which casts even more doubt of von Stechow's theory.

$\|\phi\|^{r,e}$  indicate that  $\phi$  is interpreted with respect to reference time  $r$  and eventuality  $e$ . Then we have the following Temporal Sequencing Principle:

- (TSP) For any tenseless clause  $\phi$ , reference time  $r$ , and event  $e$ ,
- (i) if  $\phi$  is not stative:  $\|\phi\|^{r,e}$  implies that  $e$  precedes  $r$ ; and
  - (ii) if  $\phi$  is stative:  $\|\phi\|^{r,e}$  implies that  $e$  either precedes or overlaps  $r$ .

The (TSP) encodes the same temporal relations as we observed with the present perfect in (37).

Let us consider (39) by way of example. Let  $e_s$  represent the event of speaking and  $r_s$  the reference time of the main, past tense clause. A Reichenbachian past tense semantics would establish the relations  $e_s = r_s$  and  $r_s < s$ . Assuming that  $r_s$  is linked to the reference time  $r_r$  of the embedded clause, and that the (TSP) operates to require that  $e_r < r_r$ , we end up with the following time-line:

$$(40) \quad e_r < r_r = r_s = e_s < s$$

### 3.2.2. *A Connection to Temporal Sequencing in Discourse?*

The (TSP) encodes a relationship between aspectual class and temporal sequencing that is very similar to what we find within discourse semantics. In the DRT framework (e.g., Hinrichs 1982, Partee 1984, Kamp and Reyle 1993), it is proposed that different aspectual classes of sentences have different properties with respect to how they establish the reference time for subsequent discourse. In this section, I will make some remarks about this similarity, suggesting that it is possible to unify the (TSP) with a principle operating at the discourse level. However, because of the number and complexity of factors affecting the temporal interpretation of discourses, I will not go beyond the claim that the ideas presented here provide one part of a multi-faceted explanation. My goal here is to lend some additional support to the (TSP) by showing that the principles which underlie it are operative in a wider domain.

Within very simple discourses of the type in (41a–c), the reference time for an event sentence is located “just after” (Partee 1984) the event, while for a state sentence it may be included within the state. So, for example:

- (41)a. (i) Mary walked in. (ii) She sat down.  
 b. (i) Mary was tired. (ii) She sat down.  
 c. (i) Mary was angry. (ii) Suddenly, she smiled.

When the event sentence (41a-(i)) is uttered, it establishes a new reference time  $r$  which just follows the time of her walking in. When the subsequent sentence (ii) is interpreted, it is interpreted as describing an event occurring at  $r$ , and thus one which follows Mary's entrance. In contrast, when the state sentence (41b-(i)) is uttered, the reference time is established within the time of her tiredness; for this reason, (ii) describes an event which takes place during her tiredness. Example (41c) is another case where the first sentence describes a state, but in this instance the reference time it introduces may follow the state, so that (ii) describes an event which follows the time when she was angry.

In an important way, this DRT use of the concept of reference time differs from that seen in Reichenbach's work. Instead of merely having a particular reference time, a sentence may be seen as expressing a relation between two reference times: the INPUT REFERENCE TIME provided by prior context, and the OUTPUT REFERENCE TIME provided to subsequent discourse. For example, in the simple sequence (41a), (i) takes some time provided by context as its input reference time,  $r_{(i)}$ -in; Mary's walking in,  $e_{(i)}$ , is located at this time. Then (i)'s output reference time,  $r_{(i)}$ -out, must follow  $r_{(i)}$ -in and then serves as the input reference time  $r_{(ii)}$ -in for (ii). Sentence (ii) in turn produces its own  $r_{(ii)}$ -out, subsequent to  $r_{(ii)}$ -in. What is normally called, within the DRT literature, the sentence's "reference time" is what I call its "input reference time", while the reference time made available for the subsequent sentence is my "output reference time". The parallelism between temporal sequencing in discourse and the semantics of the perfect will be more apparent if we remain explicit about the fact that sentences in discourse indicate relations between reference times. (Conversely, if this point is not kept in mind, some of what I say below will seem to be completely backwards.)

At an informal level, the temporal relationships seen in (41a-c) are the same as those described by the (TSP): eventive sentences require temporal sequencing, as seen in (41a), while stative sentences are compatible with either temporal sequencing or overlap, as in (41b-c). Things are a bit more complex than in the previous cases, however, for two reasons. First, there is the need to distinguish the input and output reference times for each sentence. A Discourse Temporal Sequencing Principle therefore needs to be slightly different from the (TSP) outlined above:

(DTSP) For any main clause  $\phi$ , reference times  $r$ -in and  $r$ -out, and event  $e$ ,

(i) if  $\phi$  is not stative:  $\|\phi\|^{r\text{-in}, r\text{-out}, e}$  implies that

- (a)  $e = r\text{-in}$ ,
  - (b)  $e$  precedes  $r\text{-out}$ ,
  - (c)  $r\text{-in}$  precedes  $r\text{-out}$ .
- (ii) if  $\phi$  is stative:  $\|\phi\|^{r\text{-in}, r\text{-out}, e}$  implies that
- (a)  $e = r\text{-in}$ ,
  - (b)  $e$  overlaps or precedes  $r\text{-out}$ ,
  - (c)  $r\text{-in}$  overlaps or precedes  $r\text{-out}$ .

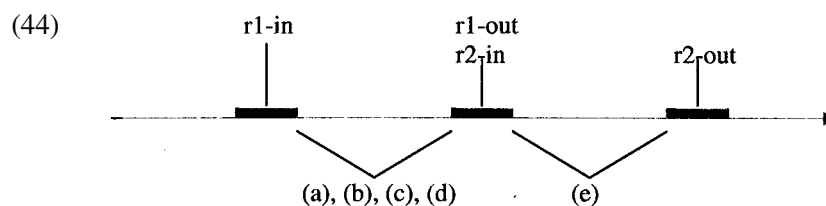
(The (a) clauses are shorthand for “the temporal extent of  $e = r\text{-in}$ ”.) Given the (DTSP) (41a-(i)) would have its  $r\text{-in}$  fixed contextually (most likely it is an arbitrary time within some larger interval which may be contextually determined). This is the time at which Mary walked in. Following the (DTSP)’s clause (i),  $r\text{-out}$  must follow Mary’s walking in, and it serves as the  $r\text{-in}$  for (41a-(ii)). As Mary’s sitting down will then coincide with this time, and it is thus ensured to follow her walking in.

The second way in which temporal sequencing in discourse differs from what we have observed with the perfect and sequence of tense is that the discourse principle appears not to be true of all examples. Problematic cases like the following have been brought up by Dowty (1996), among others:

- (42) (a) The children built a boat. (b) John sewed the sails. (c) Mary cut the wood. (d) Bill assembled the hull. (e) They first sailed the boat in April.
- (43) (a) John walked into the forest. (b) The birds sang. (c) The frogs croaked. (d) The river flowed peacefully by. (e) John sat beside a tree.

In (42), all of the eventualities described by (b)–(d) may have occurred simultaneously with each other and with (a), though all precede (e). In (43), (b)–(d) may be simultaneous with each other, (a), and (e), while (a) must precede (e). Despite these apparent problems, I believe that a closer examination of the discourse function of cases like (42)–(43) shows that they are not in fact counterexamples to the (DTSP). Concerning (42), clearly what is going on here is that (b)–(d) report parts of the overall event reported by (a). Though in informal terms they fail to “move the action forward”, this does not mean that they fail to conform to the (DTSP). Rather it shows that that the  $r\text{-in}$  and  $r\text{-out}$  of (b)–(d) coincide with (or at least fall between) the  $r\text{-in}$  and  $r\text{-out}$  of (a). Only when (e) is reached does the overall temporal

sequence continue to move forward. The situation may be diagrammed as follows:



Viewed, this way, the interpretation of (b)–(d) is completely in accord with the (DTSP). It differs from simpler examples only in that (b)–(d) fail to identify their *r*-in with the preceding sentence's *r*-out. Instead, because they express subevents of (a), they all share its input reference time,  $r_1$ -in. In other words, example (42) shows that the (DTSP) only regulates the relationship between a sentence's *r*-in and *r*-out; how these two times relate to the reference times of other sentences in the discourse is not always as simple as just linking the *r*-out of one sentence with the *r*-in of the next.

Matters with (43) are a bit different, but still compatible with the (DTSP). Dowty (1986) notes that examples of this kind do involve a temporal sequencing of sorts, though not of the events themselves. Rather, (b)–(d) give an impression of a shifting narrative point of view, a kind of moving camera's eye, which first attends to the birds, then the frogs, and finally the river. This is most likely the order in which John noticed these things, as Dowty points out. What this suggests to me is that (b) does not pertain to the full event of the birds' singing, but rather to a temporal part of it – for example, the temporal part which John attended to (cf. Smith 1999 for a very similar view, as well as a much more explicit discussion of how the semantics of activity sentences fits into the picture). Since this sentence reports an activity, we can count on it also to describe any reasonably long subevent of it. Likewise (c) and (d) describe subevents of the full events of the frogs croaking and the river flowing. These sub-maximal events may then be sequenced by the (DTSP) without implying that the full events of birds singing, frogs croaking, and river flowing are themselves sequenced. Viewed this way, (43) is well-behaved, reporting a series of events in their correct temporal sequence.

Even though cases like (42)–(43) are fully compatible with the (DTSP), they still leave open an important question: How do listeners know that (42b–d) reports subevents of (a), and that (43b–d) report events seen from a moving point of view? There appears to be little hope of getting anywhere on this just with the tools of semantic theory. Rather, it is common-sense reasoning applied to the content of the examples, in combination with an

understanding of the structure of narrative discourse, which allows hearers to determine what is going on. For this reason, going much further with explanation of (42)–(43) and like data requires a detailed theory of narrative structure, such as that of Asher (1993) or perhaps Labov (1972) and the tradition which follows upon it.

For reasons of space and focus, I must leave aside any further discussion of such details of how temporal sequencing operates in narrative discourse. The claim is that the (DTSP) provides a crucial part of our overall understanding of temporal sequencing in narrative. Though it is only part of the story, in particular the part of the story which is derived from sentence-internal compositional principles, it nevertheless supports the use of a similar sequencing mechanism with the perfect.

My aim in this subsection has been to make plausible the idea that there are close connections among the semantics of the perfect, sequence of tense, and the principles which govern temporal interpretation at the discourse level. To the extent that this has been successful, I have given support to the idea that the connection between aspectual class and temporal sequencing is to be factored out of the semantics of particular constructions or morphemes, and given over to independent principles. In particular, it need not be part of the meaning of the perfect. As was pointed out, though, many issues need to be resolved before we can confidently say we understand how the (DTSP), or something like it, fits into discourse semantics. Because of this, as I return to the details of the semantics of the English perfect I, will state my proposals in terms of the original (TSP), rather than the more complex (DTSP).

### 3.2.3. *Michaelis' Counter-Argument*

Michaelis (1998) argues, contra my conclusion above, that the correlation between aspectual class and the readings of the perfect is not sufficient to justify a unitary semantic analysis of the perfect form. Rather, she claims that the perfect is ambiguous (in her view, among three uses: existential, continuative, and resultative, though only the existential/continuative contrast is relevant to us right now).<sup>13</sup> Her view is based on the observation that, though there is certainly some connection between the aspectual features of a sentence and the reading of the perfect, aspectual features do not suffice to determine the meaning of the perfect in every case; in

<sup>13</sup> Whereas Michaelis treats the resultative use as on a par with continuative and existential ones, in my analysis the resultative/current-relevance contrast is a parameter of variation independent of the temporal (existential/continuative) contrast. Since I only claim that aspectual class is relevant to the perfect's temporal interpretation, I can agree with Michaelis' point that aspectual features of a sentence are irrelevant to whether it has a resultative reading or not. Here the only issue is their relevance to temporal interpretation.

particular, as we have noted previously, stative examples like (4) remain compatible with either a continuative or an existential reading. Therefore, she claims, a unified analysis is impossible and the perfect must be treated as ambiguous.

Michaelis doesn't note that precisely the same sensitivity to aspectual class is shared by the perfect, SOT, and perhaps independent past-tense clauses in discourse. This fact argues strongly that aspectual class is an independent factor responsible for the availability of continuative vs. existential interpretations. It would be rather unparsimonious to propose parallel ambiguities for the perfect, the SOT construction, and the unembedded past tense. Moreover, at the methodological level, there is no reason to require of the unified analysis that any precise, formal factor be able to resolve the vagueness between readings in all cases. Neither ordinary lexical vagueness (e.g., that of *tall*) nor more complex cases like the vagueness of modals within Kratzer's analysis has this character. Therefore, it is consistent to hold that the perfect has a single interpretation, sometimes leaving a choice between an existential and a continuative temporal value, while claiming that aspectual class is one factor which is decisive in certain cases. In the next two subsections, we will examine some other factors which also play a role in the perfect's temporal interpretation.

#### 3.2.4. *Continuative Perfects*

Thus far the primary claim I have made about the temporal interpretation of the perfect has been negative: the basic temporal relations indicated by the perfect follow from the (TSP), and aren't specific to the construction itself. Yet the perfect does show various interactions with temporal elements. In the next two subsections, I will consider certain present perfect sentences with noteworthy temporal features. The first of these concerns the details of the distribution of continuative readings. While they only arise when the perfect takes scope over a stative clause, as implied by the (TSP), some such sentences only have continuative readings, while others do not have them at all. My goal here is to explain more precisely when continuative readings do and don't occur by looking at some details of the syntax/semantics interface.

A first fact is that a continuative use is only possible in examples like (45) in the presence of an overt temporal adverbial. This may be seen in (46), which lacks a continuative reading:<sup>14</sup>

<sup>14</sup> To be a bit more precise, (46) has no reading entailing that Mary still lives in London, although it is compatible with her currently living there. Moreover, in many contexts it implicates that she does not live in London any more, since the present tense *Mary lives*

(45) Mary has lived in London for five years.

(46) Mary has lived in London.

Some other data which show similar properties to the above:

(47) Mary has known the answer (for five minutes).

Mary has been angry (for a while now).<sup>15</sup>

Another fact to consider is that certain preposed adverbials, such as in (48), require the continuative reading, as noted by Dowty (1979, p. 343):

(48) For five years, Mary has lived in London.

Example (48) entails that Mary still lives in London (a fact which, by the way, lends support to the common assumption that (45) has a separate continuative reading, synonymous with (48), and not simply a vagueness as to whether she is still living in London). Because of this complex pattern of facts, more needs to be said about the conditions under which the overlap vs. the non-overlap conditions allowed for states by the (TSP) are chosen.

The analysis I will give is an elaboration of Hitzeman's (1997). To begin with the contrast between (45) and (48), first note that a sentence containing the phrase *for five years* allows an overt specification of the temporal location of the five-year interval, as in:

(49) Mary has lived in London for five years *as of now*.

*in London* would be more informative, if the fact that she now lives in London is relevant. This implicature is defeasible, however, since (46) may be followed by *and in fact she may still live there*.

<sup>15</sup> A progressive does not require the adverbial for a continuative reading, and lacks a non-continuative reading (Vlach 1993):

(i) Mary has been living in London.

I do not have a detailed explanation to offer for this difference, though it suggests that the covert *for* phrase to be discussed below can escape existential closure in progressive sentences. This behavior of progressives should be related to the fact, pointed out by Smith (1991), that progressive sentences differ from other statives in not allowing inchoative readings (examples from Glasbey 1998):

(ii) When I arrived, Fred was phoning the police.

(iii) When I arrived, Max was happy.

In (iii), Max's happiness may begin with my arrival, but with (ii), Fred's phone call may not. Note that the facts illustrated in (i)–(iii) further support the idea that the temporal relationships indicated by the perfect have the same source as temporal sequencing in discourse.

- (50) Mary had lived in London for five years *as of January, 1985*.

I would like to suggest, following Hitzeman, that when this temporal location is not expressed, it can be dealt with in one of two ways. The first option is that it receives a value from context; in the case of the present perfect, this value is the speech time, and with past perfects like (50) it is a contextually supplied past time. The other option is that it is existentially quantified. Thus, (45) can mean either of the following:

- (51) Mary has lived in London for five years *as of now*.

- (52) Mary has lived in London for five years *as of some time*.

The “now” reading of the adverbial seen in (51) gives a continuative use of the perfect. In contrast, the “existential” reading of the adverbial in (52) provides a non-continuative use.<sup>16</sup>

Given this idea about how the continuative and non-continuative readings come about, we may consider again the data above. Let us begin with the contrast between (45) and (48). As noted by Hitzeman, a *for*-adverbial may receive the existential reading (like that paraphrased in (52)) only when it occurs in postverbal position; a preposed *for*-adverbial only has the “as of now”, i.e., continuative reading. Her explanation for the correlation between the readings of the adverbial and its position, which I will adopt, is that an operation of existential closure (Heim 1982) is responsible for the existential interpretation; the idea is that the covert temporal specification in (45) is represented by a variable, and this variable can get bound by an unselective existential quantifier (“existential closure”) only if it is inside the VP (Diesing 1992). Given these ideas, since (45)’s *for* phrase may be either inside or outside the VP, it may get either reading, while (48)’s preposed *for* phrase cannot be caught by existential closure because it must be outside of the VP. Thus it can only mean *for five years now*. This implies, correctly, that (48) can only have the continuative reading. Thus, Hitzeman’s ideas can explain the ambiguity of (45) and the lack of ambiguity in (48).

Before moving on, I would note that the position of the adverbial in a present perfect sentence affects its interpretation in other ways besides the continuative/existential contrast. It also affects the presuppositional meaning of the perfect (to be discussed in more detail in Section 3.3). Let

<sup>16</sup> The reading in (52) would implicate, by Grice’s Maxim of Quantity, that the more specific (51) is false.

us focus on current relevance uses of (45) and (48) within the following context:

- (53) A: We need someone who remembers where that restaurant is. Anyone who has lived in London for four years or longer would remember it.  
 B: Mary has lived in London for five years. (=45)  
 B': ??For five years, Mary has lived in London. (=48)

While B and B' both have a continuative reading, the latter is extremely odd in this context. This is because B can be taken as suggesting that Mary remembers the restaurant, while B' cannot. Speaking informally, this suggests that the "current relevance" indicated by the perfect is more specifically the relevance of the material under the scope of the perfect. In the context of A, the length of Mary's residency in London is crucial to making the response relevant. With B, *for five years* is under the scope of the perfect, and so relevance is obtained. With B', it is not. The mere fact that Mary has lived in London doesn't provide the information A seeks. This means that we should not consider B'/(48) to be a mere stylistic variant of the continuative use of B/(35).

The remaining problematical piece of data brought up at the beginning of this section is (46), which lacks an adverbial altogether and must receive a non-continuative reading. I follow Bäuerle and von Stechow (1980) in proposing that any sentence which lacks overt temporal adverbials receives a default temporal specification, something like *once* or *at some time* (cf. also Vlach 1993, Iatridou et al. 2000). There are a number of ways to implement such an intuition. Within the system proposed by Hitzeman, one would formalize this by saying that the temporal variable associated with the *for* phrases in (45) or (48) is still present in (46) and expressed by a phonologically null adverbial within the VP. For some reason, an unexpressed adverbial cannot be preposed.<sup>17</sup> Because it is in the VP, it undergoes existential closure, and thus it is equivalent to *at some time*. Since the existential interpretation of the temporal variable gives the non-continuative perfect, this suggestion provides an explanation for why (46) lacks a continuative reading.

An alternative way of formalizing Bäuerle and von Stechow's idea that is consistent with the present framework would begin with the assumption

<sup>17</sup> I think it's an extremely natural assumption to make that phonologically unrealized material can't be topicalized or left-dislocated unless some other (overtly realized) feature of the sentence signals that it has been. Exactly how to formalize this requirement is dependent on broader assumptions about the syntax/semantics interface, though, so I won't go farther here.

that the temporal variable we are talking about is an implicit argument of the verb (or is attached to the verb through a VP internal compositional process). Thus, *eat* might be of type  $\langle i, \langle e, \langle e, t \rangle \rangle \rangle$ , where *i* represents the interval overtly realized by material like *for five years*. This argument may be saturated by a temporal adverbial, or it may be suppressed by a lexical rule which provides it with an existential interpretation; this rule would be parallel to the object-suppression rule which is often seen as responsible for creating intransitive *eat* from its transitive source. The existential interpretation of the temporal variable would, as discussed above, result in the non-continuative meaning. Clearly what I have said is just a sketch of how to develop the relevant temporal semantics, but because of space considerations and because I actually prefer the more syntactic alternative based on Hitzeman's work, I will not develop it further here.

To summarize, continuative perfects may arise when the clause embedded by the perfect is stative. This much follows from the (TSP). The question of more precisely when they arise and when they don't is complex, and depends in part on the details of how the adverbials in the sentence are interpreted. I have outlined a system that explains the effects of placing a *for* phrase in sentence-initial or sentence-final position, as well as of not having any adverbial at all. The cases like (45) that have both readings are diagnosed as structurally ambiguous; which structure, and reading, makes sense in a given case depends on context.<sup>18</sup>

### 3.2.5. *Past Time Adverbials*

Next we turn to the fact that the English present perfect is unable to occur with purely past-time adverbials:

- (54) Mary has read *Middlemarch* (\*yesterday).

Intuitively, what is wrong with (54) is an incompatibility between the past time adverbial and the present tense. It is important to note that the adverbial is a crucial part of the unacceptability of (54). If the adverbial is lacking, the sentence may perfectly well describe an event which occurred yesterday. That is, the event may have occurred yesterday, but one may not mention yesterday while describing it with the perfect. Different approaches have considered this incompatibility to be due to either syntactic or interpretive (semantic or pragmatic) factors, and while a syntactic approach is attractive for a number of reasons to be discussed below, I believe that a pragmatic approach is in fact preferable.

<sup>18</sup> Note that I agree with Michaelis (1998) that (some) perfect sentences are ambiguous, but I treat this as a structural ambiguity, while she treats it as a lexical ambiguity of the perfect form itself.

Giorgi and Pianesi (1997) provide several arguments in favor of the syntactic approach. To begin with, they recall that neither the past perfect nor tenseless perfects display a parallel restriction (McCawley 1971):

- (55) Mary had read *Middlemarch* the day before.
- (56) Having read *Middlemarch* yesterday, Mary can answer our questions.<sup>19</sup>

According to the syntactic view, (55)–(56) are easily explained. While (54) is unacceptable because of a syntactic incompatibility between the present tense and past adverb, there is no such incompatibility when the sentence has past tense, as in (55), or is tenseless, as in (56). Semantic and pragmatic approaches to this phenomenon, in contrast, have sometimes solved the problem by proposing that the perfect form is ambiguous between an aspectual and a past tense interpretation (McCawley 1971, Stump 1985, Spejewski 1997). Example (55) would then be acceptable on the reading where it contains two past tenses, one expressed by the past and one expressed by the perfect, but not on the reading where it is semantically a past perfect. This approach must somehow rule out the use of the perfect form with past tense meaning in present perfect sentences.

Giorgi and Pianesi support their syntactic approach by noting the inapplicability of the restriction seen in (54) to many other languages, such as Italian, German, Dutch, and Icelandic:

- (57) Gianni è partito alle quattro. (Italian)  
Gianni is left at-the four

They argue that in languages of the Italian sort, so-called present tense sentences are actually tenseless, so that the present is simply the absence of past, in contrast to English-like languages (including also mainland Scandinavian) where the present tense is syntactically and semantically realized. In Italian, therefore, this is no syntactic incompatibility between the so-called “present” tense and past adverbial, since the “present” is actually tenseless. This leaves open many questions as to how what we call “present tense” sentences are interpreted in the two classes of languages. I leave these aside, as they are of only marginal relevance in understanding Giorgi and Pianesi’s analysis of the English present perfect.

<sup>19</sup> An interesting aside is that this pattern provides an argument that modal sentences are tenseless. I find the following quite acceptable: Sylvia may have arrived yesterday, or she may have arrived this morning.

Opposed to Giorgi and Pianesi's arguments in favor of a syntactic approach to (54) is other evidence that the phenomenon is actually pragmatic. We begin with the Gutenberg example discussed above, repeated here as (58):

(58) ??Gutenberg has discovered the art of printing.

According to McCoard's intuition, which I share, (58) is unacceptable for a reason related to the unacceptability of (54). In some sense, Gutenberg's discovery is too long ago. Backing up this intuition is the fact that the unacceptability of (58) is linked to the fact that it is a present perfect; a past perfect or tenseless analogue is acceptable, just as the past tense and tenseless analogues of (54), namely (55)–(56), are:

- (59)a. In the final few years of the twentieth century, the world saw the advent of paperless publishing over the world wide web. *Gutenberg had discovered the art of printing* centuries before, and mass publication had followed a paper and ink model ever since . . . .
- b. Gutenberg's life had changed immeasurably. *Having discovered the art of printing*, he was ready to flood the bible market . . . .

Ideally we will be able to relate the unacceptability of both (58) and (54) to a single factor having to do with the present tense.

As noted in Section 2.3, the ability to account for the Gutenberg example is one of the advantages of the Extended Now theory of the perfect, which plausibly explains its status as resulting from the fact that Gutenberg's discovery is too long ago to fall within the Extended Now of any context in which it might be naturally used. I will pursue a particular way of working out this idea. Towards this end, note that the unacceptability of (58) does not seem to be part of its truth conditional semantics. This can be seen by the fact that its negation is not judged true, but rather equally odd. Rather, it seems that (58) registers an infelicity on the order of a presupposition failure. This point will be crucial to the analysis I will provide of both (58) and (54).

From the data above, we can list the crucial facts to be explained as follows:

- (60) (i) A present perfect is unacceptable with a past time adverbial, as in (54).
- (ii) A present perfect is unacceptable if the event it describes does not fall within a plausible Extended Now, as in (58).
- (iii) These restrictions only apply to present perfect sentences; past perfects and tenseless perfects are exempt.

Point (iii) suggests that, if we wish to explain the data in terms of an Extended Now requirement, this requirement actually arises from the present tense, and not from the perfect. It may be stated as follows, where  $XN_c(u)$  is a contextually given interval of which the interval  $u$  is a final subinterval. Informally,  $XN_c(u)$  is the Extended Now in context  $c$  for a sentence uttered at  $u$ . In the definition,  $c_{u,r,e} + S$  indicates that  $S$  is to be added to a context in which the utterance time is  $u$ , reference time is  $r$  and the time of evaluation (the event time) is  $e$ .

- (61) *XN Presupposition of the Present Tense*: A present tense sentence is only usable in context  $c$  if the event it describes falls within  $c$ 's Extended Now.

More formally: For any context  $c_{u,r,e}$  and present tense sentence  $S$ ,  $c_{u,r,e} + S$  is only defined if  $e \in XN_c(u)$ .

This requirement will only be observable in present perfect sentences, since, as noted in Section 3.1.1, simple [-perf] sentences obey the stronger constraint that  $e$  coincides with  $r$ , which in turn coincides with the speech time due to the semantics of the present tense. The semantics of [-perf] masks the Extended Now requirement of the present tense. Only with perfect aspect, where  $e$  may precede the moment of utterance, do we observe the weaker requirement that  $e$  fall within the Extended Now.

Point (60)(i) may be reduced to point (60)(ii) if we assume that the use of an adverbial places constraints on what interval may function as the Extended Now. In particular, I propose the following principle:

- (62) For any past time adverbial  $\alpha$ , the use of  $\alpha$  in context  $c$  presupposes that no event  $e$  described by  $\alpha$  in  $c$  overlaps  $c$ 's extended now.

*Example*: For any context  $c$  and sentence  $S$  of the form [<sub>S</sub>  $\phi$  *yesterday*],  $c_{u,r,e} + S$  is only defined if  $\| \textit{yesterday} \|^{u,r,e} \cap XN_c(u) = \emptyset$ .

The intuition behind (62) is that in any context in which *yesterday* is used, the speaker thereby signals that the distinction between things that happened yesterday and those that happened today is relevant in the context. Because of this, those that happened yesterday cannot count as "present" in the context; in other words, they cannot fall within the contextual Extended Now. In contrast, if *yesterday* is not used and the context is appropriate, events that happened yesterday may indeed fall within the Extended Now.

These ideas let us explain the crucial data above as follows. For (58), I simply maintain the explanation of the Extended Now theory. In those situations where one may naturally utter (58), it is not plausible that the event of Gutenberg's discovery falls within the Extended Now of that context. This may be summarized as follows:

- (63) ??Gutenberg has discovered the art of printing.
- A. Contribution of present tense:
    - (i)  $r = u$
    - (ii) XN Presupposition:  $e_{\text{discovery}}$  falls within  $XN_c(u)$ .  
(FAILS IN PLAUSIBLE CONTEXTS)
  - B. Contribution of (TSP): (irrelevant)

Matters are more interesting with (54). There the presence of the adverbial *yesterday* requires, via (62), that any events which occurred yesterday do not fall within the Extended Now. But this conflicts with the presupposition (61):

- (64) \*Mary has read *Middlemarch* yesterday.
- A. Contribution of *yesterday*:
    - (i)  $e_{\text{reading}}$  occurred yesterday.
    - (ii) Presupposition:  $e_{\text{reading}}$  does not fall within  $XN_c(u)$ .
  - B. Contribution of present tense:
    - (i)  $r = u$
    - (ii) XN Presupposition:  $e_{\text{reading}}$  falls within  $XN_c(u)$ . (CONTRADICTS PRESUPPOSITION OF *yesterday*)
  - C. Contribution of (TSP): (irrelevant)

Finally, a past tense (or tenseless) case will be unproblematical because the Extended Now requirement is not applicable:

- (65) Mary had read *Middlemarch* the day before yesterday.
- A. Contribution of *the day before yesterday*:
    - (i)  $e_{\text{reading}}$  occurred the day before yesterday.
    - (ii) Presupposition:  $e_{\text{reading}}$  does not fall with  $XN_c(u)$ .
  - B. Contribution of past tense:  $r < u$ .
  - C. Contribution of (TSP):  $e_{\text{reading}} < r$ .

To summarize, then, I propose that the prohibition against past time adverbials in present perfect sentences can be seen as resulting from a

pragmatic restriction also seen in McCoard's Gutenberg example. This restriction is an Extended Now presupposition tied to the present tense. It follows that those languages which allow past time adverbials to co-occur with the present perfect would differ from English in the nature of their present tense. In this respect, I agree with Giorgi and Pianesi (1997), even though I differ from them in suggesting that this difference may be merely pragmatic rather than syntactic. It is worth pointing out, though, that Giorgi and Pianesi's basic idea is actually compatible with the approach taken in this paper. If, as they argue, there is no present tense in Italian, there will be nothing to carry the Extended Now requirement. Thus, so-called "present perfect" sentences in this language will actually be tenseless perfects, and hence will be correctly predicted to be grammatical just like (56). However, we need not be as radical as Giorgi and Pianesi are. It would also suffice for our purposes to say simply that Italian present tense lacks the Extended Now requirement.

### 3.3. *Current Relevance and Result State Presuppositions*

In this section I will examine the non-temporal contribution of the English perfect. In Section 2 we noted some facts which cannot be explained by the perfect's temporal semantics, namely the contrast between (66a) and (66b), the oddness of (67), and the adverbial choice pattern in (68):

- (66)a. ??Einstein has visited Princeton.
- b. Princeton has been visited by Einstein.
  
- (67) (i) Mary has lived in London for five years.
- (ii) ??She has become ill.
  
- (68) Has Kay paid her bills this month/??this week/??today?

The ideas which I will develop in this section have much in common with the discussion of current relevance by Inoue (1979), though my analysis will differ substantially enough to avoid the difficulties mentioned in Section 2.1. In Section 3.3.1 I will focus on cases intuitively describable in terms of the idea that the perfect indicates a result state, while in Section 3.3.2 I will concentrate on examples which are more plausibly described in terms of a relevance requirement.

3.3.1. *Resultative Readings*

Let us begin by considering again (2), repeated here as (69):

(69) Mary has read *Middlemarch*.

Intuitively, this will be analyzed as: there is some current state which was caused by Mary's reading *Middlemarch*.

The most famous modal analysis of causation is that of Lewis (1973); he would analyze "there is some current state which was caused by Mary's reading *Middlemarch*" as: there is some current state which wouldn't exist if Mary hadn't read *Middlemarch*.

(70) would( $\neg p$ ,  $\neg\text{Pres}(s)$ )

Here,  $p$  would be the proposition that Mary read *Middlemarch*. However, this treatment does not seem appropriate for the perfect. Example (69) does not really imply that if Mary hadn't read *Middlemarch*, she wouldn't understand Eliot's style. If she later read *Silas Marner*, this would be sufficient to let her understand Eliot's style; so, (70) would be predicted false. But even if we don't know whether she read *Silas Marner*, we could be confident in the appropriateness of (69) on the basis of her reading *Middlemarch*. (Lewis would say that the cause of Mary's understanding Eliot's style was her reading some book or another by Eliot, not her reading *Middlemarch* or any other particular book. Thus (70) doesn't give a relation which will let us explain (69), though it may be the philosophically correct analysis of causation.)

Instead I will pursue an analysis along the lines of (71):

(71) A sentence  $S$  of the form PERFECT( $\phi$ ) presupposes:  
 $\exists q[\text{ANS}(q) \ \& \ \mathbf{P}(p, q)]$ .

Here,  $p$  is the proposition expressed by  $\phi$  and the property ANS is true of any proposition which answers the question which the speaker of  $S$  is trying to answer. The operator  $\mathbf{P}$  is similar to an epistemic *must*. The precise values of ANS and  $\mathbf{P}$  will be elucidated, and given more theoretical content, as we proceed.

Let us make a bit more explicit the kind of context in which (69) might be used to indicate that Mary understands Eliot's style:

- (72) A: We need to get an explanation of George Eliot's style.  
 Who can we ask?  
 B: Well, George Eliot wrote *Middlemarch*, and if someone reads an author's books, they understand her style. Unless they're stupid of course. Mary is smart, and she has read *Middlemarch*. So we can ask her.

The clause *she has read "Middlemarch"* is used in this context to answer A's question, i.e., to indicate that Mary is able to discuss Eliot's style. Informally, it highlights a result of her reading. I am proposing that we actually view this result state implication as being fundamentally epistemic in nature. At the time that *she has read "Middlemarch"* is uttered, the following things are established in the conversation:

- (73) {If someone who isn't stupid reads an author's book, they understand her style; Mary is smart; George Eliot wrote *Middlemarch*}

This is (a subset of) the conversational background for *she has read "Middlemarch"* in (72). If the proposition that Mary has read *Middlemarch* is added to (73), it entails that Mary can explain Eliot's style. Thus, the idea I will develop is that the perfect's presupposition is satisfied because, given this conversational background, (69) entails that Mary can explain Eliot's style, which answers the question which B is trying to answer.

This analysis incorporates the idea of "result state" in a somewhat indirect way. The treatment doesn't exactly say that reading *Middlemarch* caused Mary to understand Eliot's style; rather, it says that, given what we know about the relation between reading and understanding, the fact that she read *Middlemarch* provides evidence that she understands the style. Since the relation between reading and understanding is one of causation, however, in fact the latter state is a result of her reading the novel. In general, I claim that "resultative perfects" occur when the past event referred to provides evidence for the existence of some current state because of a causal relation. Non-result state perfects will come about when the relation is not one of causation, as we will see momentarily.

### 3.3.2. *Current Relevance Readings*

Next we can move on to consider current relevance uses of the perfect. Our primary example of this type has been (3), repeated here slightly simplified:

- (74) The Earth has been hit by giant asteroids before.

that (74) is uttered in a context like the following:

- (75) A: Is the Earth in danger of being struck by giant asteroids?  
 B: Astronomical conditions aren't very different now from what they have been in the past. And the Earth has been struck by giant asteroids before. So it's quite possible it will happen again.

Here the “current relevance” is the Earth’s being in danger of being struck by giant asteroids. In terms of the present theory, we would formalize this with reference to A’s preceding question. The Common Ground at the time (74) uttered within (75) contains the proposition that astronomical conditions aren’t very different now from what they have been in the past, as well as background assumptions like the idea that, if conditions are the same, the past is a good guide to the future. In this context (74) implies that the earth is presently in danger of asteroid impacts, answering A’s question and thus satisfying the perfect’s presupposition.

The use by B of the perfect form serves an information management role within the conversation. Though the use of the past tense (*The Earth was struck by giant asteroids in the past*) would convey virtually the same information, thus yielding a common ground which plausibly also entails an answer to A’s question, it would not be functionally equivalent to the use of the perfect. The perfect’s presupposition functions to highlight the fact that B’s utterance, in context, serves to imply an answer to A’s question. It doesn’t only provide an answer; it even presupposes that it provides an answer. This point may be closely connected to Inoue’s idea that the perfect stands in a logical relation to the discourse topic. Within the recent literature on topics, one prominent idea has been that a topic is a question, i.e., a set of propositions (cf. von Stechow 1994, Roberts 1996, Büring 1997, McNally 1997).<sup>20</sup> At each point in a conversation, there is a question which the speakers are aiming to answer, though this question need not have been explicitly asked. It is the “topic” for that portion of the discourse which is devoted towards providing it an answer. A topic may be broken down into several subtopics (subquestions), answering each of which aids in answering the main topic. If we adopt this view of topicality, the presupposition of the perfect may be reformulated as follows:

- (76) A sentence S of the form PERFECT( $\phi$ ) presupposes:  
 $\exists q[\text{ANS}(q) \ \& \ \mathbf{P}(p, q)]$ ,  
 where ANS is true of any proposition which is a complete or partial answer to the discourse topic at the time S is uttered.

<sup>20</sup> This “topics as questions” theory of topicality is to be distinguished from the “topics as entities” theory (cf. Portner and Yabushita 1998). Here we will make use of the former, whereas in Section 2.2, as we considered alternative versions of the result state semantics for the perfect, we made use of the latter. Those versions of the result state view which make reference to (entity) topics may be seen as sharing Inoue’s insight that topicality is crucial to our understanding of the perfect, in particular lifetime effects, while pursuing a very different implementation of this basic idea. I suspect that both approaches to topicality are necessary for the analysis of language, and so the only question here is which is more appropriate for analyzing specific facts pertaining to the English perfect.

This discussion makes clear how the presupposition of the perfect helps to differentiate it from the simple past. At first glance, it may seem odd to focus on the result state/current relevance presupposition as something special to the perfect. After all, past tense sentences may be used in similar ways. For example, *The Earth was struck by giant asteroids in the past* could serve to indicate the very same current state which the perfect sentence would. Given this, how can we say that presupposition (76) characterizes something distinct in the perfect's meaning? What this objection misses is that, while the past may indicate a current result or state of relevance to the discourse topic, it does not linguistically presuppose that it does so. This makes for at least two significant differences. On the one hand, a simple past tense sentence, but not the perfect, may be used as part of a simple narrative, a story about the past, and describe an event which in and of itself has no particular current relevance. (The narrative as a whole might be required to be relevant, by some general pragmatic principle, but the particular event would not be.) And on the other, a speaker can use the perfect in a situation in which it is not obvious how the presupposition is satisfied in order to prod the hearer into uncovering (and accommodating) the type of discourse topic that he or she has in mind. For example, out of the blue (77a) below would suggest that the speaker is still ill, while (77b) would not necessary do so (and is, in fact, a bit odd):

- (77)a. I have been diagnosed with cancer.  
 b. I was diagnosed with cancer.

The two examples differ because (77a) requires that the event of diagnosis itself be specifically relevant to the speaker's intended discourse topic; an obvious way in which it can be relevant is because it provides evidence that the speaker is currently ill. In terms of the question-based theory of discourse topics, we might say that the question "How are you?" is inferred. This is plausibly a standing topic which can be accessed at almost any time within a conversation between friends. In contrast, (77b) allows this possibility as well, but it is also compatible with the speaker's just wanting to tell the story of his or her treatment and cure. In this case, the fact that the speaker has not marked a current relevance presupposition via the perfect form allows different inferences about the intended discourse topic.

Moving on to other data, the relevance effects pointed out by Spejewski (1997) receive a natural explanation in terms of this account. Consider once again (78):

- (78) Has Kay paid her bills this month/??this week/??today?

A natural discourse topic for (78) would be *Is Kay up-to-date with her bills?* The proposition that Kay paid her bills within the past month would provide an answer to this question, given assumptions in the Common Ground. The proposition that she paid her bills within the past week would also entail an answer, but would give more information than is required, a violation of Grice's Maxim of Quantity. Unless the sentence can be reinterpreted to bring it in line with the Maxim (as a case of flouting), it will be pragmatically odd.

Another example which can be explained in these terms is (9), repeated here.

- (79) (i) Mary has lived in London for five years.  
 (ii) ??She has become ill.

Without much preceding context, there is no easily identifiable discourse topic for which the information that she became ill provides an answer. The simple past form should therefore be used, and indeed *She became ill* would be acceptable in (79), and suggests the start of a narrative about her illness. However, recall that (79) becomes acceptable if we imagine a context where her past illness is related to the question which the speaker aims to answer in the right way. For example, if the discourse topic is something like "Which of our friends might need to go see their doctors due to these revelations about toxic waste?", (79) is fine, indicating that Mary ought to seek medical attention.

My proposal that current relevance uses come from the interaction between perfect sentences and the Common Ground means that a special situation arises when the Common Ground is close to empty, as at the start of a conversation. In such cases, the present theory implies that one of two situations holds: either a very weak common ground suffices to allow the perfect's presupposition to be satisfied or the common ground is not as impoverished as it seems. Examples of the first type are so-called "hot news" perfect like (80) (=6):

- (80) The Orioles have won!

This sentence may be said even to a complete stranger, but in such instances reveals the speaker's assumption that everyone is interested in the question *How is the Orioles baseball team doing?* The second type of "out of the blue" perfect can be exemplified by (81):

- (81) Several terrible things have happened to me this week.

This example has the feel of resuming an already-established correspondence or catching up with a friend. That is, it invokes a previously existing

Common Ground, and suggests that in that context, the several things that happened can be seen as answering the implicit question in the discourse, *How are you?*

While it is obviously impossible to discuss the full variety of ways in which the presupposition of a perfect sentence may be satisfied in specific contexts, before closing this section I would like to mention one type of example which at first glance seem to lack such a presupposition entirely, and which are frequently used to dispute the intuition that concepts like “result state” or “current relevance” are useful at all when describing the perfect. These are sentences of the form “X TENSE have been to Y”:

(82) I have been to London.

It is not obvious that the speaker here has in mind any particular question like *Where have you been lately?* I would point out, however, that the compositional structure of this type of example is not at all clear. Corresponding sentences not in the perfect form are ungrammatical, as shown below:

(83) \*I was/am/will be to London.

This shows that sentences of this type do not result from an ordinary combination of the perfect with a VP of the form *be to Y*. Instead, they may well be an idiosyncratic, non-compositional construction, one whose precise nature remains to be elucidated. In any case, it is not wise to draw firm conclusions about the perfect from examples like (82).

#### 4. SUMMARY OF THE EXPLANATIONS OF THE CRUCIAL PROPERTIES

This section will revisit the six phenomena outlined in Section 1, reviewing how the present theory has explained each (and providing a bit more discussion in some cases). This will make clear the points at which the present analysis has an empirical advantage over the alternatives.

Continuative perfects are for the most part explained by the (TSP). This principle allows continuative interpretations only when the phrase under the scope of the perfect is stative. The lack of continuative readings with certain statives, for example when there is no adverbial or when the adverbial is preposed, is explained in terms drawn from Hitzeman’s theory.

The present approach deals with the variability of result state entailments in terms of the flexibility of the perfect’s modal presupposition. The perfect sentence is required to help answer a question at issue in

the discourse, and it may do so through various kinds of relations with the material already in the common ground. If it relies on causal facts established in the common ground, the notion of result state will seem particularly important. If it relies on other sorts of relationships, such as evidentiary ones, the notion of result state will not seem relevant at all. There can of course be mixed cases, where causal and non-causal facts are both involved.

The “lifetime effects” illustrated by (84) are related both to the presupposition of the perfect and to its temporal semantics:

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

My explanation of this contrast is very similar to Inoue’s. Recall her idea that (84a) is naturally associated with an implicit discourse topic like *Talking about Einstein’s visits to American universities*, while (84b) might be more naturally connected with *Talking about Nobel Prize winners visiting Princeton*. Then she claims that the topical proposition must be “repeatable” at the speech time, so that (84a) presupposes that Einstein could visit Princeton again. Above I adopted the proposal that that the “discourse topic” is an implicit question denotation, not a single proposition. In these terms, we would rephrase her account by saying that (84a) is most naturally associated with the topic “Where has Einstein visited?”, while (84b) suggests “By whom has Princeton been visited?”. This contrast makes sense if we take into account the relationship between question/answer relations and focus. Assuming that the default focus in English falls on the right edge of the sentence (considering only fairly simple structures), out of context (84a)’s focus structure is naturally taken to be *Einstein has visited [<sub>F</sub> Princeton]* or *Einstein has [<sub>F</sub> visited Princeton]*. These focus structures are appropriate for answering the questions *Where has Einstein visited?* or *What has Einstein done?*, respectively. With regard to (84b), in contrast, the natural question to infer is *By whom has Princeton been visited?*

In light of this, the lifetime effect follows from the perfect’s Extended Now presupposition. In the context of the topic *Where has Einstein visited?* or *What has Einstein done?*, it is natural to assume that the conversation pertains to Einstein’s personal history, or at least some aspects of it. In a conversation about Einstein, his death provides a natural boundary between the “present”, i.e., the Extended Now, and the “past”, the time before the Extended Now. Thus, the Extended Now most likely does not extend far enough back in time to encompass anything Einstein did. In the context of another discourse topic, (85a) might not license the same conclusion. For example, Inoue’s context (12) makes explicit the topic

*Which Nobel Laureates have visited Princeton?*, and as an answer to this question the focus in (84a) would be on the subject rather than in the VP. This conversation is not particularly about Einstein, but rather on Nobel Laureates in general, and so his death does not place a natural limit on how far back the Extended Now may stretch. The context could provide an Extended Now covering all of Princeton's history, for example, or the history of the Nobel Prize. In either case, Einstein's visiting Princeton would indeed fall within the Extended Now, and so (84a) would be fine. Similarly, in the absence of any additional context, (84b)'s discourse topic, *By whom has Princeton been visited?*, also suggests a long Extended Now having nothing to do with whether Einstein is alive or not.

As discussed above, the present theory explains the Gutenberg example in terms of the present tense's Extended Now requirement. The Extended Now would not include the past event of Gutenberg's discovery in any context in which the sentence would naturally be used. To my mind, the sentence is only acceptable if one thinks of a supernatural being orchestrating important discoveries in human history. This demon could say:

- (85) Now that Gutenberg has discovered printing and Berners-Lee has invented the world wide web, it's time to lead these humans to the next thing . . . .

Of course, from the perspective of an immortal being the time of Gutenberg's discovery would not seem so long ago, and might be part of the Extended Now (the interval of its attempts to control human progress).

The incompatibility with past adverbials and asymmetries with tenseless and past perfects has been discussed extensively above. The idea is that past adverbials generate a presupposition which is incompatible with the Extended Now presupposition of the present tense, but not with anything in past tense or tenseless sentences. This point suggests that languages which lack the incompatibility between present perfect and past adverbials differ in the meaning of their present tense.

Finally, I have already discussed the pragmatic relevance effects which help condition adverbial choice. These are directly attributed to the perfect's presupposition, and in fact provide fairly direct evidence in favor of it.

In sum, I have shown that the six key phenomena outlined in Section 1 can all be explained in terms of the present theory. Some have to do with the temporal meaning of perfect sentences, while others have to do with the presupposition. Of course, one can consider these two components of meaning independently, and it would certainly be possible to accept

one while rejecting the other. However, simply adding my proposal concerning the relevance presupposition to any of the previous (temporal) theories of the perfect will not suffice to fully rescue any of them. This can be appreciated by reviewing Tables 1 and 2 above. The Indefinite Past and Extended Now theories would still have trouble accounting for the continuative/non-continuative contrast, while the result state theory would leave the past adverbials and asymmetries between past and present perfects unexplained. I conclude that the analysis presented here currently provides the best empirical coverage of any monosemous theory of the perfect.

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*Paul Portner  
Department of Linguistics  
Georgetown University  
Washington, DC 20057  
USA  
portnerp@georgetown.edu*