

Event Structure and the Perfect

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1 The Polysemy of the Perfect

The English perfect has as many as five readings, illustrated by the most salient interpretations of the sentences in [1a-e].

- [1] a. **Existential:** Fred has visited Paris several times.
b. **Universal:** I have known him since 1960.
c. **Resultative:** The police have probably caught the suspect by now.
d. **Recent Past:** Archduke Ferdinand has been assassinated in Sarajevo. [“hot news” June 28, 1914]
e. **[Stative Present:** I’ve got (=I have) something to tell you.]

In English, [1e] occurs only in *have got*, but it is included here because of its importance in other languages. In Vedic Sanskrit and ancient Greek, for example, the perfect of many achievement predicates can be used to denote the result state. A good semantics of the perfect should therefore have something to say about it.

Opinions differ on whether the readings in [1] are semantically distinct, or are pragmatic interpretations of a basic perfect meaning. The popular Reichenbachian theory of tense and aspect (Reichenbach 1947; important later studies include Comrie 1976, 1985, Dowty 1982, Partee 1984, Binnick 1991, Hornstein 1990, Kamp & Reyle 1993, Klein 1994) seems to force the latter view, for it provides an undifferentiated category of “perfect” whose meaning is that event time (E) precedes reference time (R). Notable attempts to reconcile this basic meaning of the perfect with the varied usage seen in [1] through appeals to pragmatics include McCoard 1978, Matthews 1989, Declerck 1991, and Klein 1992, 1998.¹

In two influential articles, McCawley (1971, 1981) argued on the contrary that there are several *semantically* distinct kinds of perfect, and developed a

¹The structuralist literature, for its own theoretical reasons, also tended to claim that the uses of the perfect can be reduced to a unitary meaning, such as “current relevance” (Joos 1964).

generative semantics-style structural analysis of them. From a different perspective, true polysemy for the perfect has been claimed in two studies that I will be drawing on heavily here: Mittwoch 1988, in a model theoretic semantic analysis, and Michaelis 1994, who treats the resultative reading as a conventionalized construction, or “formal idiom”, whose properties cannot be derived from the semantics of the perfect. Of course, this does not mean that *all* of the perfect’s readings must be irreducibly distinct, and these authors do not claim that they are.

Telling cross-linguistic evidence for the view that the perfect is truly polysemous is the fact that languages can distinguish morphologically among of the readings in [1], grouping them in different ways into tense/aspect inflections. For example, in Vedic Sanskrit the resultative and recent past readings are marked by the Aorist, and the universal, existential, and stative present readings are marked by the Perfect (Kiparsky 1998). Several languages have a special existential perfect form, e.g. the Hungarian “indefinite tense” (Piñon 1996) and the *gid* or *ǰid* form of Najdi Arabic (Ingham 1994:104).

The first goal of this paper is to establish that the resultative and existential/universal meanings of the perfect are semantically and structurally distinct in English. I will present three arguments, based on sequence of tense, on the present perfect with time adverbials, and on the perfect in Wh-questions.

My second goal is to reconcile this polysemy of the perfect with the unified category of perfect posited in Reichenbachian theory, so as to remove the principal empirical objection to what is otherwise a very attractive approach to tense. Rejecting the pragmatic approach in favor of a semantic one, I propose to unify the perfect’s distinct meanings by enriching the tense semantics to allow a verbal predicate’s event structure to be mapped in different ways into the parameters that define temporal relations. The types of perfect in [1] correspond to the possible assignments of event structure to the perfect’s temporal parameters, and each type’s distinctive properties can be structurally explained.

The minimal assumption about event structure that we will need is that state and activity predicates denote simple events, and that telic predicates (achievements and accomplishments) denote complex events consisting of an activity leading to a change of state (Rappaport Hovav and Levin 1998). All verbal predicates take an event argument ϵ , and the event argument of achievements and accomplishments is a complex event consisting of two simple events, an activity e and a state argument r corresponding to the result.² The event argument of verbs is assigned to three TEMPORAL PARAMETERS E, R, P, specified by tense and aspect features.

[2] a. E (event time, the time during which the event unfolds)

²Piñon 1995 argues that these are Theta-roles.

- b. R (reference time, the time to which adverbs refer)
- c. P (perspective time, the “now” of temporal deixis)

The values of E, R, P are intervals, with points as the degenerate case. Following Kamp and Reyle 1993 I distinguish perspective time P (the origin of temporal deixis) from speech time S (the moment of actual utterance), which I take to be a point. This distinction makes it possible to deal with flashbacks, historical presents, and other rhetorical complexities of tense usage (more on these in Kiparsky 1998). In the present essay I only consider the simple case where P includes S.

Temporal relations are specified by precedence (A—B, read “A precedes B”) and temporal inclusion ($A \subseteq B$, read “A is included in B”). The default temporal relations for verbs unmarked for tense and aspect are the following inclusion relations:

- [3] a. $P \subseteq R$
- b. $E \subseteq R$

This implies, among other things, that present is the unmarked tense.

The function of morphologically marked tenses and aspects is to defeat these defaults. TENSE defeats [3a] by specifying a precedence relation between R and P (R—P = past tense, P—R = future tense). ASPECT defeats [3b] by specifying a precedence relation between E and R (E—R = perfect, R—E = prospective). Thus, I adopt Comrie’s important insight (1985, see also Hornstein 1990) that E is not linked to P (traditionally S) directly, but only via R.

For example, the English tense/aspect categories are as follows:

[4]

	Present	Past	Pres.Perfect	Past Perfect
Defining property		R—P	E—R	E—R—P
Default by [3]	$E \subseteq R, P \subseteq R$	$E \subseteq R, R—P$	E—R, $P \subseteq R$	E—R—P

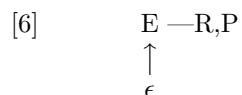
For clarity I will often use the more perspicuous but space-consuming notation in [5], where the arrow shows temporal inclusion:

- [5] a. Past: E
 ↓
 R—P
- b. Present Perfect: P
 ↓
 E—R

The types of perfect differ in how they relate the event structure to the temporal structure E—R denoted by perfect aspect. In particular, let ϵ be the

temporal trace of the event denoted by a verbal predicate, e the temporal trace of the activity leading up to the change of state, and r the temporal trace of the result state. Then the readings of the perfect can be distinguished as follows.

a. The **existential** reading, also known as the experiential reading, is obtained when the event denoted by an atelic or an iterative telic verbal predicate (a state or process) is contained in the interval E.



A sentence with an existential perfect asserts that one or more events of that type occurred during the interval E. The event does not have to extend throughout the entire interval E to the beginning of R (as in the universal reading), and the implicature is that it does not. For example, [1a] asserts that Fred has visited Paris on one or more occasions during a period E extending from some past time up to time R, and implicates that he is not currently visiting Paris.

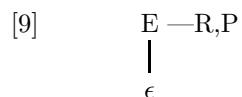
The existential reading is associated with the presupposition that a recurrence of the event type in question is possible (McCawley 1981, Piñon 1996). In particular, the referents of the NP arguments must exist at P time, and the event must be of a repeatable type. [1a] thus implies that Fred might visit Paris again, therefore in particular that Fred is alive and that Paris exists. In contrast, [7a] is incongruous because Nazi Germany no longer exists, and [7b] is incongruous because one can only be born once.³

- [7] a. #Fred has visited Nazi Germany. [Uttered in 2000.]
 b. #Fred has been born in Paris.

The other readings of the perfect are not subject to this constraint:

- [8] Fred has just eaten the last doughnut.

b. The **universal** reading (or continuing reading) arises when the event denoted by an atelic or an iterative telic verbal predicate is coextensive with the interval E.



³However, [7a] seems better than [7b] for some reason that I do not understand.

(I use an arrowless vertical line to mark this relationship). For a sentence with a perfect to be true in the universal reading, the state or process must last for the entire duration of the period terminating at R. For example, [1b] means that the knowing extends through the entire time from 1960 up to R, which in this case is the present.

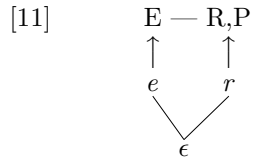
The universal reading requires an adverb specifying a duration (such as *always*, *since 1960* or *for two years*) and so it is tempting to derive it as a special case of the existential reading, resulting from cancellation, by the adverb, of the existential reading's implicature that the event does not obtain throughout E. Such a unification of the universal and existential readings would have to overcome at least three prima facie objections. First, the boundaries that define the duration are understood in an exclusive way in the existential reading but in an inclusive way in the universal reading (Mittwoch 1988). The sentence

[10] I have been in Hyderabad since 1977.

is false on the existential reading if I last was in Hyderabad in 1977 or if I have just landed on my first visit there; it is the intervening time that counts (exclusive boundaries). For the universal reading of [10] to be true I must have been there in 1977 and I must be there now (inclusive boundaries). This difference between the universal and existential readings constitutes a bar to the proposed unification, unless of course it could be shown to be a general property of existential versus universal quantification. The second objection is that some languages disprefer the universal reading of the perfect, or disallow it altogether.⁴ Any claim that the universal reading is derived from the existential perfect would then have to be complemented with an explanation for why the derivation fails in those languages. The third and weightiest objection is that there are, conversely, languages with a special perfect that is restricted just to the existential reading, such as Hungarian and Najdi Arabic, as mentioned above. At least those existential perfects cannot be just implicatures of the universal perfect.

c. The **resultative** reading, also called the state reading, is confined to accomplishment and achievement predicates, which are characterized by a change of state component in their lexical semantic form (Vendler 1957, Dowty 1979, Foley and van Valin 1984, Rappaport Hovav and Levin 1996). An accomplishment predicate, such as *catch* or *hide*, denotes an event ϵ consisting of an activity leading to a change of state. An achievement predicate, such as *die*, *arrive*, denotes an event consisting of a change of state. The resultative reading of the perfect arises when the change of state corresponding to an accomplishment or achievement predicate is temporally located between time E and time R in the perfect's temporal schema.

⁴For example, German prefers the present in sentences like [1b], and (modern) Greek apparently requires it.



In the case of accomplishment predicates, the change of state is temporally located at the onset of R time, and hence the activity leading up to it must immediately precede R. For example, in [1c] *catch the suspect*, the activity of pursuing the suspect is located at E, i.e. it extends from some time prior to R up to R, the change of state is located between E and R, and the result state begins at that point. Because $P \subseteq R$, the sentence entails (or at least implicates) that the suspect is currently in custody — the so-called “current relevance” property of the resultative reading. In the case of achievement predicates, the change of state is again temporally located at the onset of R time, with the same “current relevance” implication, but no activity is entailed to be located at E.

The resultative reading of the present perfect admits deictic adverbs that specify a point included in P ([12a]). It excludes adverbs that denote a point anterior to P ([12b]), and those that denote an interval ([12c,d]).

- [12]
- a. The convict has escaped now (already, at this point). [*Now* specifies a point included in P; R-reading OK.]
 - b. #The convict has escaped three hours ago (yesterday, last year). [*Three hours ago* specifies a point that precedes P; no acceptable reading.⁵]
 - c. #The convict has escaped nowadays (currently, these days). [*Nowadays* specifies an interval that includes P; no acceptable reading.]
 - d. The convict has escaped often recently (in the past, in her previous prison terms). [*In the past* specifies an interval that precedes P; existential reading only.]

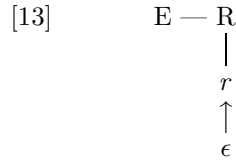
The reason adverbials denoting a point of time anterior to R are incompatible with the meaning of the perfect, is obviously that temporal adverbs relate to R time, and the R time of the present perfect includes P (“now”) time. It is not so obvious why adverbs denoting an interval are excluded. I suppose that temporal adverbs in the R-reading specify the edge between E and R, the point at which the change of state is located, which is incompatible with adverbials denoting an interval.⁶

⁵Such sentences can be amnestied under rather special conditions (Meyer 1992, Ch. 8, Declerck 1991:333). E.g. [12b] is OK if the adverb is read as a separate intonational phrase.

⁶Nondeictic adverbs also seem to be excluded or are at least somewhat peculiar: #*The convict has escaped on July 4, 2000* is odd even if uttered on that date. This is probably not

d. The **recent past** or “hot news” reading is illustrated by [1d], which could only have been uttered felicitously a few days after the event. That this is an independent reading is doubtful. There have been two proposals for reducing it to one of the other readings. McCoard 1978 and McCawley 1981 claim that it is a variant of the existential perfect. This is problematic because the recent past perfect is not subject to the abovementioned constraint on the existential perfect that the re-occurrence of the event type should be possible. Moreover, the existential perfects of Hungarian and Arabic have no recent past reading. The second proposal, due to Michaelis (1994:127, fn. 4), and which I will adopt, is that the recent past reading is a special case of the resultative reading. It is plausible because the resultative reading situates an event at a time which verges on P time, and locates the result state at P time. In support of this view, note that the distinction between [1c] and [1d] goes away when the adverbs are removed, which is not the case for the other examples. Resultative and recent past functions co-occur cross-linguistically, as in the Vedic Sanskrit Aorist (Kiparsky 1998). Therefore, in the rest of this paper I consider the recent past and resultative readings as special cases of a single reading, here referred to as the R-reading.

e. In the **present state** reading, the reference interval is included in the result state corresponding to the verbal predicate. The change of state is not assigned to any temporal parameter, but remains implicit. It is thus not part of this reading of the perfect, though it may be pragmatically inferred. This yields a purely stative interpretation, and strictly present time reference.⁷



In Vedic Sanskrit, this reading is illustrated by such perfects as *veda*, *ciketa* “knows” (from *vid*, *cit* “find out”), *jujoṣa* “enjoys”, *cakāna* “likes”, *bibhāya* “fears”, *taṣṭhau* “stands”, *śiśrāya* “rests on”, *dadhāra* “holds”, *ānaśa* “has”, *babhūva* “is”.

special to the perfect, but a general property of reference to any time that includes P time. E.g. *on Friday* means last Friday or next Friday, not the current day, even if it happens to be a Friday.

⁷There is an analogy between the present state reading and the middle (such as *this wood cuts easily*). Just as in the present state perfect, the event component of an achievement predicate is suppressed, leaving only the result, so in the middle, the causal component of an accomplishment predicate is suppressed, leaving only the change of state. In each case, the highest predicate in the semantic decomposition is suppressed. Could this be the rationale behind the probable historical identity of the Indo-European perfect and middle?

I now turn to the English evidence for the perfect's polysemy, and for its analysis in terms of alternative mappings of event structure onto the temporal parameters. I will argue that this analysis solves three puzzles:

- [14]
- Declerck's sequence of tense puzzle.
 - Klein's present perfect puzzle.
 - Michaelis' Wh-puzzle.

These will be discussed in turn.

2 The Sequence of Tense Puzzle

It was noted by Declerck 1991:174 that sequence of tense distinguishes between resultative and existential/universal readings. While the resultative perfect never triggers tense shift from present to past in subordinate clauses, the existential and universal readings can trigger tense shift:

- [15]
- a. #I have finally realized that the earth was round. [Resultative]
 - b. I have always known that the earth was round. [Universal]
 - c. I have often thought that the earth was round. [Existential]

In reference to the proposition that the earth is round, [15a] is anomalous, whereas [15b,c] are acceptable. Such data refute the view that sequence of tense is a purely morphological or syntactic phenomenon, as Declerck makes clear.⁸ In particular, they are incompatible with classical Reichenbach-style theories, which traffic only in the temporal parameters and assign perfects the single representation E—R,P. In these, the interpretation of tense in subordinate clauses must be a matter of associating one of their temporal parameters with a temporal parameter of the main clause, leaving no scope for the contrast in [15].⁹

Using the modification of Reichenbachian theory sketched out in the preceding section, on which perfects are not merely specified as E—R, but for how

⁸There is of course much other evidence which shows the same thing. For example, Binnick 1991:65 points out that a sentence such as *Jack was leaving the next day* cannot be embedded as *# Jill believed Jack to have been leaving the next day*. here . . . *to be leaving* . . . is the only possibility.

⁹That includes syntacticized versions of Reichenbach theory, such as Hornstein 1990 and Stowell 1996. For example, Hornstein's sequence of tense rule associates the subordinate clause's P with the main clause's E, and shifts the morphological tense from present to past when the main clause's E is a past time. For the perfect, this would predict that tense shift would be triggered not only by the existential and universal perfect [15b,c], but also by the resultative perfect [15a], contrary to fact.

the event structure specified by the lexical content of the verb is mapped to those parameters, we can solve the problem by assuming that the P time of the subordinate clause is anchored to the temporal trace of the event, rather than to one of the temporal parameters of the main clause. The contrast seen in [15] is then accounted for by the proposed representations of the R-reading and the existential and universal perfects.

To implement the analysis we assume the following rules for tenses in complements and relative clauses (where P_{sub} , P_{main} stand for the P of the subordinate and main clause, respectively):

- [16] a. *Tense subordination*: P_{sub} includes the temporal trace of the event denoted by the main clause.
- b. *Independent tense*: P_{sub} may include P_{main} . (optional)
- c. *Sequence of tense*: If $P_{sub} - P_{main}$, the verb of the subordinate clause has past tense (i.e. simple past or past perfect).

Although the intrinsic function of past tense is to mark that R is anterior to P within a clause, [16c] allows it to mark also that P of a subordinate clause is anterior to P of a main clause. The difference between languages like English which have sequence of tense and languages like Sanskrit which do not have sequence of tense is then a matter of whether [16c] is applicable in them.¹⁰

The different ways of relating event structure and the temporal parameters predict different temporal relations between main and subordinate clause. Consider first a future subordinated to a past:

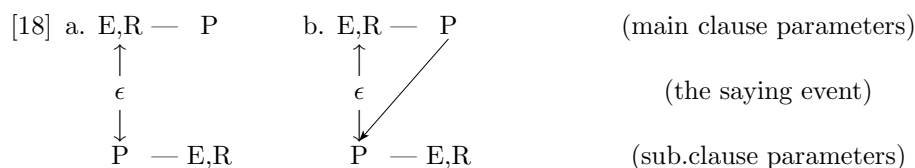
- [17] a. John said that he would leave. [(i) ... and he did; (ii) ... and he will.]
- b. John said that he will leave. [(i) *... and he did; (ii) ... and he will.]

[17a] and [17b] both assert that John said that he would leave at some time after he spoke; [17b] in addition places this departure after P time: it can be true only if John has not yet left.¹¹

Writing the main clause above the subordinate clause in the temporal representations of complex sentences, [17a] and [17b] look like this:

¹⁰In truth, [16c] is no more than a makeshift descriptive solution. It should probably be extended to other deictic dependencies of subordinate clauses with respect to main clauses, involving such categories as person and spatial orientation. Languages that lack sequence of tense seem to lack all these deictic shifts.

¹¹John might have explicitly stated when he would leave, or the fact that his departure would follow P time could be an inference of the speaker.



The rules in [16] derive [18] as follows. By [16a], the P_{sub} time relative to which the leaving is in the future is anchored to the saying event ϵ . The past tense *said* locates the saying event (and P_{sub} with it) at E_{main}/R_{main} preceding P_{main} . This represents the temporal relations of [17a]. Here P_{sub} precedes P_{main} , so that we get past tense by [16c]. A second, more restrictive reading is derived by letting P_{sub} include P_{main} by the option [16b]. This locates the leaving event after P_{main} , which is to say after “now” time. Since P_{sub} includes P_{main} , [16c] is inapplicable, yielding [17b].

Both [17a] and [17b] are unambiguous, for [16c] signals non-application of [16b] in [17b], given that [16c] is the only possible source of past tense in [16b] (*would* not being available as an independent past tense). Ambiguities are created under two circumstances: whenever [16b] applies without effect on the applicability of [16c], and whenever a subordinate past tense has an independent source. I will consider these two cases in turn.

An example of the first type of ambiguity is [19].

[19] John will say that he lives in California.

By [16a], P_{sub} is anchored to the saying event, which follows P_{main} , i.e. is temporally located in the future. Therefore, [19] implies that John will say at some future time that he lives in California at that time. In addition, [16b] allows P_{sub} to be synchronized with P_{main} , yielding a more restrictive reading [20b] with the additional entailment that he lives in California at P_{main} , i.e. “now”.

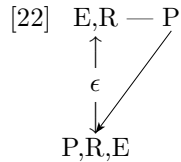


Because neither reading shows the relation $P_{sub}—P_{main}$, [16c] is inapplicable and the two interpretations of [19] are morphologically identical.

As an example of the second type of ambiguity, consider [21], discussed by Enç 1987 and By Hornstein 1990:126 ff.

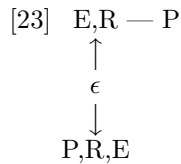
- [21] a. John knew that Mary is pregnant.
 b. John knew that Mary was pregnant.

For [21a] to be true, Mary must have been pregnant both when John knew she was and she must still be pregnant at the current P time.

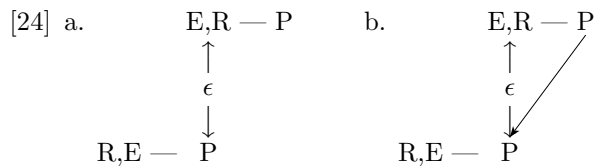


[16a] anchors P_{sub} to the knowing event, which is temporally located in the past. [16b] applies, making [16c] inapplicable. Therefore, the subordinate clause is temporally unmarked (“present”) in this reading.

Next consider [21b], which comes out with three interpretations. First, if [16b] does not apply in [22], the subordinate clause gets a shifted past tense by [16c], and we derive the reading of [21a] on which Mary was pregnant when John knew she was.



Secondly, if the subordinate clause has an inherent past (R—P), [16b] may again apply or not, yielding [24a] and [24b], both of which mean that Mary was pregnant before John knew it, and she was no longer pregnant when John came to know it.



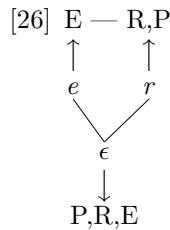
[24a,b] are not obviously distinct, but it seems they can be distinguished by whether deictic time adverbs in the subordinate clause (such as *three weeks ago*) refer only to the time of the embedded event or to current P time as well.

Subordinate past perfects show a similar ambiguity, to which we will return in the next section.

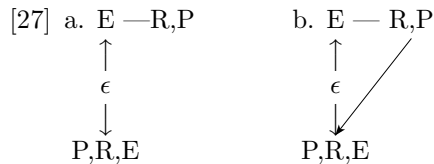
Now we are ready to return to the sequence of tense contrast between resultative and existential/universal perfects in [15], repeated here in [25]:

- [25] a. #I have finally realized that the earth was round. [Resultative]
 b. I have finally realized that the earth is round. [Resultative]
 c. I have always known that the earth was round. [Universal]
 d. I have often thought that the earth was round. [Existential]

In the R-reading of the present perfect, the subevents of an event denoted by a telic predicate are contained in E and R,P respectively. P_{sub} does not precede P_{main} but includes it, and [16c] is inapplicable.



In the existential and universal readings, the entire event is respectively contained in and coextensive with E, so P_{sub} precedes P_{main} , and if the option [16b] is not chosen, [16c] applies (optional sequence of tense).



Thus the contrast seen in [25] is accounted for by the previously motivated analysis of the perfect.

Embedded sentences with telic predicates, such as [28a], don't have this ambiguity. They have only the independent past tense reading. The shifted reading is not available because telic predicates do not allow the temporal relation $E,P \subseteq R$, a prohibition which applies to the plain and shifted present alike, as [28b] shows, and follows from the meaning $E _ P$.

- [28] a. John knew that the convict escaped. [OK only on the reading on which the escape preceded the hearing.]
 b. #The convict escapes. [OK only as a historical present.]

[16] can be generalized to main clauses in the scope of *implicit* perspectival predicates. Several authors have interpreted main clause past perfects in “flash-backs” and free indirect speech along these lines (Banfield 1982, Declerck 1991, Ch. 2, Kamp and Reyle 1993:594):

[29] John came to work at noon yesterday. He had woken up at 10. He had made coffee and eaten breakfast.

If each past perfect in [29] has the same R as the past tense of the first clause, then how can they constitute a narrative progression? On the other hand, if each has a different R, why do they all denote events anterior to the event of first clause? The solution is to assume that such past perfects are governed by the perspective time of the first clause, even though they are not syntactically subordinated to it. We can think of them as subordinated to a perspectival operator which extends over a stretch of discourse. Even apart from past perfects, this is clearly necessary anyway for past tenses in such cases as:

- [30] a. What was your name again?
b. Tarzan was not yet king of the jungle. That would come later.¹²

Sequences of past perfects allow distinct R times, and that enables them to advance the narrative (just like sequences of plain past tenses). But the successive R times of the past perfects all precede the P time of their clause, and this is anchored to the event denoted by the first clause, and so cannot advance beyond it.¹³ This is why the perfect is not a narrative tense.

Let us verify that our treatment of sequence of tense correctly generalizes to *before* and *after*. In the data in [31], the question is why [31a,b] are truth-conditionally equivalent, and why [31c] is anomalous.

- [31] a. John died after he climbed the mountain.
b. John died after he had climbed the mountain.
c. #John died before he climbed the mountain.
d. John died before he had climbed the mountain.

Assume that *after* and *before* impose a temporal ordering on the reference times R_a , R_b of the main clause A and the subordinate clause B. Thus “A after B” means that R_a follows R_b , and “A before B” means that R_a precedes R_b . Then, in [31a,b], we have $R_{climb}—R_{die}$ (from *after*), and in [31b], also $E_{climb}—R_{climb}$ (from the perfect). This gives the correct reading for both cases. In [31c,d] we correspondingly get $R_{die}—R_{climb}$. But, in [31c], since $E \subseteq R$, this implies $E_{die}—E_{climb}$, which is impossible. Hence [31c] is anomalous. In [31d], we have $R_{die}—R_{climb}$ (from *before*) and $E_{die}—R_{climb}$ (from the perfect), which, with the resultative perfect’s mapping of event structure to the temporal parameters allows the interpretation that John dies prior to completion of the climbing.

¹²I owe this example to a lecture by J. McCawley.

¹³But if the last sentence in [29] is changed to past tense (*He made coffee and ate breakfast*), the inference is that the event took place *after* John came to work.

In this section I have sketched out a semantic account of the temporal relation between subordinate and main clauses, in which the rules [16] do most of the work. With the additional assumption that tenses can be subordinated to a past implied in discourse, the account generalizes to free indirect discourse and flashbacks. The next section builds on this result to solve another puzzle about the perfect.

3 The present perfect puzzle

With respect to point-denoting adverbials in the R-reading, the past and future perfects differ from the present perfect in a surprising way. The present perfect is not compatible with adverbials denoting a specific past time (see [12b], [32a]). But the past perfect is not only compatible with such adverbials, it even allows two distinct readings with them! The time adverbial may be read as specifying either the *terminus ante quem* of the event (reading 1) or the culmination of the event itself (reading 2):

- [32] a. #The convict has escaped at 3.
b. The convict had escaped at 3.
Reading 1: At 3, the convict had (already) escaped [the actual time of escape may have been earlier].
Reading 2: The convict had escaped, and the escape took place at 3.

These data pose a famous problem for the theory of tense (Bertinetto 1982, Klein 1992). The ambiguity of the past perfect in sentences like [32b] has been taken to show that, contrary to the original assumption that adverbs relate only to R time, adverbs in the past perfect can associate either with the reference time R (reading 1) or with the event time E (reading 2). But then, why is even the latter reading unavailable in the present perfect, where the same option ought to be available?

Bertinetto 1982 proposes to solve this problem by introducing another parameter L (“localization”), an otherwise unmotivated enrichment of the Reichenbachian system, it seems. Klein, on the other hand, proposes a pragmatic constraint to the effect that event times and reference times cannot be simultaneously fixed to specific intervals. However, this does not look like a pragmatic constraint because it is neither motivated by rational communicative principles nor defeasible by explicit contrary information. Moreover, Michaelis 1994 also points out that Klein’s proposal is undermined by discourses in which both these two times are in fact fixed (such as [29]). Her own solution is to place a construction-specific constraint on the R-reading, also a conceptually undesirable step that we would like to avoid if possible.

Let us continue to assume that temporal adverbs relate only to R time. We can then maintain the previously stated straightforward semantic explanation for why the present perfect cannot be modified by past tense adverbs, namely that its R time includes its P (“now”) time. The past perfect, on the other hand, can be modified by past tense adverbs because its R time precedes P time. Thus the present perfect puzzle simply disappears. But of course now we have to find another explanation for the ambiguity of the past perfect seen in sentences like [32b].

We can account for that ambiguity by means of the ambiguity between the existential and resultative perfect that we have already motivated on the basis of semantics and sequence of tense. Our solution to the ambiguity of sentences like [32b] is this:

- [33] a. Reading 1 has the existential perfect.
 b. Reading 2 has the resultative perfect.

To show why this is the right analysis, let us start with overtly embedded past perfects, and then turn to cases like [32b] where the past perfect is embedded under an implicit past operator.

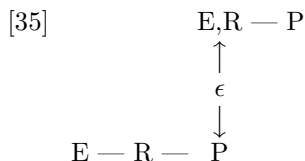
When [32b] is embedded under a past tense main clause, we get the same ambiguity as before:

- [34] John heard that the convict had escaped at 3.

Reading 1: John heard that at 3, the convict had already escaped [the actual time of escape may have been earlier].

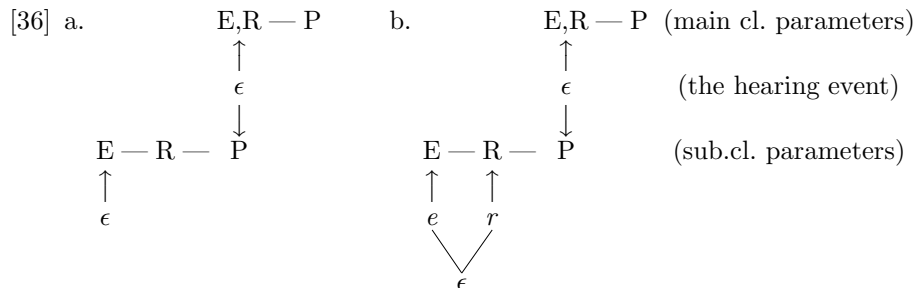
Reading 2: John heard that the convict had escaped, and that the escape took place at 3.

The reading as an embedded present perfect with sequence of tense from [16c] is excluded by the constraint mentioned in connection with [12e] in fn. 6 (erasing the adverb or substituting an adverb such as *then*, corresponding to the present perfect’s *now*, would render it acceptable). The reading as an embedded past perfect is fine, though, with $R_{sub} = at\ 3$.



But as we know already, this corresponds to two distinct readings depending on how the event structure of the escaping event is mapped to the subordinate

clause’s temporal parameters. In the existential reading (reading 1 of [34]) there was at least one escape during the interval E_{sub} , with the result state possibly initiated before 3 P.M., and no entailment that the convict was still at large at 3 (she might have been caught again by that time.) In the R-reading (reading 2), there was an escape that culminates at time R_{main} , and the convict is still at large at main clause R time. These are the respective readings of [34].



If [16] can be triggered by an implicit past context (as we supposed at [29]), we can extend the analysis of the overtly embedded case in [34] to explain the ambiguity of [32b]. Again, the existential reading yields reading 1, and the resultative reading yields reading 2. The point is that [32b] is ambiguous in exactly the same way due to the contextually implied past.

The upshot is that there is no shift of past to past perfect in sequence of tenses as many writers have supposed. The apparent “past perfect as back-shifted past” is really the existential reading of the past perfect. This fits well with our previous observation that the existential reading of the present perfect functions like a past tense in triggering sequence of tense (see [25]).

The ambiguity of the future perfect (Comrie 1976) follows analogously from its temporal specification $E-R$, $P-R$.

[37] The convict will have escaped tomorrow at 3.

Reading 1: Tomorrow at 3, the convict will have escaped.

Reading 2: The convict will complete an escape tomorrow at 3.

As before, reading 1 is the existential reading (the escape falls within E, before 3) and reading 2 is the R-reading (the escape culminates at the E/R edge, i.e. at 3).¹⁴ Again, there is no need to assume that the past tense “becomes” a perfect in infinitives. The perfect’s own meaning is responsible for all its uses.

Finally, what about perfect infinitives such as [38]?

¹⁴Note that the constraint of fn. 6 can have no effect on future and modal perfects.

[38] John claims to have escaped yesterday.

They can receive the same analysis on the assumption that the infinitive is unspecified for the relation between P and R. In [38], *yesterday* forces the past tense interpretation R—P, and the ambiguity is explained as before as a reflex of the perfect’s ambiguity between resultative and existential/universal readings.

In this section we have seen that the account of the perfect’s ambiguity proposed in section 1, coupled with the account of tense subordination in section 2, makes it possible to solve the present perfect puzzle without positing either unmotivated pragmatic constraints or construction-specific grammatical properties of the R-reading.

4 The Wh-puzzle

In the presence of adverbial Wh-questions, the existential reading, however far-fetched, is always available. As noted by Michaelis 1994, the R-reading is crisply excluded unless the adverbial relates to the result state:

- [39] a. (#)Where have the police caught the suspect? [No R-reading, only the existential reading “In what places have the police caught the suspect (over the years)?”]
b. #Where has Archduke Ferdinand died? #At what age has he died? [No R-reading; the existential reading presupposes resurrection.]
c. Where have you hidden my watch? [R-reading OK.]
d. (#)Where have you found my watch? [Existential reading only.]
e. (#)When have you hidden my watch? [Existential reading only.]
f. How have you worded the letter? [R-reading OK.]
g. (#)How have you found the letter? [Existential reading only.]

The subcategorized adverbials associated with *hide* and with *word* in [39c,f] specify a property of the result state, while non-subcategorized adverbials associated with *die* and *find* in [39b,d,g] specify a property that obtains at the time when the activity leading up to it terminates. For example, the locative in [39c] specifies the location of the watch from the time it was hidden, whereas the locative in [39d] specifies the location of the watch up to the time it was found.

According to a suggestion by Michaelis, in the R-reading the change of state is an assertion and the activity leading up to it is a presupposition, and the unacceptable Wh-questions in [39] are ruled out because an element in a presupposition has been questioned. This is known on other grounds to be unacceptable:

- [40] a. What did Mary believe (#know) that John took?
 b. Who did John read a (#the) book by?

Similar contrasts to those in questions appear with focus. Compared to [41a], [41b] is odd because the main clause and the subordinate clause are assigned inconsistent readings.

- [41] a. Not only did he FIND that lost letter, he even found it IN HIS OWN POCKET.
 b. #Not only has he FOUND that lost letter, he has even found it IN HIS OWN POCKET.

The first clause of [41b] invites the R-reading, but in the second clause the focus on a non-subcategorized adverbial in a perfect seems to force the existential reading; this incongruity explains the oddity of the sentence. Generalizing Michaelis' proposal to these sentences, I venture the conjecture that *an element in a presupposition cannot be focused*.

But why is it only in the R-reading that the change of state can be an assertion and the activity leading up to it a presupposition? We can understand this on the basis of the special character of the R-reading that was justified in the preceding sections. The R-reading is the only reading in which the change of state and the activity leading up to it are temporally distinguished, by being assigned to the parameters E and R, respectively. In the existential and universal readings, the activity and the resulting change of state are not temporally distinguished; thus only the entire event, respectively contained in or coextensive with E, can be asserted or presupposed.

5 Summary

I have proposed a modified Reichenbachian theory which allows perfects to be specified for how the event structure specified by the lexical content of the verb is mapped to the perfect's temporal structure E—R. It predicts that the well-known distinction between the readings of perfect is structurally relevant (and not just a pragmatic effect). I have presented three arguments for this view from English. The first argument is that my proposal explains why the existential perfect triggers sequence of tense like a past tense whereas the resultative perfect does not. The second argument is that it solves the so-called present perfect puzzle without positing either unmotivated pragmatic constraints or construction-specific grammatical properties of the perfect. The third argument is that it contributes to explaining why the resultative perfect is excluded in adverbial Wh-questions unless the adverbial relates to the result state. presupposition.

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