

On the Present Perfect Puzzle

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1. The Puzzle Illustrated

In English, the present perfect, unlike future, past, and non-finite perfects, cannot be modified by so-called ‘positional’ adverbials (Comrie 1976, McCoard 1978, a.o.). This phenomenon is known as the *present perfect puzzle* (Klein 1992).

- (1) a. *Alicia has danced *on Monday / yesterday / at 10 o'clock*.
b. Alicia will have danced *on Monday / at 10 o'clock*.
c. Alicia had danced *on Monday / yesterday / at 10 o'clock*.
d. Alicia must have danced *on Monday / yesterday / at 10 o'clock*.

The prohibition against positional adverbials in the present perfect is not found in German (as seen in (2)), Dutch, Icelandic, or Italian. Notably, a present perfect morpho-syntax in these languages does not have the meaning of PAST¹, since it is compatible with present adverbials (Giorgi and Pianesi 1998, Musan 2001), a fact also illustrated in (2).

- (2) Hans ist {*gestern um zehn / jetzt*} weggegangen. German
Hans is yesterday at 10 now left (Musan 2001)
'Hans has left yesterday at 10 / now.'

The puzzle has proved rather difficult to solve (see Dowty 1979, Klein 1992, Giorgi and Pianesi 1998, Kiparsky 2002, Katz 2003, Portner 2003, a.o.). Lack of space prevents us from discussing the previous accounts in any detail. We can only note here that none are without problems, and hence we consider the puzzle still unresolved.

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¹ We use capitalized regular font (e.g., Tense) for the syntactic category/node, small caps (e.g., PAST, PERFECT) for the semantic feature, and lowercase font (e.g., past, perfect) for the morpho-syntactic realization of the semantic feature (e.g. a *-d/-*-suffixed verb, an auxiliary + past participle).

2. The Main Ingredients of the Proposal

A present perfect locates an eventuality (e.g., *Alicia's dance* in (1)) relative to a time interval that extends in the past. The intuition that we want to capture is that in English, though not in German, this interval necessarily includes the speech time, and hence cannot be modified by positional adverbials. This intuition is shared by many accounts of the perfect, most notably the Extended Now (XN) theory (McCoard 1978, Dowty 1979, a.o.). Our formalization of the intuition is novel in several respects.

Specifically, we propose that the inclusion/exclusion of the speech time is not solely due to the lexical meaning of PERFECT in its combination with PRESENT. The strictly compositional meaning of PRESENT PERFECT is compatible with intervals that precede the speech time. This meaning is, however, further restricted in English, because of competition with a semantic formative with a more specified meaning, namely PAST. The particular semantics of PRESENT is the reason PAST is a stronger scalar alternative to PRESENT PERFECT in English. PRESENT PERFECT is strengthened to non-PAST, requiring inclusion of the speech time. Failure of modification by positional adverbials then follows, as intervals including the speech time may not be modified by e.g. *yesterday*. PRESENT PERFECT is not strengthened in German, because of the different meaning of PRESENT in this language. Since inclusion of the speech time is not required, positional adverbials are predictably acceptable.

Below we present in more detail the three main components of our solution to the present perfect puzzle: (i) weak semantics for PERFECT, (ii) a cross-linguistic variation in the semantics of PRESENT, and (iii) a mechanism of grammatical competition and strengthening of meaning. But first we turn to the necessary background assumptions.

2.1. Background Assumptions

We assume a tense-aspect architecture as in (3) and interpretations as in (4). Tenses relate an interval (commonly called *reference time*) with respect to the speech time (t_c).² Tenses are treated here as variables with presuppositions, after Partee (1973), Heim (1994), Schlenker (1999), von Stechow (2003)³. PERFECT relates an interval called here the *Perfect Time Span (PTS)*⁴ and the reference time in a way, which will be made precise in the next subsection. The aspectual system is two-tiered (e.g., Smith 1991). Viewpoint aspects set up an interval – the interval at which an eventuality holds, called the *event time* – in relation to an evaluation interval. Composed with Tense, the Viewpoint aspects

² Embedded tenses are not directly interpreted relative to the speech time. We assume that tense features are deleted under semantic binding by verbs (see von Stechow 2003).

³ Temporal variables may not be interpreted in the scope positions occupied by the tense features. Apposition to the variable, expressing the presupposition, is needed, as already reflected in (4a). Existential closure then applies (see Schlenker 1999, von Stechow 2003 for details of the formalization.)

⁴ Perfect Time Span is a term introduced in Iatridou et al. (2001) for the concept of XN; it has the advantage of generalizing over intervals extending back in time from any reference time, not just a present one. The PTS in our proposal has weaker restrictions on its temporal location, than the PTS of Iatridou et al.

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temporally situate the event time relative to the reference time. Composed with PERFECT, the Viewpoint aspects temporally situate the event time relative to the PTS. ν Ps denote predicates of eventualities.

- (3) $[_{TP} \text{ Tense } [_{PerfP} \text{ Perfect } [_{AspP} \text{ Viewpoint-Aspect } [_{\nu P} \text{ Aktionsart }]]]]$
- (4) a. $[[\text{PAST}_1]]$ = $\lambda p_{(it)}. \lambda t_{1(i)} [t_1 < t_c \ \& \ p(t_1)]$
 $[[\text{PRESENT}_1]]$ = $\lambda p_{(it)}. \lambda t_{1(i)} [t_1 = t_c \ \& \ p(t_1)]$ (to be further qualified)
 b. $[[\text{PERFECT}]]$ = $\lambda p_{(it)}. \lambda t_{(i)}. \exists t'_{(i)} [t' R t \ \& \ p(t')]$ (to be specified)
 c. $[[\text{IMPERFECTIVE}]]$ = $\lambda P_{(\nu t)}. \lambda t_{(i)}. \exists e_{(\nu)} [t \subseteq \tau(e) \ \& \ P(e)]$
 $[[\text{PERFECTIVE}]]$ = $\lambda P_{(\nu t)}. \lambda t_{(i)}. \exists e_{(\nu)} [\tau(e) \subset t \ \& \ P(e)]$
 d. $[[\nu P]]$ = $\lambda e_{(\nu)}. P(e)$

We further assume that positional adverbials have different semantics from the time adverbials acceptable in a present perfect, such as e.g., *on (a) Monday*, certain instances of *on Monday/at 10 o'clock* (see (5)). As has been noted before, the prohibition is against specific temporal adverbials (cf. Heny 1982, Klein 1992, Giorgi and Pianesi 1998, a.o.). The meanings we assume are as in (6) (cf. Pratt and Francez 2001, von Stechow 2002, a.o.). Adverbials such as *on Monday, at 10 o'clock* conceal two structures and corresponding meanings: as in (6b) and (6c).

- (5) a. Alicia has danced *on a Monday*.
 b. Alicia has often/never danced *on (a) Monday/at 10 o'clock*.
- (6) a. $[[\text{yesterday}]]$ = $\lambda p_{(it)}. \lambda t_{(i)} [t \subseteq \text{yesterday}_c \ \& \ p(t)]$
 b. $[[\text{on Monday}]]$ = $\lambda p_{(it)}. \lambda t_{(i)} [t \subseteq \text{Monday}_c \ \& \ p(t)]$
 c. $[[\text{on a Monday}]]$ = $\lambda p_{(it)}. \lambda t_{(i)}. \exists t'_{(i)} [\text{Monday}(t') \ \& \ t' \subseteq t \ \& \ p(t')]$

Consider now the question of where in the structure of a present perfect positional adverbials can be interpreted. Given the tense-aspect architecture and meanings we adopted, composing νP with time adverbials is not possible for type reasons. Three modification structures are in principle available: the adverbials can compose with TP, PerfP or AspP, as in (7). The LFs in (7a) yield semantically equivalent, and contradictory, statements. They involve reference time modification and a present reference time cannot be in yesterday_c (a point made by pretty much every account).

- (7) a. i. $\text{yesterday } [_{TP} \text{ PRESENT}_1 \ [_{PerfP} \text{ PERFECT } [_{AspP} \text{ PERFECTIVE } [_{\nu P} \text{ Alicia dance}]]]]]$
 ii. $[_{TP} \text{ PRESENT}_1 \ \text{yesterday } [_{PerfP} \text{ PERFECT } [_{AspP} \text{ PERFECTIVE } [_{\nu P} \text{ Alicia dance}]]]]]$
 = $\exists t_1 [t_1 = t_c \ \& \ t_1 \subseteq \text{yesterday}_c \ \& \ \exists t_2 [t_2 R t_1 \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \text{dance}(A, e)]]]$
- b. $[_{TP} \text{ PRESENT}_1 \ [_{PerfP} \text{ PERFECT } \text{yesterday } [_{AspP} \text{ PERFECTIVE } [_{\nu P} \text{ Alicia dance}]]]]]$
 = $\exists t_1 [t_1 = t_c \ \& \ \exists t_2 [t_2 R t_1 \ \& \ t_2 \subseteq \text{yesterday}_c \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \text{dance}(A, e)]]]$

The only structure that can yield a contingent interpretation is (7b), where the adverbial modifies the PTS. Therefore, this has to be the source of the present perfect puzzle.

2.2. Weak, Interval-Based Semantics for PERFECT

We propose that the semantic contribution of PERFECT, in both English and German, is to introduce an interval – the PTS – no part of which may be after the local evaluation time, as in (8).⁵ Our proposal is in the spirit of the XN theory. But whereas the XN has to include the reference time as its final subinterval, the PTS has weaker restrictions: it may also precede and partially overlap with the reference time, or it may entirely precede it.⁶

$$(8) \quad \llbracket \text{PERFECT} \rrbracket = \lambda p_{(it)}. \lambda t_{(i)}. \exists t'_{(i)} [t' \leq t \ \& \ p(t')] \quad (t' \leq t \text{ iff there is no } t'' \subset t', \text{ s.t. } t'' > t)$$

2.3. Cross-Linguistic Variation in the Meaning of PRESENT

We adopt a suggestion by Klein (1992), Giorgi and Pianesi (1998), a.o., that the semantics of PRESENT_i is different in English and German. Specifically, we propose that in English, PRESENT_i introduces an interval coextensive with the speech time, whereas in German, it introduces an interval no part of which may precede the speech time.⁷ The contrast between (10) and (11) illustrates the meaning difference: the English present is not compatible with future adverbials⁸, whereas the German present is.

$$(9) \quad \begin{array}{ll} \text{a. } \llbracket \text{PRESENT}_1 \rrbracket = \lambda p_{(it)}. \lambda t_{1(i)} [t_1 = t_c \ \& \ p(t_1)] & \text{English} \\ \text{b. } \llbracket \text{PRESENT}_1 \rrbracket = \lambda p_{(it)}. \lambda t_{1(i)} [t_1 \geq t_c \ \& \ p(t_1)] & \text{German} \\ & \text{where } t' \geq t \text{ iff there is no } t'' \subset t', \text{ such that } t'' < t \end{array}$$

- (10) a. # Fred is sick in 10 days.
 b. # It {rains/is raining} next week.

⁵ Musan (2001) proposes a similar meaning for the German PERFECT.

⁶ There are no interesting consequences of the distinction between (i) the PTS partially intersecting with the speech time, or (ii) the PTS including the speech time as a final subinterval. The speech time is sometimes conceived of as a point, which would obliterate this distinction anyway.

⁷ It has been argued that in German, the PRESENT_i interval may extend prior to the speech time (Giorgi and Pianesi 1998, a.o.). The contrast between (i) and (ii) is often given as evidence. Our proposal does not depend on this specific aspect of the meaning of PRESENT_i. We note in passing that von Stechow (2002) gives an alternative explanation for the acceptability of (i), relating it to the meaning of *seit* (see also Musan 2003). When this factor is controlled for, German is like English (see (iii)-(iv)).

(i) Maria wartet seit gestern auf Hans. (Musan 2003)

Maria waits since yesterday on Hans
 'Maria has been waiting on Hans since yesterday.'

(ii) *Maria lives in LA since 2000.

(iii) *Maria wohnt in LA ab dem Jahr 2000.

Maria lives in LA from the year 2000
 'Alexandra has lived in LA since 2000.'

(iv) *Alexandra lives in LA from 2000 onwards / from 2000 till now.

Furthermore, if the PRESENT_i interval could extend prior to the speech time, it should be possible for the calling event in (v) to be before the speech time. Yet this is not the case.

(v) Ich rufe Hubert heute einmal an
 I call Hubert today once up

only: 'I will call Hubert today once.' not: 'I called Hubert today once.'

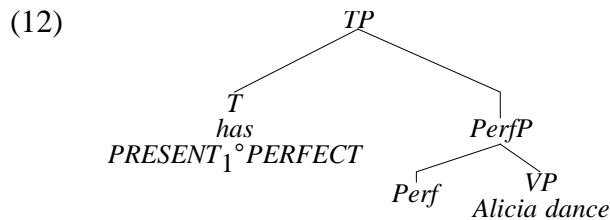
⁸ Only planned events can receive future interpretation with the present in English.

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- (11) a. Fritz ist in 10 Tagen krank.
 Fritz is in 10 days sick
 ‘Fritz will be sick in 10 days.’
- b. Nächste Woche ist das Wetter schlecht.
 next week is the weather bad
 ‘Next week the weather will be bad.’

2.4. Grammatical Competition between PRESENT PERFECT and PAST

Here are the outlines of a theory of feature distribution that is compatible with the idea of grammatical competition. Semantic features such as PRESENT_i, PAST_i, PERFECT, etc. are specified at syntactic terminal nodes, according to the architecture in (3). In the unmarked case, the feature PERFECT moves to Aux *have/be*. Feature-movement leaves no trace/copy behind. When the auxiliary is finite, it, together with the feature PERFECT, moves to T. PRESENT_i and PERFECT thus meet at finite T (see (12)), and form the complex operator PRESENT_i° PERFECT, as in (13). If the auxiliary is non-finite, PRESENT_i and PERFECT do not meet, as in (14). (In the trees below we ignore the issue of pronunciation, both with respect to the position of the subject, and concerning the morphology on the verb⁹.)



- (13) $[[\text{PRESENT}_1^\circ \text{ PERFECT }]]$ = $\lambda p_{(it)}. \text{PRESENT}_1 (\text{PERFECT } (p)) =$
 = $\lambda p \text{ PRES}_1 \lambda t_1 \exists t_2 [t_2 \leq t_1 \ \& \ p(t_2)]$

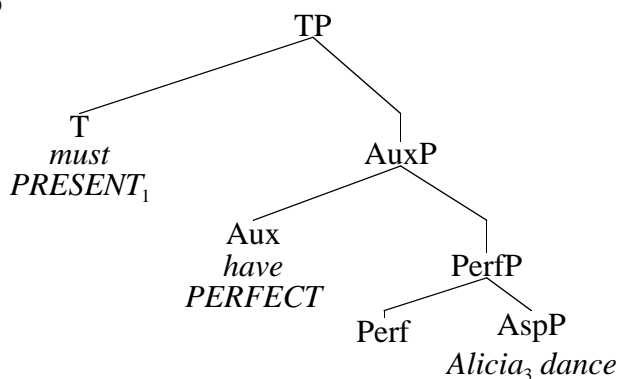
⁹ The correspondence between the semantic temporal features and the verbal morphology can be stated in various ways. In von Stechow (2003), for instance, uninterpretable temporal features on verbs determine the morphology. These features are checked against the interpretable ones and deleted at LF.

(14)¹⁰

A general principle dictates that meanings be expressed by the most specified form available. A familiar application of this principle is the realization of syntactic features by morphological forms. For instance, in a theory such as Distributed Morphology (Halle and Marantz 1993, a.o.), vocabulary items compete for insertion in syntactic terminal nodes, based on their feature specification. The vocabulary item that best matches the information in the syntactic node (i.e., the most specified one) wins the competition.

In an analogous way, semantic features realized at the same syntactic node compete with each other. The competition applies in the construction of an LF, both on the basis of an intended meaning (by a speaker), and on the basis of an utterance (by a hearer). Given an intended meaning, a speaker chooses the most specified semantic feature available in the language, to express at a syntactic node. Similarly, upon comprehending an utterance, a hearer chooses the most specified semantic feature available that corresponds to the morphology realized at a syntactic node. Among the temporal features, $PAST_i$, for instance, competes with $PRESENT_i$ as only one of them can occupy finite T. Since the two do not share aspects of their meaning, i.e., no interval can be described by both $PAST_i$ and $PRESENT_i$, the outcome of the competition is trivial. The interesting cases of competition are when one feature's meaning is less specified than that of another. The feature that has the more specified meaning wins in every case when it can be expressed as a value of the syntactic node. Therefore, when a feature with a less specified meaning is realized as a value of a syntactic node, it must be because its more highly specified competitor couldn't appropriately be used. As a result, the meaning of

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the less specified feature is restricted: those aspects of the meaning that are shared between the competing features are no longer available.

2.5. Present Perfect in English and German

In both English and German, $\text{PRESENT}_i \circ \text{PERFECT}$ and PAST_i compete for expression at the finite T node. The meaning of $\text{PRESENT}_i \circ \text{PERFECT}$, though, is different in the two languages, because the meaning of PRESENT_i is. The results of the competition are thus different in the two languages.

In English, $\text{PRESENT}_i \circ \text{PERFECT}$ is less specified than PAST_i . PAST_i denotes an interval that is strictly before the speech time, as in (15). The restrictions on $\text{PRESENT}_i \circ \text{PERFECT}$ are weaker: it sets up an interval that does not extend after the speech time, as in (16a). $\text{PRESENT}_i \circ \text{PERFECT}$ in English relates the PTS directly to the speech time, because PRESENT_i makes the reference time coextensive with the speech time.

$$(15) \quad \llbracket \text{PAST}_1 \rrbracket = \lambda p \exists t_1 [t_1 < t_c \ \& \ p(t_1)]$$

$$(16) \quad \llbracket \text{PRESENT}_1 \circ \text{PERFECT} \rrbracket = \lambda p \text{PRES}_1 \lambda t_1 \exists t_2 [t_2 \leq t_1 \ \& \ p(t_2)] =$$

a. $= \lambda p \exists t_1 [t_1 = t_c \ \& \ \exists t_2 [t_2 \leq t_1 \ \& \ p(t_2)]] = \lambda p \exists t_2 [t_2 \leq t_c \ \& \ p(t_2)]$	English
b. $= \lambda p \exists t_1 [t_1 \geq t_c \ \& \ \exists t_2 [t_2 \leq t_1 \ \& \ p(t_2)]]$	German

As a result, when $\text{PRESENT}_i \circ \text{PERFECT}$ is the value of T, its meaning is restricted to the complement of PAST_i : i.e., the PTS has to overlap with the speech time, as in (17).

$$(17) \quad \llbracket \text{PRESENT}_1 \circ \text{PERFECT} \rrbracket = \lambda p \exists t_1 [t_1 = t_c \ \& \ \exists t_2 [t_2 \cap t_1 \ \& \ p(t_2)]] \quad (\text{strengthened})$$

where $t \cap t' \neq \emptyset$ iff $t \cap t' \neq \emptyset$ and there is no $t'' \subset t$, such that $t'' > t'$

Thus, we get essentially an XN meaning for the English present perfect, without positing in the lexical semantics of *PERFECT* that the PTS has to overlap with the reference time. Given the strengthened meaning of $\text{PRESENT}_1 \circ \text{PERFECT}$, it follows that positional adverbials may not modify the PTS. (18) is clearly a contradiction.¹¹

$$(18) \quad [\text{TP} [\text{PRESENT}_1 \text{ PERFECT}] [\text{PerfP } \textit{yesterday} [\text{AspP } \text{PERFECTIVE} [\text{VP } \textit{Alicia dance}]]]]$$

$$= \exists t_1 [t_1 = t_c \ \& \ \exists t_2 [t_2 \cap t_1 \ \& \ t_2 \subseteq \textit{yesterday}_c \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \textit{dance} (\textit{Alicia}, e)]]]$$

¹¹ In the case of *on Monday, at 10 o'clock*, the restriction obtains too, as these may not include the speech time. At 10 o'clock on Monday we may not say (i). Most likely, this is so because of competition with *today/now*. Similar facts obtain with proper names vs. 1st and 2nd personal pronouns in argument position. Speakers may not refer to themselves by name (see (ii)).

(i) *We are writing *on Monday/at 10 o'clock*.

(ii) *Roumi and Arnim are writing.

In English, $\text{PRESENT}_i \circ \text{PERFECT}$ competes not only with PAST_i but also with PRESENT_i . Note that the meaning of PRESENT_i in English is a special case of the meaning of $\text{PRESENT}_i \circ \text{PERFECT}$ (compare (9a) and (16a)). As a result of this competition, the meaning of $\text{PRESENT}_i \circ \text{PERFECT}$ is strengthened such that the PTS may not coincide with the speech time. Rather some part of the PTS must precede the speech time.

Let us now turn to the analysis of the present perfect in German. In this language, $\text{PRESENT}_1 \circ \text{PERFECT}$ and PAST_i are not scalarly ordered (see (16b) compared with (15)). Therefore, when $\text{PRESENT}_1 \circ \text{PERFECT}$ is expressed as a value of finite T, its meaning is not restricted. As a result, the PTS may precede the speech time, and be modified by positional adverbials. (19) is not a contradiction.¹²

- (19) $[_{\text{TP}} [_{\text{PRESENT}_1 \text{ PERFECT}}] [_{\text{PerfP}} \textit{yesterday} [_{\text{AspP}} \textit{PERFECTIVE} [_{\text{VP}} \textit{Alicia dance}]]]]]$
 $= \exists t_1 [t_1 \geq t_c \ \& \ \exists t_2 [t_2 \leq t_1 \ \& \ t_2 \subseteq \textit{yesterday}_c \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \textit{dance (Alicia, e)}]]]$

Consider the following facts, which support the proposal that in the German present perfect the PTS need not intersect with the speech time. The so-called universal perfect requires the event time to include the PTS (cf. Iatridou et al. 2001). In the case of the English present perfect, this means that the event time includes the speech time, as the speech time and the reference time are coextensive. This is why, (20) may not be felicitously continued by *until recently: I live here* needs to be true at the speech time. In German, the facts are different, as (21) shows. The acceptability of *until recently* in (21) indicates that the event time precedes the speech time. But since the event time still includes the PTS, it follows that the PTS does not overlap with the speech time.

(20) I have always lived here (*... until recently).

- (21) Ich habe hier immer gewohnt ... bis vor kurzem
 I have here always lived until recently
 ‘I have always lived here ... until recently.’

It is important to emphasize that the competition responsible for the strengthening of the meaning of a present perfect in English is strictly local, operating between two features that can potentially be realized at a single syntactic node. There is no global competition between proposition-expressing LFs. If there were such a global competition, the German present perfect too would have its meaning strengthened because of the existence of the past as a competitor. Consider the LF and interpretation in (22a). The location of the PTS with respect to the speech time is not directly specified. Yet it is still the case that the PTS is somehow situated relative to the speech time: it either precedes it, follows it, or intersects with it. When this inference is taken into consideration, it is clear that the interpretation in (22a) is less specified than that of the corresponding past sentence in (22b). If these LFs were allowed to compete, the interpretation in (22a) would be restricted in a way that makes the PTS overlap with or follow the speech time.

- (22) a. $[_{\text{TP}} [_{\text{PRESENT}_1 \text{ PERFECT}}] [_{\text{PerfP}} [_{\text{AspP}} \textit{PERFECTIVE} [_{\text{VP}} \textit{Alicia dance}]]]]]$

¹² This argument is not correct as it stands. It will be fixed at the end.

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$$= \exists t_1 [t_1 \geq t_c \ \& \ \exists t_2 [t_2 \leq t_1 \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \text{dance}(\text{Alicia}, e)]]]$$

b. $[\text{TP} [\text{PAST}_1 [\text{AspP} \text{PERFECTIVE} [\text{vP} \text{Alicia dance}]]]]$
 $= \exists t_1 [t_1 < t_c \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \text{dance}(\text{Alicia}, e)]]]$

The above discussion makes it clear that the strengthening of the meaning of the English present perfect is not the same phenomenon as the generation of scalar implicatures, as these are conceived of in traditional accounts such as Grice (1968), Horn (1972, 2001), a.o. According to the traditional view, scalar items such as e.g., numerals, are posited to have weak semantic content, i.e., *two* means “*two or more*”. The strong reading “*exactly two*” in e.g. *John has two cats* comes about as a pragmatic effect. The addressee computes the meaning of this utterance as *John has two or more cats* and compares it with the stronger proposition *John has more than two cats*. On the assumption that speakers make the most informative contribution needed, the addressee concludes that the stronger assertion cannot be made, and thus, restricts the meaning of *John has two cats* to *John has exactly two cats*.

The traditional accounts of scalar implicatures compare propositional content, and this is not what we want in our competition account, if we are to have an explanation for the difference between the English and German present perfect. It does not follow, however, that the competition between $\text{PRESENT}_1 \circ \text{PERFECT}$ and PAST_i and the strengthening of the meaning of $\text{PRESENT}_1 \circ \text{PERFECT}$ that it triggers, is a different phenomenon from the generation of scalar implicatures. Recent work in that domain by Kratzer (2003) (see also Chierchia, to appear) argues for a very local computation of the scalar implicatures to be followed by subsequent semantic composition. On that view, the lexical meaning of *two* is “*two or more*”. Direct competition with e.g., *more than two*, restricts the meaning of “*two*” to “*exactly two*”.¹³ Viewed from that perspective, the two competition phenomena are very similar.¹⁴ It remains to be seen whether they are, in fact, essentially the same.

Before we move to the discussion of non-present perfects, consider the question of how a FUTURE semantic feature would figure in the tense system of German. The meaning of PRESENT_i as defined in (9b), makes it a less specified tense feature than FUTURE_i . One might ask why PRESENT_i and FUTURE_i in German do not compete with the result that the meaning of the PRESENT_i is restricted to non-future. The claim is that the competition with PRESENT_i doesn’t arise, because the FUTURE_i is not productive in colloquial speech in German, i.e. the two are really not part of the same grammar. Grammatical competition across registers is not expected.

¹³ See Fox (2003) for further discussion of various issues in the analysis of scalar implicatures.

¹⁴ It may be further objected that scalar implicatures are cancelable, whereas the strengthening of the meaning of the English present perfect is not. As we will show, however, there is an environment where the meaning of a present perfect is not restricted. As discussed in section 4, PRESENT_1 and PERFECT sometimes remain on separate syntactic nodes; thus, the conditions for competition with PAST_i are not met. In a similar way, the failure to generate scalar implicatures is conditioned by the grammatical environment. There appears to be no argument from cancelability then, that the strengthening of the meaning of a present perfect and the generation of scalar implicatures are unrelated phenomena.

To summarize, the proposal makes the prediction that, keeping the meaning of PERFECT (and PAST) the same cross-linguistically, the semantics of PRESENT may by itself determine whether a language will prohibit positional adverbials in the present perfect.¹⁵ It, of course, does not exclude the possibility that there may be cross-linguistic variation in the meaning of PERFECT itself.

3. Positional Adverbials in Non-Present Perfects

The meanings of non-present perfects modified by positional adverbials follow directly from our proposal without any further provisions.

3.1 Past Perfect

The proposal predicts two readings for a past perfect modified by a positional adverbial. On one reading, the adverbial modifies the PTS, and on another it modifies the reference time. The lexical meaning of PERFECT is such that the PTS does not have to intersect with the reference time. Thus, when the PTS is modified by a positional adverbial, the reference time need not be included in the denotation of the adverbial (see (23) where clearly *last night_c*, which serves as the reference time for the subsequent past perfect, is not included in *Monday_c*). Here the proposal differs from the predictions of the XN account, which requires such inclusion, because of the lexical meaning of PERFECT.

- (23) a. I saw Alicia last night. She had danced on Monday.
 b. $\exists t_1 [t_1 < t_c \ \& \ t_1 \subseteq \text{last night}_c \ \& \ \exists t_2 [t_2 \leq t_1 \ \& \ t_2 \subseteq \text{Monday}_c \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \text{dance (Alicia, e)}}]]]$

Importantly, the PTS is not required to overlap with the reference time through strengthening either. This is so, because there is no semantic tense with a more specified meaning of a PAST-under-PAST, i.e., a tense feature denoting an interval that precedes a past interval.

¹⁵ PRESENT_i in Swedish, Norwegian, and Danish appears to be the same as in German.

- (i) a. John bliver syg i løbet af de næste par dage. Danish
 John becomes sick in -run of the next couple days
 ‘John will become sick in the next few days.’
 b. Det regner paa deres bryllupsdag.
 it rains on their wedding-day
 ‘It will rain on their wedding day.’

Thus we would expect positional adverbials to be acceptable in the present perfect. However, Giorgi and Pianesi (1998) claim that in these languages the restriction with respect to positional adverbials obtains.

- (ii) *Johan har slutat klockan fyra. Swedish, (Giorgi and Pianesi 1998)
 Johan has finished clock four
 ‘*Johan has finished at four.’

The judgment in (ii) is challenged by some speakers (Bjorn Rothstein, p.c.). Similarly, we have found positional adverbials to be acceptable in Danish (Uffe Bergeton, p.c.)

- (iii) John er ankommet igaar / klokken fem / in mandags
 John is arrived yesterday clock five in Monday’s
 ‘John has arrived yesterday/at 5/on Monday.’

3.2 Non-Finite Perfects

The structure of non-finite perfects complements of modals is as in (14). The auxiliary is non-finite, so it doesn't move to T, therefore PRESENT_i and PERFECT do not meet at the same node. One might ask why the feature PERFECT does not climb alone to T to form the alignment PRESENT_i PERFECT *must*, which would make sense semantically. However, movement across a semantically non-empty head and across an intensional operator in particular seems not to be possible, a version of the head-movement constraint for feature movement.

Because PRESENT_i and PERFECT are not together at the same node, competition with PAST_i does not arise, and the meaning of the modal present perfect is not strengthened. Furthermore, competition may not arise between PAST_i and PERFECT at the non-finite Aux node, as PAST_i is a finite tense feature and needs to be expressed at T. Thus, despite the fact that (14) is semantically a *present* perfect, with a *present* reference time, its interpretation allows the lexical meaning of PERFECT to surface unrestricted. Since inclusion of the speech time in the PTS of a modal present perfect is not forced, the PTS may be modified by positional adverbials. (24), which roughly says that in every world that is compatible with what we believe in the actual world at the speech time, there is a time in *yesterday*_c that contains a dancing of Alicia, is not a contradiction.¹⁶

$$(24) \quad [_{TP} [_{PRESENT_1} \text{ must}_{t_H}] [_{PerfP} \text{ PERFECT } \textit{yesterday} [_{AspP} \text{ PERFECTIVE } [_{vP} \text{ A. dance}]]]] \\ = \exists t_1 \lambda w [t_1 = t_c \ \& \ H(t_1)(w) \subseteq \lambda w' \exists t_2 [t_2 \leq t_1 \ \& \ t_2 \subseteq \textit{yesterday}_c \ \& \ \exists e [\tau(e) \subset t_2 \ \& \ \text{dance}(\text{Alice}, w', e)]]]]$$

Next, consider non-finite perfects in embedded clauses. No tense feature is expressed at the embedded non-finite T. In the absence of PRESENT_i in the embedded clause, competition with PAST_i does not arise. The lexical meaning of PERFECT allows modification of the PTS by positional adverbials.¹⁷

- (25) a. Alicia claims to have danced yesterday.
 b. PRESENT₁ A. claim $\lambda_2 [_{TP} [_{PerfP} \text{ PERFECT } \textit{yesterday} [_{PERFECTIVE} [_{vP} t_2 \text{ dance}]]]]]$

4. Coordinated Perfects

¹⁶ Meanings have been suitably modified to include a world parameter.

- (i) $\llbracket \text{Alicia dance} \rrbracket = \lambda e \lambda w. e$ is a dancing of Alicia in w (vP : type $v(st)$, v type of events)
 (ii) a. $\llbracket \text{PERFECTIVE} \rrbracket = \lambda P_{v(st)}. \lambda t \lambda w \exists e [\tau(e) \subset t \ \& \ P(e)(w)]$
 b. $\llbracket \text{PERFECT} \rrbracket = \lambda p_{i(st)}. \lambda t \lambda w \exists t' [t' \leq t \ \& \ p(t')(w)]$
 c. $\llbracket \text{PRESENT}_i \rrbracket = \lambda p_{i(st)}. \lambda t \lambda w [t = t_c \ \& \ p(t)(w)]$
 (iii) $\llbracket \text{ON } \textit{yesterday} \rrbracket = \lambda p_{i(st)}. \lambda t \lambda w [t \subseteq \textit{yesterday}_c \ \& \ p(t)(w)]$

Modals are evaluated with respect to a modal background H , which assigns to any world w and time t the sets of worlds accessible in w at t . Modals identify the local evaluation time with the time at which the complement of the modal is evaluated. *Must* is a universal quantifier over worlds.

- (iv) $\llbracket \text{must} \rrbracket = \lambda H_{i(s(st))} \lambda p_{i(st)}. \lambda t \lambda w. H(t)(w) \subseteq p(t)$

¹⁷ For PRO, we assume with Chierchia 1987 that it is a semantically empty *de se* pronoun, which has to move at LF thereby creating a λ -abstract.

We next consider an apparent violation of the generalization that positional adverbials are prohibited in the English present perfect. The exception to the generalization is reported in McCoard (1978) (where it is attributed to Diver 1963), but it has subsequently been forgotten in the literature. The example in (26) is not addressed by any account of the present perfect puzzle, as far as we are aware, and constitutes a problem for all.

(26) How has he been occupying himself this week? Well, he's played golf on Tuesday, ridden horseback on Wednesday, and rested on Thursday.

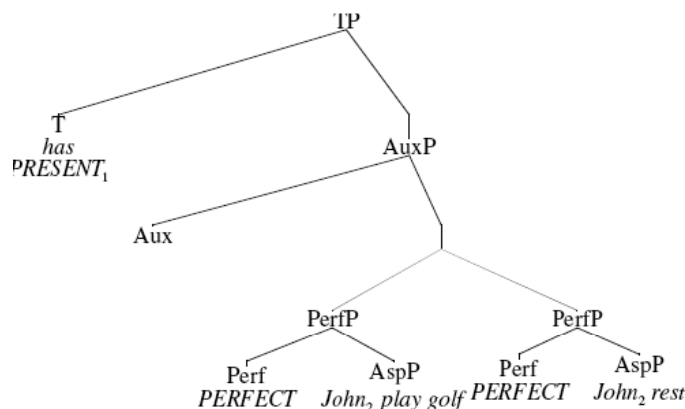
The coordinated perfects in (26) are semantically and morphologically present. Yet, they allow modification by positional adverbials. Crucially, example (26) involves sharing of Tense. When Tense is repeated in each conjunct, the prohibition against positional adverbials resurfaces, as (27) (from Schein 2003) shows.

(27) How has he been occupying himself this week? *He has played golf on Tuesday, has ridden horseback on Wednesday, and has rested on Thursday.

Sharing the subject but not the Tense is not what is causing the unacceptability of (27), nor is the initial question necessary for the contrast between (26) and (27) to obtain:¹⁸

- (28) a. John has played golf on Tuesday and ridden horseback on Wednesday.
 b. *John has played golf on Tuesday and has ridden horseback on Wednesday.
 c. John has played golf and has ridden horseback.

The structure and interpretation of coordinated perfects are found in (29) and (30). There are two semantic features PERFECT, one in each conjunct. Since the auxiliary is shared, there is no feature movement of PERFECT to Aux. Across-the-board-style feature movement of PERFECT is syntactically possible, but would yield a single shared PERFECT, whose PTS will have to be simultaneously included in *Tuesday_c* and *Wednesday_c*.



(29)

¹⁸ In fact, for some speakers, the presence of the question containing the adverbial *this week* obscures the contrast between (26) and (27), i.e., for them (27) is relatively acceptable. See the next section for discussion of the role of such adverbials.

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- (30) $[_{TP} \text{PRESENT}_1 [_{\text{PerfP1}} \text{PERFECT on Tue. } [_{\text{AspP}} \text{PERFECTIVE } [_{\text{VP}} \text{he play golf}]]] \&$
 $[_{\text{PerfP2}} \text{PERFECT on Wed. } [_{\text{AspP}} \text{PERFECTIVE } [_{\text{VP}} \text{he ride horseback}]]]$
 $= \exists t [t = t_c \& \exists t_1 [t_1 \leq t \& t_1 \subseteq \text{Tuesday}_c \& \exists e[\tau(e) \subset t_1 \& \text{play-golf (he, e)}]] \&$
 $\exists t_2 [t_2 \leq t \& t_2 \subseteq \text{Wed.}_c \& \exists e[\tau(e) \subset t_2 \& \text{ride-horseback (he, e)}]]]$

PRESENT₁ and PERFECT are not at the same node, so no competition with PAST_i arises. No competition arises at the Perf node either, as there is no non-finite PAST_i in English. Because no competition with PAST_i arises, the PTSs do not have to be interpreted as intersecting with the speech time, hence the acceptability of positional adverbials.

5. So far...

Another example of an apparent violation of the present perfect puzzle is found in McCoard (1978). Like the case of coordinated perfects, this example has not been analyzed by any of the previous accounts. It too is problematic for all previous proposals.

- (31) Has he been playing much golf lately? Well, so far he has played on Tuesday.

The relevant factor is the presence of *so far* (*lately* in the question has a similar role) (see (32)). This adverbial obligatory requires perfect, not past, morphology (cf. McCoard 1978), as (33) shows. Other such adverbials are *since x*, *lately*, *for the past n years*. As Iatridou et al. (2001) argue, ‘perfect-level’ adverbials necessarily modify the PTS.

- (32) Has he been playing much golf? *? Well, he has played on Tuesday.
 (33) a. So far, John has visited the Getty and LACMA.
 b. *? So far, John visited the Getty and LACMA.

We give *so far* an analysis that is analogous to that of *since x*. Similarly to *since x*, *so far* has two readings – inclusive (as in (34)) and durative (as in (35)) (Mittwoch 1998, Iatridou et. al 2001, von Stechow and Iatridou 2002). The precise source of the two readings is not of direct concern here. Importantly for us, when these adverbials in their inclusive guise modify an interval (a PTS), they select a subset of the interval, where the underlying eventuality is located. The difference between *since x* and *so far* is that the former makes the left boundary of the interval precise.

- (34) a. $[[\text{since}^E]] = \lambda x. \lambda p. \lambda t. \exists t' [t' \subseteq t \& \text{LB}(\tau(x), t) \& p(t')]$
 b. $[[\text{so far}^E]] = \lambda p. \lambda t. \exists t' [t' \subseteq t \& p(t')]$
 (35) a. $[[\text{since}^U]] = \lambda x. \lambda p. \lambda t. \forall t' [t' \subseteq t \& \text{LB}(\tau(x), t) \& p(t')]$
 b. $[[\text{so far}^U]] = \lambda p. \lambda t. \forall t' [t' \subseteq t \& p(t')]$

A present perfect as in (31) has its meaning strengthened as the result of competition between PRESENT₁ ° PERFECT and PAST_i. Therefore, the PTS is interpreted as overlapping with the speech time. But because the PTS is modified by *so far*, a subinterval of the PTS is selected, and the event of him playing golf is situated within

that subinterval. Now, the subinterval of the PTS need not intersect with the speech time, and therefore it could be modified by positional adverbials.

- (36) $[_{TP} [PRESENT_1 PERFECT] [_{PerFP} \textit{so far} [_{on Tue.} [PERFECTIVE [_{VP} \textit{he play golf}]]]]]$
 $= \exists t_1 [t_1 = t_c \ \& \ \exists t_2 [t_2 \sqcap t_1 \ \& \ \exists t' [t' \subseteq t_2 \ \& \ t' \subseteq \textit{Tuesday}_c \ \& \ \exists e [\tau(e) \subset t' \ \& \ \textit{play-golf} (\textit{he}, e)]]]]]$

PTS-modifying adverbials that have the effect of licensing positional adverbials in the present perfect need not be exclusively perfect-level, i.e., they need not require the perfect morphology. It is sufficient that they *may* modify the PTS and have the relevant semantics. Adverbials such as *this week*, *today* may modify the PTS, and they may be given an analysis analogous to *so far*. We suggest that this is the reason why there are some speakers who find (27) rather acceptable. These speakers posit an anaphoric PTS-modifying adverbial *this week* in their present perfect answer to the question containing *this week*, and this adverbial licenses positional adverbials in the same way *so far* does.

6. Conclusion

A simple account of the present perfect puzzle is offered. The proposal has three main parts: weak, interval-based semantics for PERFECT; cross-linguistic difference in the meaning of PRESENT, shown to be needed for phenomena independent of the perfect; and an independently needed mechanism of grammatical competition between features.

In both English and German, the feature PERFECT moves to the auxiliary (unless prevented by e.g., coordination). When the auxiliary moves to PRESENT_i-valued Tense, the complex feature PRESENT_i ° PERFECT is formed. This feature competes with PAST_i. In English, PRESENT_i ° PERFECT is less specified than PAST_i, because of the particular semantics of PRESENT_i, and as a result, its meaning is strengthened such that the PTS overlaps with the speech time. In German no such scalar relationship exists between the meanings of PRESENT_i ° PERFECT and PAST_i. Hence, the PTS need not intersect with the speech time. As positional adverbials can only modify a PTS that does not intersect with the speech time, the cross-linguistic facts of the present perfect puzzle follow.

Ambiguities in the past perfect are captured by the proposal. The lack of a relative PAST (PAST-under-PAST) in the grammar of these languages is the reason no direct competition with PERFECT arises. Perfect complements of PRESENT_i-Tense modals are predicted to allow positional adverbials, despite being interpreted as present perfects. Similarly, coordinated perfect participles under PRESENT_i Tense are also predicted to allow modification by positional adverbials, despite being morphologically and semantically present perfects. In both cases, PRESENT_i and PERFECT do not meet at the same node, and no PRESENT_i ° PERFECT is formed that can compete with PAST_i, and there is no non-finite relative PAST to compete with PERFECT directly. Perfects in non-finite clauses are also predicted to allow positional adverbials, as in the absence of PRESENT_i, the conditions for competition are not met. Finally, positional adverbials are acceptable with a present perfect, provided the PTS is modified by an inclusive perfect-level adverbial such as *so far*, *since x*, *lately*, etc., whose lexical semantics places the event

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time in a subset interval of the PTS. As the subset interval need not overlap with the speech time, it can be modified by positional adverbials.

The account makes strong predictions. The meaning of PRESENT_i is sufficient to determine compatibility of the present perfect with positional adverbials in a given language (provided the meanings of PAST_i and PERFECT are cross-linguistically the same). Furthermore, there is no need to posit ambiguity of the perfect morpho-syntax: every instance of *have...-ed* can be analyzed as containing a semantic PERFECT .

Addition (August 2004):

The above claim about the relation between PAST_i and $\text{PRESENT}_j \circ \text{PERFECT}$ in German is not true; cf. fn. **Fehler! Textmarke nicht definiert.** PAST_i and $\text{PRESENT}_j \circ \text{PERFECT}$ stand in a subset relation given our semantics. PRES_i denotes the speech time or a future time. In the first case, the same reasoning as in English applies. In the second case, we have a Future II reading. This reading is implied by a PAST -statement as well. If Alicia has danced, she will have danced.

So we have to say something more. It has been observed occasionally (Higginbotham, among others) that the Future Perfect should not give us a time before the speech time. So we apply a general strategy of strengthening to the Future II in the following sense:

- (37) PERFECT -strengthening
 PERFECT under FUTURE should deliver a time after the speech time.

This can be implemented by adding a context variable C to the PERFECT -operator, which somehow gives us this restriction:

- (38) $[[\text{PERFECT}_C]]^g = \lambda P. \lambda t. \exists t' [g(C)(t') \ \& \ t' \leq t \ \& \ P(t')]$

Given this principle, the Future II reading isn't entailed anymore by the PAST -reading and the argument goes through.

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