Where Do the Resultative/Current Relevant States Come from in the English Perfect?

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Mean-Young Song. 2000. Where Do the Resultative/Current Relevant States Come from in the English Perfect?. *Language and Information 4.1*, 21–42. In this paper, I explore the semantic interpretation of the English present perfect by arguing that the perfect is analogous to modals in its interpretation. The perfect produces several different readings, i.e., the resultative and the current relevant reading, to mention a few. Despite this, the meaning of the perfect remains invariable in sentences where it occurs. Instead, the semantic variability of the perfect is due to the nature of the conversational background. This indicates that just as modals are context-dependent, so is the perfect, which inspires a modal-based approach to the semantics of the perfect. By incorporating such an approach into its semantic analysis, we can present a unified account of the different meanings of the perfect. **(Korea University)**

1. Introduction

In this paper, I will investigate a proper semantic interpretation of the English perfect, focusing on the current relevant and resultative state of the events picked out by the verb in the perfect; specifically, my object is to provide a modal-based explanation for the semantic variability of the perfect.

The present perfect serves primarily to mark the present relevance of an eventuality under the scope of the perfect. Consider the following sentences:

(1) a. The secretary has eaten his lunch

b. Tom has studied semantics before

In a sentence like (1a), the event of the secretary's eating his lunch is located in a past, yet this sentence definitely carries a current state that results from the past event of the secretary's eating his lunch. Such a state might be understood

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to implicate that he doesn't have to eat at present, as noted by McCoard (1978) and Vlach (1993). In (1b), the current relevance of the event picked out by the verb can be spelled out as the state of Tom's having the knowledge of semantics.[1]

The sentences in (1a-b) indicate that the English perfect illustrates its variability in meaning. For example, the present perfect in (1a) is usually referred to as the resultative perfect in the sense that it indicates the present existence of a state that results from the past eventuality under the scope of the perfect. The present perfect in (1b) is, on the other hand, regarded as the experiential (or current relevance) perfect which indicates the existence of a past eventuality or the subject of the prefect has experienced the event being described by the perfect.[2] Cf. McCawley (1971). Perhaps the difficulty with treating the perfect properly lies in the fact that the perfect shows the variance in meaning. Such a semantic variability is not properly treated in the previous treatments of the perfect, as we will see in section 2. In this paper, I will elaborate on how we can provide a unified way to account for the semantic variability of the perfect in terms of modal semantics.

Another aspect of the prefect we should consider when dealing with the semantics of the perfect is how we can pick out the most appropriate current or resultant state that holds at the reference time,[3] since one event may cause its various resultant states. Such a state varies from context to context. For one thing, depending on the context of use, the sentence (1b) might implicate an entirely different state. Take the following two dialogues for instance:

(2) Mary: I need someone who knows semantics. I am going to ask him to help me with my semantic paper.

Jane: You should ask Tom. He has studied semantics before, so he knows it.

(3) Mary: I need someone who knows semantics. I am going to ask him to help me with my semantic paper. Should I ask Tom?

Jane: He has studied semantics before, but he doesn't know anything about semantics.

1. Whate I have mentioned regarding (1a-b) so far seemes to be a significant factor in distinguishing the present perfect from the simple past. Consider the following sentence in which the simple past tense occurs:

(i) The secretary ate his lunch

In (i), The event designated by the verb took place within a period of time which is wholly past without being presented by the speaker as having present relevance . The sentences in (1a-b) and (i) indicate that it is the characteristic of the present perfect that it establishes a relation to the utterance time, whereas this is not the case with the simple past.

2. Besides the resultative and the experiential perfect, McCawley (1971) discusses another two different usages of the English present perfect:a continuative perfect, as in Mary has lived in Seoul since 1997, a "Hot News" perfect, as in The Chicago Bulls have won the final at NBA.

3. In case of the present perfect, the reference time coincides with the utterance time.

(2) implicates that the current relevant state of Tom's knowing semantics holds at the utterance time, while this is not the case with (3). This shows that a current relevant or resultant state expressed by the perfect is context-dependent. Thus, picking out the right state depends on the context of use where the perfect takes place. This suggests that the state cannot be any state that follows an event under the scope of the perfect. Giorgi and Pianesi (1996) claim that the resultant state of an event is a collection (sum or set) of all eventualities that follows that event. Their claim amounts to saying that every state which results from the event under the scope of the perfect can be considered to be the current state. This view still has some difficulty with pinpointing the right state since it might pick out an inappropriate state in some context. As modals are context-dependent, so is the perfect. On the basis of this, I will argue in this paper that modal semantics would present a plausible way to pick out the right current relevant or resultant state in question.

This paper is structured as follows. Section 2 is devoted to discussing the previous treatments of the perfect and their problems. In section 3, I will argue that the present perfect is characterized by temporal and modal aspects. The former relates the temporality of the present perfect to the utterance time, while the latter involves picking out the most appropriate state of the eventuality being described by the perfect. In section 4, I will discuss the treatment of the perfect as a modal in order to present a unified account of the semantic variability of the prefect.

2. Problems with the Previous Analyses of the Perfect

McCoard (1978) discusses several major approaches to the perfect such as the Indefinite Past Theory, the Current Relevance Theory, the Extended Now Theory, and the Embedded Past Theory.[4] What follows next is a brief survey of the first three approaches. I will not go into the details of the embedded past theory, McCoard (1978: Chapter 5), which takes the perfect to be a compound structure composed of a past tense embedded in the present tense, since it is not so influential in the modern treatments of the perfect. My discussion will follow the order of McCoard's (1978).

2.1 Indefinite Past Theory

The indefinite past theory asserts that the present perfect should be treated as expressing an event being described by the perfect is true at some past time without referring to any particular interval.[5] Cf. Klein (1992), Montague (1973), Reichenbach (1947), and Stump (1985). Montague treats the present perfect as

4. The reader is referred to Klein (1992) for the discussion of some other approaches which are not included in my discussion.
5. Stump's (1985) analysis of the perfect is different from Montague's. I will discuss Stump (1985) later when I discuss the Extended Now Theory.

something like an indefinite past tense.[6] In Reichenbach's (1947) framework, the point of event (or the event time) is prior to the point of reference (or the reference time), which coincides with the speech time in the present perfect. His analysis of the present perfect is in the lines with the indefinite past theory. Klein (1992) proposes that the present perfect asserts that the speech time is in the topic time, a time at which a claim is made, and the topic time is in posttime of the time of situation, a time at which a situation described by the verb occurs. His basic assumption is, however, in the spirit of Reichenbach.

The Indefinite Past Theory is faced with difficulty as soon as it takes account of the following sentences:

(4) a. *John has left for Seoul yesterday

b. ♯America has been discovered by Columbus[7]

c. ♯Einstein has visited Princeton(Chomsky (1970:85))

As McCoard (1978) notes, the indefinite past theory cannot account for why the English present perfect is not compatible with a past time adverb like *yesterday*, as in (4a). One might argue that since *yesterday* refers to a particular (or definite) time, the present perfect, which denotes an indefinite time, is not compatible with any kind of time adverbs referring to a specific time. The following sentence (5) shows that this is definitely wrong since like *yesterday, today* is also a temporal adverbial denoting a definite time:

(5) John has left for Seoul today

Let us get back to (4b-c). The indefinite past theory would wrongly predict that (4b) should be appropriate since there is indeed a past time at which America was discovered by Columbus. The same comments hold for (4c). This approach cannot take proper accounts of the present perfect.

Another point I'd like to make against the indefinite past theory is that it fails to give a proper semantic account of sentences like (6a-b).

(6) a. John has lived in Seoul for five years

b. For five years John has lived in Seoul

As noted by Dowty (1979) and Hitzeman (1997), a sentence like (6a) is ambiguous between a reading in which there is a five-year past time interval at which John lived in Seoul and a reading in which John has lived in Seoul for five years earlier than the utterance time and still lives there at the utterance time. Hitzeman (1997) refers to the former reading as a non-p-definite reading in the sense that the event time E is some time earlier than the reference time R, and the latter

6. Refer to (7) below
7. The marker♯ means that a sentence is grammatical, but it is not felicitous in a given context.

reading as a p-definite reading in the sense that the event time E ends at the reference time R.[8]

In contrast to (6a),(6b) has only a p-definite reading. Notice that according to the indefinite past theory, the truth conditions for the present perfect can be stated as follows:

(7) $\|\text{perfect}(\phi)\|^{M,w,g,t}=1$ iff $\exists t_1 : t_1 \subset t \ \& \ \|\phi\|^{M,w,g,t1}=1$

The ambiguity of (6a) can be represented as (8a-b) on the assumption that *for five years* is an operator.

(8) a. Perfect (for five years (John lives in Seoul))

b. For five years (Perfect (John lives in Seoul))

(8a) where *for five years* occurs within the scope of the perfect represents the non p-definite reading of (6a), while (8b) where *for five years* is outside of the scope of the perfect is for the p-definite reading of (6a) and (6b). I assume that the expression *for five years*(ϕ), where ϕ is a tenseless sentence, can be truth-conditionally defined as in (9):

(9) *for five years*(ϕ) is true at t iff there is a five-year interval t and for every subinterval t′ of t, ϕ is true at t′.

According to (7) and (9),(8a) is true at t iff there is an interval t_1 such that $t_1 \subset t$ and t_1 is a five-year interval and for every subinterval t_2 of t_1, John lives in Seoul at t_2. This interpretation indicates that the five-year interval during which John has lived in Seoul is located within any time before its evaluation time, thus (8a) does not imply that John still lives in Seoul at the present time. The indefinite past theory succeeds in accounting for the non-p-definite reading of (6a). In contrast, the truth conditions for (8b) can be stated as follows in terms of (7) and (9):[9] (8b) is true at t iff there is a five-year interval t such that for every subinterval t_1 of t, there is an interval t_2 such that $t_2 \subset t_1$ and John lives in Seoul at t_2. However, this interpretation is not appropriate for dealing with the p-definite reading of (6a-b). The truth conditions for (8b) would have to predict that (8b) is true iff John lives at any interval earlier than every subinterval of the five-year interval. Thus, this does not guarantee that John still lives in Seoul at the present moment, which is contrary to the p- definite reading. Given this, the indefinite past theory runs into troubles when it deals with the p-definite reading of (6a) and a sentence like (6b) which receives only a p- definite reading.

8. One should note that since we are considering the present perfect right now, the reference time R coincides with the speech time S, as in Reichenbach's (1947) analysis of the present perfect. Given this, the non-p-definite reading locates the event time E at some time in the past, while the p-definite reading indicates the event under the scope of the present perfect is still ongoing at hte speech time.

9. One anonymous referee pointed out to me that we apply (9) to (8b) because in (8) ϕ contains a tense. Notice, however, that ϕ in (9) refers to formula. When ϕ is a formula and an operator is added to it, it is still a formula. Thus, the truth conditions in (9) can apply to (8b).

2.2 Current Relevance Theory

The Current Relevance Theory asserts that the present perfect shows the current connection of a past event to the present time by expressing a present state which results from the past event being described by the perfect. Cf. Harris (1982), Jespersen (1931), and Smith (1991). The theory would predict that a sentence like (10) asserts a resultative state, whatever it may be:

(10) John has reached the top of Mt. Everest

As Kuhn and Portner (1997) and Sorensen (1964)[10] point out, past events might yield the results which may be related to the present. Provided that the present perfect asserts to the existence of a state resulting from the past event, it would be expected that the present perfect is truth conditionally equivalent to an indefinite past, for the past event in question may assert a currently relevant resultative state. Given the normal situation, for example, the present perfect sentence *John has died* is expected by the current relevance theory to have the same truth definition as the past sentence *John died*, because both of them express some current state of John's being dead which holds at the speech time. Therefore, this view will have the same difficulty as the indefinite past theory in dealing with the perfect.

The current relevance theory has problems with handling an experiential perfect, as has been noted by McCoard (1978). This is because the experiential perfect lacks a current resultative state in some cases. Consider the following sentence:

(11) John has met Mary before, but he doesn't remember her since it was a long time ago

The sentence *John has met Mary before* in (11), which is an experiential perfect, seems to lack some current relevance or result state in the situation where (11) is uttered.

Any event can bring about various kinds of consequences, depending on the context. The difficulty with this theory is how we can pick out the right results. Regarding this, for example, Smith (1991) claims that present perfect sentences ascribe their subjects to some current property, i.e., "the participant property" (Smith 1991: 148), that result from their participation in a past event described by the perfect. She refers to this as a pragmatic felicity requirement on the use of the perfect. This felicity requirement takes account of the contrasts between (12a) and (12b), which were pointed out by Chomsky (1970:85):

(12) a. Princeton has been visited by Einstein

b. ♯Einstein has visited Princeton.

10. The claim made by Sorensen (1964) is cited in McCoard (1978:56).

A sentence like (12b) is infelicitous when uttered at a time after Einstein's death (also see McCoard (1978)). Thus, the participant property cannot be ascribed to Einstein, the subject of the sentence in (12b). However, this cannot account for the following sentences:

(13) a. ♯America has been discovered by Columbus

b. Shakespeare has written impressive dramas (McCoard (1978:40)).

The continent called America exists at present, hence (13a) should be felicitous in terms of the current relevance theory, contrary to fact. In addition, this theory predicts incorrectly that (13b) should be infelicitous since Shakespeare is not alive right now. Thus, no adequate description of "current relevance" has been given.

2.3 Extended Now Theory

An alternative way to treat the perfect is what McCoard (1978) calls The Extended Now Theory which has been advocated by many linguists like Bennett and Partee (1972), Dowty (1979), McCoard (1978), and Vlach (1993). The extended now, as its name suggests, asserts that the event being described by the perfect is located within the contextually supplied interval of time that began in the past and extends up to the present. Such a contextually provided interval is the "extended now," which is counted as the present interval. The extended now interval span depends on the context of use, as illustrated in (14):

(14) a. John has arrived

b. Mary has lived in Seoul for five years

c. John has been to London during his life

The extended now may be momentary, as in (14a), or it may be a five-year interval, as in (14b), or it may be the whole interval during which John has lived up to now since he was born, as in (14c).

Informally, the extended now theory asserts that a perfect sentence is true at an interval i iff its tenseless form (or its present tense form) is true at an interval i′ which is included in the extended now interval. Notice that the interval i is the final subinterval of the extended now, and also that i′ can precede or overlap i. Dowty (1979) elaborates on incorporating this idea into the semantics of the perfect by introducing a one-place predicate "XN," which stands for the extended now. He defines the truth condition for "XN(int)," where *int* denotes an interval, as follows (Dowty (1979:342)):

(15) XN(int) is true at i iff i is a final subinterval of the interval denoted by *int*.

Given this, a sentence like (14a) is translated into IL in terms of Dowty's framework as follows:

(16) $\exists t[XN(t)\&\exists t_1[t_1 \subseteq t \ \& \ AT(t_1,arrive'(j))]]$

(16) says that there is an extended now interval t and there is an interval t1 such that t1 is a subinterval of t, and John arrives at t1.

As discussed by Giorgi and Pianesi (1996) and Portner (1998) among others, the extended now theory succeeds in accounting for the ungrammaticality of a sentence like (4a), repeated below as in (17):

(17) a. *John has left for Seoul yesterday

b. $\exists t[XN(t) \ \& \ t\subseteq$ yesterday$' \ \& \ \exists t_1[t_1 \subseteq t \ \&$ left-for-Seoul$'(j)(t_1)]]$

The extended now theory predicts that a sentence like (17a) is translated as (17b) under the assumption that a time adverbial like *yesterday* has scope over the perfect: The translation in (17b) obviously shows that the sentence in (17a) is contradictory:the interval t which is denoted by *yesterday* also denotes the extended now interval which includes the utterance time. The extended now theory, thus, accounts for the fact that past time adverbials like *yesterday* cannot be compatible with the present perfect, while time adverbials which overlap the utterance time is. This theory has a strong point in this respect.

Scholars like Klein (1992) Klein (1994) and Stump (1985) argue against the extended now theory,[11],[12] Stump (1985) claims that the extended now theory fails to give the proper treatment of the following sentence, where the perfect occurs in the free adjunct:

(18) Having been on the train, John knows exactly why it derailed (Stump (1985:229))

He further observes that the perfect in a sentence like (18) can be compatible with temporal adverbials which denote a past time, as exemplified in (19) which is due to (Stump1985:230):

(19) Having been on the train yesterday, John knows exactly why it derailed

The extended now theory wrongly predicts that a sentence like (19) should be ruled out as ungrammatical. In order to remedy this, Stump (1985) proposes the perfect serves to locate an eventuality designated by the perfect somewhere within what he calls a "perfect interval," any interval which begins prior to some interval i and lasts no later than i. The perfect interval relative to i could be

11. Giorgi and Pianesi (1996) also argue against the extended now theory since it cannot account for the present perfect in Romance languages like Italian, which is compatible with past time adverbials. I will not consider the perfect in Romance to discuss problems with the extended now theory.
12. I will only discuss Stump's (1985) argument here since Klein (1992) makes a similar point of Stump. See Klein (1992) for the problems with the extended now theory that he discusses.

something like an extended now interval or something like a past interval which just precedes the interval i. His analysis of the present perfect, thus, asserts that a perfect sentence is true at i iff its tenseless form is true at a subinterval i′ of the perfect interval relative to i.

Stump (1985) introduces a predication "perf(int)" to capture the perfect interval (Stump (1985:232)):

(20) perf(int) is true at i iff i′ begins prior to i and lasts no later than i

Given this, a sentence like *John has arrived* in (14) can be translated as follows:

(21) $\exists t[perf(t) \ \& \ \exists t[t_1 \subseteq t \ \& \ arrive'(j)(t_1)]]$

This kind of analysis of the perfect immediately runs into trouble with a sentence like (17), repeated below as (22), which the extended now theory succeeds in accounting for:

(22) *John has left for Seoul yesterday

Given that the time adverb *yesterday* has scope over the perfect, the sentence in (22) is translated as (22a):

(22a) $\exists t[perf(t) \ \& \ t \subseteq yesterday' \ \& \ \exists t_1[t_1 \subseteq t \ \& \ left\text{-}for\text{-}Seoul'(j)(t1)]]$

Recall that the perfect interval can be a past interval in some contexts. Given the perfect interval defined as above, the translation in (22a) is not contradictory. Instead, it suggests that the present perfect is compatible with a past time adverb like *yesterday*, and therefore, a sentence like (22) should be grammatical, which is contrary to fact.

Stump (1985) argues that the ungrammaticality of (22) is due to pragmatic factors such as conversational implicature. According to him, the perfect sentence in (22) is logically equivalent to a simple past sentence like *John left for Seoul yesterday.* For this reason, the sentence in (22) is not semantically but pragmatically anomalous. The present perfect is more marked and more complex than the simple past, and the use of the perfect sentence in (22), thus, implicates that for some reason, the simple past is inappropriate. This kind of implicature caused by the use of the perfect becomes anomalous in a sentence like (22), since (22) and the corresponding simple past is logically equivalent. The perfect sentence in (22) is, thus, ruled out due to the pragmatically anomalous implicature.

There is a certain plausibility to Stump's pragmatic account of the ungrammaticality of a sentence like (22), but it gives rise to problems in some contexts. Consider the following pair of sentences:

(23) a. John has left for Seoul today

b. John left for Seoul today

The use of the perfect sentence in (23a), under Stump's account, implicates that the corresponding simple past in (23b) is inappropriate. Because the two sentences in (23a-b) are logically equivalent in terms of Stump's framework, the perfect sentence in (23a) with this implicature should be anomalous, contrary to fact.[13] The proposal by Stump (1985) in which the perfect interval, along with pragmatic factors, is incorporated into the semantic interpretation of perfect sentences is not sufficient for the account of the perfect.

Overall, the major approaches to the perfect which we have discussed in this sub-section do not succeed in providing a satisfactory answer to the treatment of the perfect.

3. Temporal and Modal Aspects in the Perfect

In order to give a proper semantics of the perfect, I will argue that the perfect needs to be semantically defined in terms of the combination of the temporal and the modal aspects. Adopting the definition of the present perfect that the present perfect expresses a certain consequent state of a past eventuality which holds at the time of utterance (cf. Giorgi and Pianesi (1996) , Parsons (1990), and Vlach (1993)), I assert that the modal aspect picks out the context-supplied current state of the perfect, and the temporal aspect relates that state to the time of utterance. For the purpose of our discussion, I will discuss the temporal aspect first, and then the modal aspect.

With respect to the temporal aspect, the present perfect, in general, shows its temporal connection to the present time or the utterance time (cf. Bennett and Partee (1972), Dowty (1979), Dowty (1982), Giorgi and Pianesi (1996), Harris (1982), Kamp and Rohrer (1983), Reichenbach (1947), Smith (1978), Smith (1991) among others), as illustrated in the following examples.

(24) a. *John has already left when I came to his office yesterday

b. John has left now

As Reichenbach (1947) puts it, the present perfect has its event time (E) anterior to the reference time (R) which is the same time as the speech time (S). This temporal relation takes account of why a sentence like (24a) is ruled out as ungrammatical and why a sentence like (24b) is, on the other hand, well-formed.[14]

13. Even though I have not put them into the main text, there are some other examples of the perfect which are not well explained by Stump's analysis. Consider the following sentences:

(i) *?John has already solved the problem last night

(ii) John has solved the problem already last night

(iii) John solved the problem already last night

The ungrammaticality of (i) is due to pramacit factors, as Stump has shown. A perfect sentence like (ii) is a piece of evidence which is against his analysis in the same way as a sentence like (23a) is. The adverb already in (ii) seems to me to play a certain role, but I have no idea what it is.

14. The similar explanation is provided by Klein's (1994), even though he employs different terminology

A sentence like (24b), where a dynamic predicate occurs, places the time of John's leaving at some time in the past, i.e., before the speech time (cf. Portner (1998)), but it has its reference time (R) at the same time as the utterance time. Thus, if we assume that the time adverb now in (24b) modifies the reference time, its reference time is compatible with the utterance time which now inherently overlaps. This shows that the present perfect is temporally related to the present time.

Let us turn to the modal aspect of the perfect. The first point I'd like to make is that the modal and the perfect have it in common that they are highly sensitive to the context of use. Modals are usually ambiguous between a root and an epistemic modal (cf. Jackendoff (1972) and Kratzer (1977)[15]), depending on the context of use. The term "root modality", first introduced by Hofmann (1966) to my knowledge, refers to non-epistemic modals such as a deontic modal. The term "epistemic modal" expresses possibility or necessity relative to a state of knowledge. To illustrate modals are ambiguous, let us take the modal verb *must* for instance. Consider the following sentences:

(25) a. Every American citizen who has income must pay a tax

b. It must have rained for the land to be muddy

c. If you must yawn, put your hand over your mouth

d. Because this computer is better than that one, we must buy this one.

The modal verb *must* in (25a-d) has several different interpretations: it is interpreted to be deontic, as in (25a), epistemic, as in (25b), dispositional, as in (25c), and preferential, as in (25d), respectively. The variability of the modal verb *must* results from the context use, as we will see below.[16] According to Kratzer (1977), *must* in (25a-d) is not ambiguous. It only has a meaning which remains invariable across sentences like (25a- d) (i.e., a neutral meaning of *must*). The different interpretations of the modal verb *must* in sentences like (25a-d) are caused by the fact that its variance in meanings is purely dependent upon the variability of the context of use. That is, the various interpretations of *must* in (25a-d) rely on what she calls the conversational background, a set of propositions, in which it is used.[17]

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from Reichenbach's. In order to account for the temporal relation he introduces the time of situation (TSit), the topic time (TT), and the time of utterance (TU). TSit refers to the time at which a situation comes into existence, whereas TT at which a claim is made. TSit is very similar to the point of events in Reichenbach's (1947) sense. For the temporal relation for the English present perfect, Klein proposes that TU includes TT which is, in turn, posterior to TSit. This also suggests that the present perfect be temporally related to the utterance time.

15. Kratzer (1977) does not use the term"root modality." She provides examples which demonstrate the variability of the interpretation of modals such as must and can, as we will see later. Her examples are intended to show the interpretation of modals is context-dependent.
16. When I dicuss Kratzer's theory of modality below, we will see that the variance of modals in meanings is due to the context of use. For the purpose of our discussion, let us accept for now that the meanings of modals are context-dependent, even though haven't discussed this point here.
17. I will give a more detailed discussion of the definition of the conversational background in the following section.

A similar argument can be made for the perfect. Depending upon the context, the English present perfect has different kinds of interpretations in a similar way. As I mentioned above, the perfect asserts that a consequence of an eventuality under the scope of the perfect holds at the speech time. Cf. Giorgi and Pianesi (1996), Parsons (1990) , and Vlach (1993) among others. That is, the perfect may denote such an eventuality as having present relevance or refer to a present state that results from a past eventuality, namely, the consequent state in Parsons' (1990) terms. Cf. Parsons (1990) and Smith (1991)). Consider the following examples:

(26) a. John has left.

b. John has fixed the same problem several times before.

Sentences like (26a) and (26b) are examples of the resultative perfect, and the experiential (or current relevance) perfect, respectively. (26a) is interpreted to mean that a certain state which results from the event of John's leaving holds at the time of utterance. The result of a perfect sentence like (26a) varies from context to context. For illustration, consider the following two scenarios. In scenario ♯1, suppose John is a computer expert who works for a computer repair shop, and he is the most reliable of the people who work there. One of his regular customers stopped by the shop with his broken computer in his arms, and said to the receptionist there, "I'd like John to fix this computer now. Is it possible?" The receptionist simply replied by uttering the visited John's office all of a sudden to discuss it with him. When he got there and said that he wanted to see John, his secretary replied by uttering the sentence in (26a). What are the results in these two situations? In scenario ♯1, the result of the event of John's leaving could be that John can't take care of his customer's computer, while in scenario ♯2, it could be that Joey doesn't have a chance to discuss his problem with John.

Regarding (26b), the currently relevant state that (26b) leads to varies from context to context, just as the resultative perfect in (26a) is. Consider scenario ♯3. Suppose Mary, who knows almost nothing about computers, has a problem with her computer. She called her friend, Susan, and explained her problem to her. Susan uttered (26b). In this context, (26b) may implicate that John may help Mary fix her problem, suggesting a possible way Mary can get out of the problem, which seems to be currently relevant to the context under consideration. What I have discussed so far suggests that the different interpretations of (26a-b), i.e., the resultative state and the current relevance, are dependent upon the nature of the conversational background.

What the resultative states in scenario ♯1 and ♯2 and the current relevance state in scenario ♯3 have in common is that each of the states *still* holds at the utterance time of (26a) and (26b). As we saw in (26a-b), the perfect is ambiguous between a resultative reading, as in (26a) and a current relevant reading, as in (26b). Exactly like the modal verb *must* in (25a-d), the perfect itself is not ambiguous, but instead, remains invariable across (26a-b). The context of

use, more precisely the conversational background, determines which reading is the most appropriate for the perfect sentence in question, just as the nature of the conversational background determines a deontic or an epistemic necessity of *must*.[18]

The second point I'd like to make is that just as modals (e.g., *must* in (25a-d)) spell out some logical relation between the proposition p under their scope and the conversational background in which they are used, so do the consequent state and the current relevance of the perfect. That is, *must* in (25a-d) spells out a relation like logical consequence. For instance, the proposition under the scope of *must* in (25b) (i.e., *it has rained*) follows logically from the conversational background, a set of propositions, in which *must* is used-for example, given that the conversational background is something like this:...{The sky was covered with dark clouds. Thunder rolled. The land was wet...}, it follows from this conversational background that it has rained. Thus, *must* in (25b) is an epistemic necessity. This is also true of the perfect sentence. Let's get back to (26a-b). Consider scenario ♯1 once again. The consequent state, namely, that of John's being incapable of fixing his customer's computer, follows logically from the conversational background of scenario ♯1, along with the proposition that John left. In scenario ♯3, on the other hand, the implication that John may help Mary with her problem follows from the conversational background of scenario ♯3, along with the proposition that John fixed the same problem several times before.

What we have seen so far indicates that the various interpretations of the perfect such as a resultative state and a current relevance reading are dependent on the context in which the perfect is used, just as those of the modal verb *must* in (25a-d) are. I will take these facts as sufficient evidence that the perfect is indeed accounted for in the similar way the modals are.

The analyses of the perfect I discussed in the previous section have been proposed to capture what I call the temporal and the modal aspects of the perfect. Yet, none of them provide a satisfactory answer to treatment of the perfect, and therefore, we need to account for the perfect in a different way, which I will discuss in the next section.

18. The strategy for providing the semantics of modals can be explainde in the following way. The conversational background (25a) is a function which assigns to any possible world the set of propositions expressing what the law provides in w. This is called a deontic conversational background. Similarly, the conversational background for (25b) is a function which assigns to any possible world to the set of propositions which are known in w. This is referred to as an epistemic conversational background. The other sorts of conversational backgrounds are defined in the same way. The meaning of *must* in (25a-d) is given as follows:
$[\![\Box p]\!]^{f,\gamma}=\{w \in W: \forall u[u \in \cap f(w) \rightarrow \exists v[v \in \cap f(w) \,\&\, v \leq_{\gamma(w)} u \,\&\, \forall z[z \in \cap f(w) \& z \leq_{\gamma(w)} v \rightarrow z \in p]]]\}$, where f and γ are a conversational background and an ordering source, respectively. Notice that the meaning of *must* given above is neutral across (25a-d). Its variance in meaning dependson the properties of the conversational background f, i.e. the deontic meaning of *must* in (25a) is derived from deontic conversational backgrounds, and the epistemic meaning of *must* in (25b) epistemic backgrounds, and so forth. As we will see in the next section, the same strategy for the semantics of modals goes for the semantic analysis of the perfect. See section 4 for a more detailed discussion.

4. Analysis

As I mentioned above, the consequent state is very context-dependent, i.e. the context of use supplies the clues as to what the consequent state is. Thus, the question is how we can pick out a right consequent state or result which is closely relevant to a given conversation. We can pick out the most desirable consequent state from what is known in the conversational background or common ground, which is supplied by the context of use. In this respect, the perfect has something to do with an epistemic modal which expresses possibility or necessity relative to a state of knowledge.

Along the lines of Portner (1998), I propose that an epistemic modal is committed to the interpretation of the perfect. In other words, the result of an eventuality under the scope of the perfect can be derived from what is known in a world w. The framework I will employ here is in the lines with that of modals proposed by Kratzer (1977, 1991).

Let us now discuss how to formalize the semantic analysis of the perfect. Recall from the previous section that we need to consider two aspects of the present perfect in dealing with its meaning: a modal aspect and a temporal aspect. The modal aspect serves to pick out the most appropriate context-supplied result state or current relevance of an eventuality described by the main verb in a perfect sentence. The temporal aspect locates such a state or relevance at the time of utterance. As I discussed earlier, the modal aspect is an instance of an epistemic modal. Considering the modal and temporal aspect, we can give the IL translation of the present perfect, as in (25):

(27) Translation of the present perfect, i.e., perfect ($\mathcal{P}$).
$\lambda\mathcal{P}\exists t[XN(t)\ \&\ \exists t_1[t_1 \subseteq t\ \&\ \Delta(\mathcal{P}\{t_1\}, hold'(s,u))]]$, where $\mathcal{P}$ is a variable of type $\langle s,t\rangle$.

In order to capture the modal aspect, an epistemic-modal-like operator Δ is introduced in the translation of the present perfect. We can incorporate the temporal aspect into the translation by introducing the following formula hold'(s,u), where s and u denote a state and the utterance time, respectively. In (27), the formula hold'(s, u) means a state s holds at the utterance time u, and s and u are free variables whose variables are provided by the context of use. Notice that the choice of a free variable not only means that the interpretation does not depend on the syntactic or semantic environment, but also enables us to obtain a variety of interpretations of a given sentence. The free valuables are felicitous if the context provides enough information to evaluate them. Otherwise, they are not felicitous.[19] In addition, I will adopt the extended now theory, along the lines with Bennett and Partee (1972), McCoard (1978), and Dowty (1979) among others. The epistemic modal operator Δ picks out the most appropriate state resulting

19. I will get back to this below in this section when I dicuss the presupposition or conventional implicature of the perfect.

from an eventuality under the scope of the present perfect which falls within the extended now interval.

In possible worlds semantics, a proposition is a set of possible worlds in which it is true, i.e., a function from possible worlds to truth value. Let W be the set of possible worlds and let f be the function that assigns to any possible world in W sets of propositions that are known in a world w at an utterance time u. Thus, the propositions in$f$ ($\langle$w, u$\rangle$) constitute an epistemic conversational background for the perfect. The set of worlds epistemically accessible from w is $\cap f(\langle$w, u$\rangle)$, where $\cap f(\langle$w, u$\rangle)$ is the set of possible worlds in which all the propositions that are known in w at u are true.

The set of accessible worlds is restricted by the ordering source. The ordering source determines how the set of accessible worlds is ordered according to how close they are to the normal course of events in a world w. Let γ be the function that assigns to any possible world the set of propositions representing the normal course of events in w at u. The set of propositions γ $\langle$w, u$\rangle$ imposes an ordering$\leq \gamma$ ($\langle$w, u$\rangle$) on W such that for all w, w$'$ $\in$ W, w is closer to the ideal represented by $\gamma(\langle$w, u$\rangle)$ than w$'$ is iff every proposition in $\gamma(\langle$w, u$\rangle)$ which is true in w$'$ is also true in w. This can be formalized as follows:

(28) For all w, w$'$ $\in$ W, for any $\gamma \subseteq \wp$(W):
w$\leq_{\gamma(\langle w,u\rangle)}$ w$'$ iff { p: p $\in$ $\gamma(\langle$w, u$\rangle)$ and w$'$ $\in$ p} $\subseteq$ {p: p $\in$ $\gamma\langle$w, u$\rangle$ and w $\in$ p},
where γ is a set of propositions, and $\wp$ a function from W into a set of sets of propositions.

I think the semantic treatment of the present perfect as epistemic modality could be made clear by drawing pictures in the style of Kratzer's (1991) analysis of conditional modality, since it gives us a clue as to incorporating the modal component into the semantics of the present perfect. For this reason, I will discuss Kratzer's conditional modality first, and then get back to our topic. In the course of the discussion, I will temporarily ignore the extended now part in the above translation of the perfect for the sake of simplicity, since it seems to me that this part is not closely related to what I will discuss below, namely, the modal component of the perfect. Consider the following sentence:

(29) If John murders Joey, he must go to jail

A sentence like (29) is an example of deontic conditional modality. There are two options for representing (29) on the basis of the standard analysis of modals and the standard analysis of conditionals, as illustrated in (30a) and (30b):

(30) a. [John murders Joey] $\supset$ must[he goes to jail]

b. Must[John murders Joey $\supset$ he goes to jail]

Kratzer (1991) claims that neither of (30a) and (30b) is correct. Let us consider (30a) first. The proposition expressed by a sentence like (30) is automatically

true if John does not murder Joey in a world in question since if the antecedent is false, the whole conditional is true under any circumstance. On the other hand, if John murders Joey, (30) is true iff it logically follows from what the law provides that John goes to jail. However, the whole conditional and its antecedent could be true regardless of what the law provides in$\cap f$(w).

Let us look at the case of (30b). The representation in (30b) is ruled out due to the Samaritan Paradox which shows that any deontic modality conditional turns out to be true if it has an antecedent expressing non-ideal worlds. Suppose John indeed murders Joey. The following sentence

(31) John must go to jail

cannot be properly accounted for in the standard (or classical) analysis of modality. In this situation, the standard deontic analysis predicts that John does not go to jail in any world in$\cap f$(w). The reasoning is as follows: every proposition expressed by the law is entirely fulfilled in every world in $\cap f$(w), and therefore, no murder occurs and nobody goes to jail in any world in $\cap$f(w). Those worlds in $\cap f$(w) are ideal worlds from the point of the law. Given this, the antecedent in (30b) is not compatible with the propositions in $\cap f$(w). Thus, the antecedent is false. As I mentioned above, the whole conditional in (30b) is true since its antecedent is false.

Thus, Kratzer (1991: 648) proposes the following analysis of conditional modality:

(32) $\|\text{If}\alpha, \text{must}\beta\|^{f,\gamma}=\|\text{ must }\beta\|^{\mathbf{f'},\gamma}\}$, where for all w $\in$W, f'(w)=f(w)$\cup\{\|\alpha\|^{\mathbf{f},\gamma}\}$

f'(w) is an "updated" modal base, obtainable from the set of propositions in the existing modal base f(w) by adding to it the proposition expressed by the antecedent.[20] The updated modal base determines a new set of accessible worlds.

Let us consider the sentence in (30) again and see how this analysis fits in. The addition of the antecedent in (30) to the existing modal base f(w) results in an updating modal base, namely, f' (w). Thus, for any worlds, the set of accessible worlds derived from the updated modal base f'(w) is now a set of the worlds in which John murders Joey. This indicates that we are considering the non-ideal world where a murder happens, rather than the ideal world where no murder takes place. Given this, (30) is true just in case John goes to jail in every accessible world which is closest to what the law provides in a world w. The Samaritan Paradox disappears in this analysis.

Likewise, the similar analysis goes for perfect sentences. Consider the following sentences:

(33) John has worked hard

20. I have added "existing" to my explanation for the better understanding . f(w) could be an empty set. In this case, I am not sure whether it is appropriate to say "existing." However, let us just assume there is an existing modal base (or conversation background) for convenience' sake.

(34) John has put on red clothes

The sentence in (33) implicates that there is a current result of the eventuality described under the scope of the present perfect. The result of (33) may, for example, be a current state that John is probably tired or John has recently finished his dissertation, depending on the conversational background. The result of (34) may be a current state of John's being in red clothes. From what does such an implication logically follow? To put it differently, what are the current results in (33) and (34) inferred from? It goes without saying that they are inferred directly from the given conversational background and the proposition (or the tenseless sentence) under the scope of the perfect. In other words, the addition of the proposition p under the scope of the perfect to the existing conversational background f(w), as in f(w)$\cup$ p, makes it possible for some current resultative state, for example, that John is tired in (33), to be inferred. Just as the *if*-clause is added to the conversational background in f(w), so is the proposition under the scope of the perfect. Hence, the conversational background to which the proposition under the scope of the perfect is added implicates that there exists some current state, whether it is a result or a current relevance.

Given this, the strategy for the analysis of a perfect sentence" perfect (ϕ)", where ϕ is a tenseless sentence, is given in (35), which is along the lines of Kratzer's (1991) analysis of conditional modality.[21]

(35) $\|\text{perfect}(\phi)\|^{f,\gamma} = \|\Delta(\phi', \text{hold }'(s, u))\|^{f',\gamma}$, where for every world w $\in$ W, and the utterance time u, $f'(\langle w,u\rangle) = f(\langle w,u\rangle) \cup \{\|\phi\|^{f',\gamma}\}$

Let us get back to the sentences in (33) and (34) to briefly sketch the strategy I will pursue here. By adding the sentence under the scope of the perfect to the set of propositions in $f'(\langle w, u\rangle)$, we can obtain the updated set of propositions in $f'(\langle w,u\rangle)$ for the sentence in (33), as in (36):

(36) $f(\langle w, u\rangle) \cup \{\|$ John works hard$\|^{f,\gamma}\}$

Now,$f'(\langle w, u\rangle)$ determines the set of worlds epistemically accessible from w,[22] in which the proposition expressed by *John works hard* is true. Thus, the sentence in (33) is true just in case a state s holds at the utterance time u in every accessible world which is closest to what is known in w.[23] We can account for the semantic interpretation of a sentence like (34) in the same way.

21. In (35), I focus on how we can get conversational backgrounds for perfect sentences, instead of giving a full definition of its truth conditions. I will get back to the discussion of the truth conditions for the perfect sectence later in this section. The point I'd like to make in (35) is that the perfect sentence is interpreted with respect to an updated modal base $f'(\langle w,u\rangle)$ and an ordering sourceγ, as we saw in Kratzer's analysis of conditional modality.
22. Recally that the perfect is treated in terms of an epistemic modal.
23. The state s might be any state provided by the conversational background, and thus the perfect sentence (33) may pick out a state which is irrelevant to it. Below in this section, I will discuss in detail how to pick out the right state which is currently relevant to a given perfect sentence. For the moment, let us assume that s is a current relevant state for the purpose of our discussion here.

Recall that Kratzer (1977, 1991) argues that the variance in meanings of modal sentences is dependent upon the characteristics of the conversational background (or the modal base), which is provided by the context of use. As Portner (1998) notes, the variance in meanings of perfect sentences is also dependent on the nature of the conversational background, giving rise to a resultant state or a current relevance. In this respect, the perfect is analogous to modals.

From now on, I will discuss the semantics of the English perfect more explicitly, on the basis of what I have discussed about modality. Consider the following sentence:

(37) John has lost his watch

(37) can be represented as (38) on the assumption that the (present) perfect is an operator, and its IL translation would be something like (39):

(38) perfect (John loses his watch)

(39) $\exists t[XN(t)\ \&\ \exists t_1[t_1 \subseteq t\ \&\ \Delta(\ lose'(j,\ his\text{-}watch',\ t_1),\ hold'(s,\ u))]]$

As was mentioned above, Δ in (39) is an operator which is parallel to an epistemic modal operator. (39) says that there is an extended now interval t such that there is an interval t1 which is a subinterval of t such that for every accessible world which is closest to what is known in w, John loses his watch at t1, and a state s holds at u.

In order to show how the final line of the translation in (39) is interpreted in terms of an epistemic modal, let us make clear the context where a sentence like (37) is uttered. Suppose A and B are talking about John's birthday present.

(40) A: John's birthday is just three days away. I'd like to give him a birthday present. What do you think is the best gift for him now?

B: I think a wrist watch is. John is very punctual. If a man is very punctual, he or she is always curious about the time. The watch is the most reliable thing to him. And John has lost his watch.

When B utters a sentence like (37) in the context under consideration, it asserts that there is a currently relevant resultant state of John's losing his watch, namely that he needs a watch. When the sentence in (37) is uttered, the following modal base is established:

(41) $f(\langle w,u\rangle)$ = {I think a wrist watch is. If a man is very punctual, he or she is always curious about the time. John is very punctual. The watch is the most reliable thing to him.}

The updated modal base $f'(\langle w,\ u\rangle)$ is obtainable from the addition of the tenseless sentence in (37) to the modal base in (41), as illustrated in (42). In this context, it logically follows from $f'(\langle w,\ u\rangle)$ that John needs a watch.

(42) $f'(\langle w, u\rangle) = f(\langle w, u\rangle) \cup \{$John loses his watch$\}$

Given this, the truth condition for (39), which is the IL translation of a sentence like (37), can be stated as follows (where the notion $g^{\langle a/x\rangle}g'$ indicates the value assignment g' such that g' is exactly like g except that it possibly assigns a to x.):

(43) $\|\exists t[XN(t)\&\exists t_1[t_1 \subseteq t \,\&\, \Delta(\text{lose}'(j,\text{his-watch},t_1),\text{hold}'(s, u))]]\|^{M,w,g,u,f',\gamma} =$ 1 iff for some $g\langle a/t\rangle g'$ such that $g'(a)$ is extended now and for some $g'\langle b/t_1\rangle g''$ such that $g''(b)$ is a subinterval of $g'(a)$, such that for every world $\alpha \in \cap f'(\langle w,u\rangle)$, there is a world $\beta \in \cap f'(\langle w, u\rangle)$ such that $\beta \leq_{\gamma(\langle w,u\rangle)} \alpha$ and for every world $\mu \in \cap f'(\langle w, u\rangle)$, if $\mu \leq_{\gamma(\langle w,u\rangle)} \beta$, then *John loses his watch in* μ *at* $g''(b)$ implies a state s holds in μ at u.

(43) roughly says that (37) is true in a world w at the utterance time u with respect to M, w, g, f, and γ iff *John loses his watch at a subinterval* t_1 *of the extended now interval* t implies a state s holds at u in every accessible world which is closest to the ideal established by what is known in w at u.

One should, however, notice that the truth condition (43) is somewhat weak, inasmuch as it may pick out as a correct result any irrelevant state s which also might follow from the conversational background $f'(\langle w, u\rangle)$ in (42).[24] In other words, (43) cannot guarantee the most appropriate current relevant state, for example, the state of John's needing a watch. We can entail many other states from the conversational background $f'(\langle w, u\rangle)$ in (42). Among such states are, for example, the state of John's being punctual and the state of punctual people being curious about time, and so on. These states are not relevant ones the perfect sentence (37) is intended to imply when (37) is uttered since they are already given in the conversational background $f(\langle w,u\rangle)$ in (41) before (41) is added by the proposition under the scope of the perfect (i.e., John loses his watch). Therefore, they can follow from the (existing) conversational background $f(\langle w,u\rangle)$, i.e., (41) even before the proposition under the scope of the perfect is added to that conversational background $f(\langle w,u\rangle)$. This indicates that any irrelevant state following from the conversational background plus the proposition under the scope of the prefect should be excluded from the current state the perfect sentence is intended to imply. I will elaborate upon this in what follows.

Portner (1998) argues that perfect sentences would be infelicitous, not false, in a case where any currently irrelevant state is entailed from the conversational background in which they are used, and thus presupposition or conventional implicature is somehow involved in the course of the interpretation of the perfect. Following him, I will take the modal component in the translation of the perfect, i.e., $\Delta(\mathcal{P}\{t_1\}, \text{hold}'(s, u))$ to be involved in presupposition or conventional implicature, which is not part of the truth conditions for the perfect. The presup-

24. I'd like to thank Portner for pointing out this to me.

position is committed to picking out the right result or current relevance of the perfect. Thus, when a perfect sentence is asserted, it presupposes the following:

(44) $\|\Delta(\mathcal{P}\ \{\ t_1\},\ \text{hold}'(s,\ u))\|^{M,w,g,u,f',\gamma}$ is defined iff the updated conversational background $f'(\langle w,u\rangle)$ obtainable from the addition of a proposition p under the scope of the perfect to the conversational background $f'(\langle w,u\rangle)$ implies the existence of a current relevant states which is not entailed fromthe conversational background $f'(\langle w,u\rangle)$.

According to (44), the perfect sentence in (37) presupposes that there exists some (new) current state s which is entailed from emphf'($\langle$w, u$\rangle$) in (42). This prevents the perfect sentence (37) from presupposing that there exists a current state, for example, of John's being punctual, which is entailed from $f(\langle w,\ u\rangle)$ in (41). If the presupposition in (44) is satisfied, the perfect in question is felicitous, implicating the entailmentthat a currently relevant state s exists. If not, it would be infelicitous and we couldn't go further into the truth conditions.

Given this, the perfect sentence in (37) presupposes the following:

(45) $\|\Delta(\text{lose}'(j,\ \text{his-watch},\ t_1),\ \text{hold}'(s,\ u))\|^{M,w,g,u,f',\gamma}$ is defined iff the conversational background $f'(\langle w,u\rangle)$ obtained by adding John loses his watch to the conversational background $f(\langle w,\ u\rangle)$ implies the existence of a current relevant state s, i.e., the state of John's needing a watch, or the state of John's not having awatch, which is not entailed from the conversational background $f(\langle w,\ u\rangle)$.

Given this, we can rewrite the truth condition (43) as (46):

(46) Where (45) is defined $\|\exists t[XN(t)\&\exists t_1[t_1 \subseteq t\ \&\ \Delta(\text{lose}'(j,\ \text{his-watch},\ t_1),\ \text{hold}'(s,\ u))]]\|^{M,w,g,u,f',\gamma} = 1$ iff for some $g^{\langle a/t\rangle}\ g'$ such that $g'(a)$ is extended now, and for some $g'\langle a/t\rangle g''(b)$ is a subinterval of $g'(a)$, such that for every world $\alpha \in \cap f'(\langle w,u\rangle)$, there is a world $\beta \in \cap f'(\langle w,u\rangle)$ such that $\beta \leq_{\gamma(\langle w,u\rangle)} \alpha$ and for every world $\mu \in \cap f'(\langle w,\ u\rangle)$, if $\mu \leq_{\gamma(\langle w,u\rangle)} \beta$, then John loses his watch in μ at $g''(b)$ implies a state s holds in μ at u.

Notice that if the presupposition (45) is satisfied, it follows from (45) that the current relevant state s, i.e., the state of John needing a watch, exists. This indicates that the state s in the truth conditions (46) is the same state as is defined in the presupposition (45). In this way, the perfect sentence picks out the right current relevant state which holds at the utterance time.

5. Closing Remarks

I have argued in this paper that the variability of the perfect in meaning is properly accounted for by incorporating modal semantics. The current relevant

and resultative states described by the perfect vary from context to context. This suggests that the perfect and modals have it in common that they are context-dependent. After reviewing the previous treatments of the perfect, I have argued that each of them has some problems with handling the perfect. These problems are probably caused by the fact that the previous analyses focus on one aspect of the perfect meanings without capturing its semantic variance in a unified way. They also have difficulty with picking out the most salient state of the eventuality under the scope of the perfect. As a more appropriate way, this paper has argued that the most salient state, whether it is a current relevant or resultative state, can be obtainable from the combination of the conversational background with the proposition under the scope of the perfect. The framework developed in this paper has advantage over other approaches in that it can provide a unified account of the different meanings of the perfect.

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