University of Pennsylvania Working Papers in Linguistics

Volume 4 | Issue 2 Article 17

1-1-1997

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1. The Question

The question that this paper addresses is, *Why can you have a perfect of a progressive (1) but not a progressive of a perfect (2)?* The account that this paper will give in answer to this question will be primarily semantic: I will argue that it is the aspectual constraints imposed by the perfect and progressive operators that dictate their scope interaction.[1]

(1) The president has been visiting Philadelphia.
(2) * The president is having visited Philadelphia.

2. Aspectual Shifting and Presupposition Accommodation

It is well known that the aspectual type (i.e., situation aspect in the terminology of Smith 1991) of a sentence must be calculated from various elements. The verb and its arguments (including the quantificational properties of those arguments), particles, and adjuncts all contribute to the aspectual type. For example an atelic sentence (3a) may become telic as a result of arguments (3b) or adjuncts (3c); or the telicity may be emphasized by means of a particle (4). Further, a telic sentence (5a) may become atelic given, for example, different quantificational force on its object (5b).

(3) a. The chicken ran.
b. The chicken ran a mile.
c. The chicken ran across the road.
(4) The girl ate up a sandwich.
(5) a. The child drank a glass of milk.
b. The child drank milk.

[1]My thanks go to Sabine Iatridou, Mark Steedman, Beverly Spejewski, Matthew Stone, Angeliek van Hout and the members of Sabine's aspect seminar in Spring 1996.

These examples manipulate parts of the thematic structure of the sentence and their aspectual influences seem to stem from more general aspectual properties of argument structure and lexical semantics. Precisely how these aspectual influences get integrated into a theory of argument structure is a matter of some debate (Olsen, 1994; Van Hout 1996 among others). This debate is somewhat outside the scope of this paper and I will dwell on it no further.

A somewhat different case of aspectual shifting is seen with adverbials. Certain adverbials are used as tests to determine aspectual type. Thus, in Dowty (1979) we find that *in X time* adverbials are felicitous only with telic sentences (6) and *for X time* adverbials are felicitous only with atelic sentences (7).

(6) a. Maggie built a house in an hour.
b. * Maggie built a house for an hour.
(7) a. * Maggie ran around in an hour.
b. Maggie ran around for an hour.

The tests are used frequently (Vendler, 1967; Dowty 1979; Smith 1991, e.g.) and they seem to get at a valid intuition. However, as is periodically noted, these tests are very flexible—it's not really the case that 6b and 7a are ungrammatical or even uninterpretable, it's that they don't mean the same things as 6a and 7b. Moreover, the difference in meaning is highly systematic: 6b has an atelic interpretation and 7a has a telic one.

Following Moens 1987 and Moens and Steedman 1988, I propose that the right way to think about these adverbials is not as inert elements that select sentences of a particular aspectual type, but as active elements that can force aspectual coercion. We might even say, following the terminology of pragmatics (e.g. Heim 1988) that adverbials *presuppose* they will be applied to sentences of a particular aspectual type and that when they are not, the sentences shift to accommodate the presupposition. Presupposition accommodation *feels* like coercion and is highly context dependent. Thus, if we support a sentence with a plausible context, the accommodated interpretation also seems plausible. For example, the *for X time* adverbial presupposes that it applies to an atelic predicate; it is bad with (8a) but not with the context supplied in (8b).

(8) a. ?? Maggie died for an hour.
b. Maggie died for an hour each night on stage.

Moreover, we can get accommodation of different sorts. For example, the *in X time* adverbial presupposes that it applies to a telic predicate. When it is given an atelic predicate, accommodation can happen in a variety of ways. In (9a), the atelic sentence is given an implicit endpoint (supplied by the context); in (9b), the adverbial is made to apply to the preparatory time period that is bounded by the event itself. The precise means of accommodation is determined by context.

(9) a. Unwilling to start right after the priest left, Maggie tortured the prisoner in a few minutes.
b. Showing her skill with the thumbscrews, Maggie tortured the prisoner in a few minutes.

2.1. The Progressive's Presupposition

Moens 1987 argues that the progressive operator requires an activity (+durative, –telic event) as its input. In my terms, that means that the progressive presupposes it applies to an activity. Notationally, I will indicate this input presupposition as in (10).

(10) PROG (activity)

Of course, progressives operate over events of all types but when they are applied to non-activities, those events must accommodate to meet the presupposition. We can view the well known semantic effects of the progressive, then, as various forms of presupposition accommodation. These arguments are laid out in detail in Moens 1987, but I will go over a few examples briefly here.

(11) Maggie was tapping on the table.
(12) Maggie was building a house... but she didn't finish it.
(13) Maggie was winning the race... until the last lap.

In (11–13) are examples of, respectively, a punctual (–durative, –telic), an accomplishment (+durative, +telic) and an achievement (–durative, +telic) in the progressive. Each of these differs in

features from the activity type and each undergoes an accommodation process. The punctual (11), which needs to accommodate along the durativity dimension, gives an iterative interpretation; the accomplishment (12), which needs to accommodate along the telicity dimension, loses its entailment of completion (the so-called imperfective paradox); the achievement (13) which needs to accommodate along both dimensions, is interpreted as meaning the preparatory process to the event. Thus the varied semantic effects of the progressive are traced to a common source—accommodation to meet the input requirement of being an activity.

2.2. The Perfect's Presupposition

The perfect operator also places a constraint on its input, though a much looser one: the perfect presupposes that it applies to a stage level predicate (SLP), as noted in (14) below.

(14) PERF (slp)

SLPs include all non-stative aspectual types as well as many stative ones. They are, roughly speaking, transitory properties in contrast to individual level predicates (ILP) which ascribe more or less permanent properties. The idea that the perfect presupposes an SLP is compatible with the analysis of the perfect in Smith 1991 and fits in more generally with the claim in Iatridou 1996 that the complement of the possessive *have* is an SLP.

Because so many aspectual types are already SLPs, there are few times when accommodation will be necessary. The only exception to this, of course, is ILPs; we can see in (15) and (16) that the perfect of an ILP sounds odd in isolation, but with a plausible context supplied, we can re-interpret the predicates as SLPs.

(15) a. ?? Maggie has been tall.
b. Maggie has been tall for many months now.

(16) a. ?? Bill Clinton has been president.
b. Jimmy Carter has been president.
c. Bill Clinton has been president for 4 years now.

The accommodation process of an ILP into a SLP seems to most often involve bounding the ILP, either by introducing a beginning point or an endpoint. Having either a beginning or ending

transition point in the predicate seems to be sufficient accommodation. Thus, in (15b) the ILP accommodates by introducing a beginning point and in (16b and c) an endpoint is introduced. Since this is a context driven process, note that we can use real world knowledge about transition points to accommodate the predicate, as in (16b): knowing the fact that Carter is no longer president provides sufficient context to view *be president* as an SLP.

3. Aspectual Assertions of the Perfect and Progressive

The flip side of a presupposition is an assertion and in this section, I will examine the aspectual assertions of the perfect and progressive. These operators are located outside the VP (in IP, or TP, or AGRP, or...) and they have sentence level scope. Not surprisingly, then, the aspectual assertions (or output conditions) they make are true of the sentences that contain them. This requires us to recognize the aspectual class of whole sentences.

3.1. The Progressive's Assertion

Progressive sentences are states, as noted in (17).

(17) $[PROG(activity)]_{state}$

Vlach 1981 offers several conceptual reasons to believe this, including the fact that constructions with the main verb *be* typically are stative as well as the fact that the progressive is historically related to a stative locative construction. Dowty 1979 and Smith 1991 offer a slightly more concrete test: progressive sentences have the subinterval property characteristic of states.

Perhaps the strongest objection to this claim is that progressive sentences have a 'dynamic' character that sets them apart from an average state. I have two responses to this objection. First, this may simply mean that progressive states are just a subset of states, namely the SLP subset. Second, it may be that the aspectual quality is not the entire semantic effect of the progressive, but the fact that progressive sentences are states plus some additional property does not undermine the basic fact that they are indeed states. Moens 1987

gets around this problem by defining the category 'dynamic state' which is intended to capture the particularity of progressive states. For this paper, all that is necessary is that the progressive output a state that is an SLP.

3.2. The Perfect's Assertion

The perfect construction was apparently used historically to ascribe properties; that is, the subject has (or possesses) the property in the predicate. Intuitively, this is still part of the perfect's meaning (and is, I think, the intuition behind Smith 1991's *participant property* of the perfect). Moreover, the perfect (synchronically, at least) ascribes a particular kind of property—namely, an individual level one. My notation for this is shown in (18) below.

(18) $[PERF(slp)]_{ilp}$

Sentences in the perfect indeed pass many of the standard tests for ILPs (cf. Kratzer 1995 for relevant tests). For example, ILPs are bad as modifiers in existential sentences and so are perfects:

(19) a. There is a girl in the yard/??intelligent.
b. ?? There is a girl having been in the yard.

ILPs are bad in perception sentences, and so are perfects:

(20) a. I saw Maggie asleep/??a linguist.
b. ?? I saw Maggie having been to Boston.

In absolutive constructions, ILPs yield a causative (and not temporal) reading and so do perfects:

(21) a. Being tall, Maggie can reach the ceiling.
= because she is tall
b. Standing on a chair, Maggie can reach the ceiling.
= when she stands on a chair
c. Having been to Boston, Maggie thinks it is swell.
=because she has been to Boston

Perfect sentences do fail some of the ILP tests, however. ILPs yield generic interpretations on bare plural subjects, but perfect sentences do not:

(22) a. Bears hibernate in winter (generic on bears).
b. Bears have eaten my petunias (not generic on bears).

In fact, the ability to cause genericity on a bare plural subject with a perfect seems to depend primarily on properties of the predicate *before* the perfect applies. Thus (23) does have a generic interpretation:

(23) Bears have hibernated in Yosemite park since the stone age.

I have argued above that the adverbial *since the stone age* coerces the ILP *hibernate* into a SLP and is necessary in order to accommodate the presupposition of the perfect. However, the bare plural seems able to look within the accommodation and find the ILP originally present, and thus permits the generic reading. This fact suggests one of two things is going on. It is possible that coercion or accommodation is at least a partially transparent process. Or, it is possible that genericity is determined before the perfect operator applies. Since we know that aspectual class must be determined from the entire sentence, including the subject, the perfect (and progressive) presuppositions would have to take all parts of the sentence into consideration. If genericity is determined by the presence of a generic operator, I would argue that this operator has lower scope than the perfect operator.

Another test for ILPs that perfect sentences do not pass is even more problematic. ILPs are bad in the *when*-clauses with definite NPs but perfects are just fine:

(24) a. When Mary knows French, she knows it well.
b. When Mary has been to Boston, she has been to it in style.

I don't have a way to account for this fact, but it is interesting to note that perfect sentences in this context yield only the episodic reading; that is, in (24b), Mary is no longer in Boston—the sentence refers to previous episodes of her going to Boston. There is a certain intuitive sense to getting this reading. After all, the episodic reading of the perfect is the one most likely to have an event variable to contribute. However, I have no way to integrate this fact into the current story I am telling. I will therefore put this question aside for now.

An additional objection to the ILP analysis of perfect sentences is inspired by the following kinds of examples:

(25) I have walked the dog (today).
(26) I have lost my keys... but now I've found them.

In both these cases, it seems odd to say the sentence ascribes an ILP since the property disappears so quickly. In (25), the property of *having been walked* lasts only until the next morning when the dog must be walked again. Similarly in (26), the property of *having been lost* is over once the keys are found. I do not think this is a particular problem for the current analysis for two reasons. First, it can be avoided formally by giving the perfect operator scope over temporal adverbs (as in Klein 1994), present and implied. Thus the ILP in (25) is *has been walked today*; if we replace *today* by a non-deictic expression, the fact that this predicate is an ILP can be seen more clearly: *has been walked on April 1st, 1992* is not a property that goes away as the day wears on. A similar trick can be pulled with (26). These examples, I think, raise a larger question about the nature of ILPs in general. If ILPs are supposed to be permanent properties, then why do some of them end? This problem has been noted before (by Kratzer, I think): for example, *being a butcher* is an ILP and *being angry* is an SLP even though some people may be angry for much more of their life than they are a butcher. The fact that perfect sentences are subject to this same problem only means that they inherit the theoretical difficulties of being an ILP as well as the explanatory advantages.

4. A Partial Answer

From the input and output conditions of the perfect and progressive, we can answer the question this paper originally posed: why can you have a perfect of a progressive but not a progressive of a perfect? In short, the output of the progressive is compatible with the input of the perfect but the reverse is not true. The assertion, or output, of the progressive is a (dynamic) state and this is compatible with the presupposition of the perfect (it requires an SLP as input) so all is well (27). By contrast, the output assertion of a perfect is an ILP which is not compatible with the progressive's presupposition of ap-

plying to an activity (28). Thus, the perfect must have scope over the progressive to insure that the input-output conditions are met.

(27) $[PERF([PROG(activity)]_{\mathbf{state}})]_{ilp}$
dynamic states are a subset of SLP

(28) * $[PROG([PERF(slp)]_{\mathbf{ilp}})]_{state}$
ILPs are not a subset of activity

But what about presupposition accommodation? In section 2, I discussed how adverbials and operators like the perfect and progressive could coerce their input to meet their presuppositions. Why is this not possible here? One possible argument is that in fact such accommodation is possible in principle, but that the context that would require it is so unusual that we never (or hardly ever) encounter it. So, for example, this account would predict that (29) would be acceptable.

(29) Right now Maggie is doing an acting exercise. She is pretending to live through all the stages of life of Susan B. Anthony. **Right now, she is having been in jail for 3 days after a protest.**

I find this judgment hard to get, though it is unclear whether the source of the difficulty is the strangeness of the context of the strangeness of the form. In the following section, I will propose that the output of the perfect and progressive can *not* undergo accommodation and will suggest a possible syntactic-semantic explanation.

5. Limits on Aspectual Shifting

Let us suppose, then, that the aspectual output assertions of the perfect and progressive do not shift to accommodate other presuppositions. Why not? Intuitively, you shouldn't be able to mark something explicitly and then override it leaving no trace behind. The perfect and progressive operators are large pieces of morpho-syntax and their aspectual effects shouldn't be completely eliminable.

In support of this point, I note that perfects of progressives have a characteristic reading which seems to reflect the consistent contribution of the progressive (cf. also Moens 1987).

(30) Maggie has been visiting Boston/knocking on the door/eating a cake.

In the examples in (30), the *visiting Boston, knocking on the door*, and *eating a cake* are happening right up to the moment of speech for what Comrie calls the 'perfect of persistent situation'. A progressive under the perfect seems to encourage, if not outright require this interpretation. The progressive does not need to shift its output (a state) to match the presupposition of the perfect (an SLP) since progressive states are a subset of SLPs, and it maintains its semantic relevance by imposing this characteristic reading on the perfect above it.

Looking at the reverse item the output assertion of the perfect (an ILP) does not meet the presupposition of the progressive (an activity) but shifting the ILP to an activity would completely eliminate the perfect's aspectual contribution. However, this predicts (incorrectly, I think) that a progressive of a perfect of an ILP will be better, because the ILP will shift to accommodate to the perfect and this shift will leave a residual trace of the perfect even after the progressive eliminates the perfect's assertion.

(31) Maggie is having been tall for several years now.

Again, I don't find (31) to be acceptable. If neither context (29) nor recoverability (31) is the limiting factor, perhaps it is the syntax of the perfect and progressive that is responsible. Diesing 1992 provides a syntactic framework that may make sense of this limit on aspectual shifting.

In Diesing's model, ILPs are distinguished from SLPs syntactically. ILPs create a control structure, in which the subject is base generated in the IP and controls a PRO subject in the VP. The SLP reading requires the subject of the sentence to be lowered into the VP at LF. This lowering operation is available to VP-internal subjects (which lower from Spec-IP to their base generated position) but not to ILP subjects (which already have a PRO in Spec-VP). Since the perfect outputs an ILP, it seems reasonable to suppose that the perfect *have* projects the control IP associated with an ILP. Once such a structure is in place, however, there is no way for any subject to get back into the VP since the Spec-VP will have a PRO in it. The problem then of putting a progressive over the perfect becomes twofold,

as both the input to the progressive (an activity) and the output of the progressive (a state) are SLPs. Thus, the progressive doubly requires the subject to be lowered into the VP but of course such a lowering operation is blocked by the presence of the intervening perfect control structure.

In other words, once we have a supported control IP in place (supported because it is headed by the perfect have) we can't get rid of it. Such an IP, however, has semantic consequences which must be dealt with. The progressive operator has requirements in opposition to these consequences and so can not take scope over the perfect.

6. Conclusion

In this paper I have argued that both the perfect and the progressive have aspectual presuppositions on their input and aspectual output assertions. The progressive presupposes that it applies to an activity and it outputs a state. The perfect presupposes that it applies to an SLP and it outputs an ILP. I have argued further that although aspectual type often shifts to accommodate the presupposition of an adverb or operator, the output of the perfect and progressive operators do not participate in this accommodation process. Thus, the reason that we can have a perfect of a progressive is because the aspectual input conditions of the perfect (SLP) are compatible with the output conditions of the progressive (state); the reason that we can *not* have a progressive of a perfect is because the input conditions of the progressive (activity) are not compatible with the output conditions of the perfect (ILP).

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