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THE PROGRESSIVE IN ENGLISH: EVENTS, STATES AND PROCESSES

ABSTRACT¹. This paper has two goals. The first is to formulate an adequate account of the semantics of the progressive aspect in English: the semantics of 'Agatha is making a cake', as opposed to 'Agatha makes a cake'. This account presupposes a version of the so-called "Aristotelian" classification of verbs in English into EVENT, PROCESS and STATE verbs. The second goal of this paper is to refine this classification so as to account for the infamous "category switch" problem, the problem of how it is that modification of a verb like 'run' by an adverbial like 'to the store' can turn a PROCESS phrase ('run') into an EVENT phrase ('run to the store'). Views discussed include those of Aqvist, Bach, Bennett, Bennett and Partee, Dowty, Montague and Scott, and Vendler.

1. HISTORY OF THE PROBLEM

The progressive form of a verb is formed by preceding the verb with 'be' and following it with the suffix '-ing', so that 'be leaving', for example, is the progressive form of 'leave'. One of the long-standing questions in linguistics has been how the meaning of a sentence using the progressive is related to the meaning of the corresponding non-progressive, for example, how the meaning of:

- (1) Mary is leaving

is related to that of:

- (2) Mary leaves.

The first goal of this paper is to give a simple answer to this question. I will begin by reviewing briefly the history of the problem.

An early proposal given by Dana Scott and Richard Montague (Montague, 1974, p. 125) is that a simple sentence in the progressive is true at a given time t if and only if the corresponding nonprogressive sentence is true at every moment throughout some open interval about t . Thus 'John is walking' is true at time t just in case there is an open interval of times surrounding t such that 'John walks' is true at each moment in that interval.

This analysis is now known to be inadequate. For example, it leads to what has been called the "imperfective paradox" (Dowty, 1979, pp. 133 ff.). Consider this sentence:

- (3) Mary has left.

This sentence will be true at a time t just in case the corresponding present tense sentence is true at some earlier time. The imperfective paradox is this: the Scott/Montague analysis tells us that sentence (1) entails sentence (3); if Mary is leaving then Mary has left. For if (1) is true at t then there is an open interval of times around t – and thus containing points of time prior to t – such that (2) is true at every point in the interval. So (2) is true at some time or times before t , which makes (3) true at t . But this seems wrong in the case in question, and the wrongness is even more blatant in other cases. For example, the analysis implies that if Samantha is (right now) building a house, then she has already built a house.

This situation is paradoxical, of course, only if one has persuasive reasons to believe the analysis that leads to it. Most researchers have concluded that the analysis merely needs to be corrected. But this has not proved to be an easy task. In reaction to this situation, Michael Bennett and Barbara Partee (in Bennett and Partee, 1972) were led to make a radical proposal that is now widely accepted: we should no longer analyze sentences in terms of their being true at instants of time, as has been the custom in tense logic; instead, sentences should be viewed as being true with respect to intervals of time. This idea offers a much more flexible framework for tense logic, and Bennett and Partee hoped that it would provide the possibility for a solution of the imperfective paradox. Their solution was this. Let us call a unit interval of time – that is, an interval containing just one instant – a “moment” of time. Then they propose (page 13):

A simple progressive sentence is true at an interval of time I if and only if I is a moment of time, and there is an interval I' which contains I such that the nonprogressive form of the sentence is true at I' .

For example, ‘John is building a house’ might be true at high noon today because there is an interval of time (say, starting two years ago and terminating three years from now) at which the sentence ‘John builds a house’ is true. This avoids the original form of the imperfective paradox because the progressive sentence does not require for its truth at I that there be any totally past interval at which the non-progressive sentence is true. Unfortunately, the proposal falls prey to refined versions of the paradox. For example, consider sentence (4):

(4) Mary is building a house,

and suppose that this sentence is true at high noon today. Then, accord-

ing to the analysis, there is an interval surrounding noon today at which the sentence:

(5) Mary builds a house

is true. But then there will be some moment later than every instant in that interval, and at that moment the sentence:

(6) Mary has built a house

will be true. In crude terms, if Mary is now building a house, then it will be true at some time in the future that Mary has built a house. But that is incorrect, for she may never finish. If Mary were to be struck down by lightning with the house only half complete, we would then say that she was building a house when she was struck down, but we would never say she had built a house.

More recently, Michael Bennett has described a refined version of the analysis using intervals that is, I think, immune to such counter-examples. I will discuss his proposal below, after I have stated my own. But there is a quite different approach that should be mentioned first, which is due to David Dowty. Dowty's proposal is that a progressive sentence should be true at a given time just in case the corresponding non-progressive sentence is true in all inertia worlds, where an "inertia world" is a possible world that is exactly like the actual world up to the time in question "and in which the future course of events after this time develops in ways most compatible with the past course of events" (Dowty, 1979, p. 148). The idea is that the progressive sentence is true just in case the non-progressive version would have been true in any situation like this one which proceeded "normally".

This proposal seems to be a very natural one, but there are difficulties with it. The principal difficulty is that in the proposal as stated, "inertia world" is defined so as to strongly suggest that the actual world itself is one of the inertia worlds. Prima facie, it would appear that sometimes, anyway, things actually proceed in ways "most compatible with the past course of events". But if there is ever a single case in which this happens, then this makes the actual world an inertia world for that time, and the analysis then requires that no progressive sentence be true at that time unless its nonprogressive version actually becomes true then or later – which revives the imperfective paradox for that moment in time. Clearly some subtle refinement in the notion of inertia world is needed if this proposal is to work correctly. Whether this can be provided is presently an open question.²

Because of the difficulties with the imperfective paradox that have

troubled previous accounts of the progressive, it seems appropriate to consider some completely different approach to the problem.

2. UNDERLYING EVENTS IN LOGICAL FORMS

The account of the progressive that will be discussed in this paper is couched within a theory of logical form which was originally endorsed by Frank Ramsey (1927), was presented in an expanded form by Hans Reichenbach (1947), and was considerably modified by Donald Davidson (1967). This theory holds that many sentences of English can be assigned logical forms that make reference to, or quantify over, events, states and processes. As an illustration, the sentence:

- (1) Mary saw John

is assigned the form:

- (2) $(\exists e) [\text{Seeing}(e) \ \& \ \text{Subject}(e, m) \ \& \ \text{Object}(e, j)],$

in which the variable e ranges over events, $\text{Seeing}(e)$ means that e is an event of seeing, $\text{Subject}(e, m)$ means that Mary is the subject of that seeing event, and $\text{Object}(e, j)$ means that John is the object of the seeing.³ This logical form is considerably more complicated than the symbolization that is normally taught in logic texts, which is simply:

- (3) $S(m, j).$

The two forms are not incompatible, however, for we can view (2) as a more refined version of (3). We do this by treating the traditional formula, $S(x, y)$, as a crude form which fails to display certain logical structure, the structure in question being given by:

- (4) $S(x, y) = (\exists e) [\text{Seeing}(e) \ \& \ \text{Subject}(e, x) \ \& \ \text{Object}(e, y)].$

But (2) is obviously much more complicated than the traditional symbolization, and one might naturally wonder whether – and why – the additional complication is necessary or desirable. The answer is that the more complicated forms are indeed desirable, because they allow one to account for certain phenomena that go unexplained by simpler theories of logical form. This is discussed in some detail in Parsons (1980), (1985), and (in progress); I will only give illustrations here.

A. *The Logic of Modifiers*

One phenomenon that the account handles in a nice way is the logic of certain adverbial modifiers. Davidson's idea is that these modifiers appear in logical form as predicates of events, so that a sentence such as:

- (5) Brutus stabbed Caesar in the back with a knife

would be assigned the logical form:

- (6) $(\exists e)$ [Stabbing(e) & Subject(e , B) & Object(e , Caesar) & In(e , back) & With(e , knife)].

One advantage of this method of symbolization is that it accounts for the fact that sentence (5) entails each of the following:

- (7) Brutus stabbed Caesar in the back
 (8) Brutus stabbed Caesar with a knife
 (9) Brutus stabbed Caesar

For the logical forms of each of (7)–(9) are the same as the logical form associated with (5), with one or more conjuncts dropped out. With the given method of symbolization, the inferences are valid in the ordinary predicate calculus. The method accounts similarly for the fact that both (7) and (8) entail (9), and – of prime importance – that the conjunction of (7) and (8) does not entail (5). Brutus might have stabbed Caesar in the back with an icepick and in the thigh with a knife; this makes both (7) and (8) true without making (5) true. I know of no significantly different approach to logical forms which accounts neatly for these facts.⁴

B. Implicit and Explicit Quantification Over Events

A second illustration involves the connections between assertions containing explicit quantification over events, and assertions that contain no such explicit quantification at all. Consider, for example, the following inference:

- (10a) In every burning, oxygen is consumed.
 (10b) Agatha burned some wood.
 (10c) Oxygen was consumed.

The first sentence explicitly quantifies over burnings; the second and third do not. Yet there must be some relation among them, for the argument that they make up is valid. In the theory being explored, the second sentence is assigned a logical form which does involve quantification over burnings, and the argument comes out valid in the ordinary predicate calculus.⁵

C. Implicit and Explicit Reference to Events

Additional evidence for the close relationship of explicit and implicit event talk is the near synonymy of (11a), which contains an explicit

reference to an event, with (11b), which does not:

- (11a) EXPLICIT: After *the singing of the Star Spangled Banner*, they tossed the coin.
 (11b) IMPLICIT: After the Star Spangled Banner was sung, they tossed the coin.

If 'after' stands for a relation between events, then the underlying event approach can easily account for this relationship.⁶

D. Perception Sentences

A final illustration is the semantics of perception verbs. Intuitively, if Mary saw Brutus stab Caesar, then she saw a stabbing of Caesar by Brutus; i.e., (12) entails (13):

- (12) Mary saw Brutus stab Caesar
 (13) Mary saw a stabbing of Caesar by Brutus

This relationship is easily captured by the theory of underlying events, as articulated in Higginbotham (1983) and Vlach (1983).⁷

The next two sections contain a somewhat more detailed summary of the underlying event account, followed by a proposal for how to treat the progressive within this framework.

3. THE UNDERLYING ONTOLOGY AND LOGICAL FORM

The account under discussion presupposes that in addition to individuals and times, there are events, processes, and states (or "states of affairs"). It is convenient to have a generic term to stand indifferently for events, processes and states; I will follow Bach (1981) in using the term 'eventuality' for this purpose. But the differences among events, processes and states will also be important. As illustrations, I suppose that:

- (1) Agatha knows Fred

reports a state (or reports that a state of a certain kind holds),

- (2) Agatha ran

reports a process, and

- (3) Agatha made a sandwich

reports an event. Eventualities usually have subjects, and may also have objects.⁸ If Mary builds a bookcase then there is a building event of

which she is the subject and the bookcase is the object. If she runs for a while then there is a process which has her for a subject and which has no object. If she is a doctor then there is a state (of affairs) of being a doctor which has her as object and which has no subject. The eventualities appealed to here are all "individual" as opposed to "generic". For example, people sometimes speak of "the state of being a doctor" as a state which many different people could be in. This is not the notion of state being utilized here. For present purposes, Mary's state of being a doctor is a different state from John's state if he is also a doctor; both are different states of the same kind, that is, both states are in the extension of the common noun 'doctor'.

In the case of events, we can typically identify subparts which have a special significance for the present theory: an event often has both a development portion and a culmination. For example, if Mary builds a bookcase then there is a period of time during which the building is going on – the development portion – and then (if she finishes) a time at which the bookcase finally gets built, the time of culmination. I do not suppose that every event has a culmination. If Mary begins building a bookcase but is struck down by lightning when three-quarters finished, then there is an event which is a building, which has her for a subject, which has a bookcase (an unfinished one) as object, and which never culminates. (This view will be important for the analysis of the progressive.)

There is a sizeable literature on the so-called "Aristotelian" categorization of verbs of natural language into "event"-verbs, "state"-verbs, etc., with a wide variety of tests proposed for marking these distinctions. At best these tests form clusters, but they rarely coincide.⁹ The hope is that a theory which presupposes these distinctions can simultaneously help to clarify them by filling in some of the details regarding their relationships to our language.

To illustrate the problem, consider the distinction between processes and events. This is discussed in Vendler (1967), where he considers a phenomenon that is involved in the imperfective paradox:

If it is true that someone is running or pushing a cart now, then even if he stops in the next moment it will still be true that he did run or did push a cart. On the other hand, even if it is true that someone is drawing a circle or is running a mile now, if he stops in the next moment it may not be true that he did draw a circle or did run a mile Running a mile and drawing a circle have to be finished, while it does not make sense to talk of finishing running or pushing a cart. Thus we see that while running or pushing a cart has no set terminal point, running a mile and drawing a circle do have a "climax", which has to be reached if the action is what it is claimed to be. (p. 100)

The problem is that a running to the store seems to be a running, yet the former is an event and the latter a process. Uncertainty over whether a “mere” running can have a culmination is reflected in uncertainty over classification of the verb ‘run’ in the linguistic literature. For example, Bach cites ‘John ran’ as a paradigm process sentence, but later notes that we are forced to give an event interpretation to ‘John ran yesterday’ (Bach, 1981, pp. 67, 73). And Bennett and Partee (1972), in trying to classify ‘play’, are forced to say that it is ambiguous between an event verb and a process verb. (Similar considerations force the same conclusion for hosts of verbs.) Ritchie (1979, page 100) also finds that the process/event distinction does not classify properly.

In the last section of this paper (Section 7) I will propose a solution to these problems. Prior to that section I will simplify discussion by avoiding talk of processes; I will focus entirely on event sentences and state sentences.

The two key technical notions that I will be using are those of culminating and holding. I use the notation ‘Cul(e, t)’ to mean that e is an event that culminates at time t . When I say that an eventuality e holds (at time t), I mean that either e is a state and e ’s object is in state e at t , or e is an event which is in development at t . (I use the notation ‘Hold(e, t)’ for ‘ e holds at t ’.)¹⁰

For the most part I will confine discussion in this paper to the simplest sentences of English, sentences which consist only of names and definite descriptions, plus verbs (both transitive and intransitive) and certain adverbs (which will not be discussed until later).¹¹ The sentences are in the simple present or past tense, or in the future (using ‘will’). The intent here is to capture the “reportive” use of these sentences, not the “habitual” or “iterative” use. Thus, the relevant reading of ‘Samantha ate lunch at noon’ is the reading that reports a specific past lunch-eating, not the reading that tells when Samantha habitually ate lunch (as in ‘Throughout her youth, Samantha ate lunch at noon every day’). With this limitation, the logical forms can best be explained by illustration. For example, the sentence:

Mary knows Fred

has a logical form which is, roughly:

There is a knowing which:
 has Mary as its subject,
 and has Fred as its object,
 and holds now.

In symbols:

$$(\exists e) [\text{Seeing}(e) \ \& \ \text{Subject}(e, \text{Mary}) \ \& \ \text{Object}(e, \text{Fred}) \ \& \ \text{Hold}(e, \text{now})].$$

The sentences under discussion will deviate from this model in three ways: With intransitive verbs, we omit the object clause. With past and future tense sentences we add quantification over times, in the usual fashion. And third, we need to choose between saying that the eventuality in question *holds* at the time in question, or *culminates* then. For example, if we want to say that Mary built a bookcase, then we will need to say that there is a past time (a time before now) at which that building event culminates. If we were to say only that there is a past time at which the event holds, then that leaves it open that she has not yet finished. In such a case the English sentence 'Mary built a bookcase' is not yet true. For a simple non-progressive sentence, then, its logical form contains 'Hold' if the verb is a state verb, and its logical form contains 'Cul' if the verb in question is an event verb. So the logical form associated with:

Mary built the bookcase

will be:

$$(\exists t) (t < \text{now} \ \& \ (\exists e) [\text{Building}(e) \ \& \ \text{Subject}(e, \text{Mary}) \ \& \ \text{Object}(e, \text{the bookcase}) \ \& \ \text{Cul}(e, t)]).$$

This seems to yield the right truth-conditions for the various tenses.¹²

4. AN ANALYSIS OF THE PROGRESSIVE USING EVENTUALITIES

It is difficult to know what the proper ingredients should be for analyzing the progressive. One natural idea is that the analysis should involve some appeal to intent or other mental activity, since if Mary is sitting still taking a break, there sometimes seems little else apart from her intent to pick out situations in which she is still building a house from ones in which she has abandoned that activity. But intent cannot be made part of a general analysis of the progressive on pain of falsifying examples such as:

- (1) The river is undercutting the bank.

We must give an analysis that does not require that intent is irrelevant, but not one that requires its presence.

The inertia worlds approach focusses on the idea of what would be the case (described in non-progressive terms) if present activities were to go

on uninterrupted. I suggest that it is the present activities that are the whole story.¹³ My proposal for treating progressive sentences is the following. First we recall the point made earlier, that a verb such as 'cross' is true of all crossings whether or not they culminate. If John crosses the street and reaches the other side, then he is the subject of a crossing that culminates; if he gets part way across and is then struck down by a truck he is, for a while, the subject of a crossing that does not culminate. The difference between a progressive and non-progressive event sentence is, roughly, whether the sentence requires for its truth that the eventuality picked out by the verb culminates, or whether it only needs to "go on" for a while. (This I take to be an intuitively plausible remark, that merely awaits a technical implementation.) The rule for dealing with the progressive form of the verb can then be:

If 'A' is an event verb, then 'be A-ing' is to be treated semantically as a state verb; otherwise, 'be A-ing' is to be treated the same as 'A'.¹⁴

Semantically, changing an event verb to the progressive form requires that it be treated as a state verb; this simply means that the sentence in question will require for its truth that the event in question *holds*, not that it *culminates*. As a consequence of this, event sentences in the progressive will translate differently from those not in the progressive. Here is an illustration. The (non-progressive) sentence:

Agatha crossed the street

will, by our former rules, receive the translation:

$(\exists t) [t < \text{now} \ \& \ (\exists e) [\text{crossing}(e) \ \& \ \text{Subject}(e, \text{Agatha}) \ \& \ \text{Object}(e, \text{the street}) \ \& \ \text{Cul}(e, t)]]$.

We must use either Cul or Hold in the translation; here we use Cul because 'cross' is an event verb. The sentence:

Agatha was crossing the street

is treated in exactly the same way, except that 'is crossing' is classified as a stative verb form; so we choose Hold instead of Cul, and the resulting translation is:

$(\exists t) [t < \text{now} \ \& \ (\exists e) [\text{crossing}(e) \ \& \ \text{Subject}(e, \text{Agatha}) \ \& \ \text{Object}(e, \text{the street}) \ \& \ \text{Hold}(e, t)]]$.

This might be true even though the corresponding version with Cul is never true.

It should be clear that the proposed analysis is immune to “paradoxes” of the imperfective kind, since saying of an event that it holds at a given time does not imply that it culminates at that or any other time. It can also be verified that it preserves all of the advantages of the underlying event approach that were articulated in Section 2 above.¹⁵ This proposal then seems to me to be one which (1) gets the logical relationships right, (2) has a plausible intuitive motivation, and (3) is incorporated into a robust semantical framework for the semantics of English – one which has the capacity for addressing a wide variety of interesting phenomena.¹⁶

5. ABSENT PROCESSES AND UNFINISHED OBJECTS

In this section I will discuss two objections to the analysis of the progressive that has been given above. Both involve problems that any analysis of the progressive will have to face in one form or another. The first is that there sometimes seems to be no independently specifiable present process that makes the progressive true, and the second is that the theory commits us to “unfinished” objects.

The first objection has been raised on a number of occasions by David Dowty. The theory given above supposes that an event verb picks out a kind of event, whether an event of that kind has culminated or not. If the progressive is true, then there must actually be an event *of the kind in question* that is⁴ going on. But this is puzzling in certain cases. Consider an example of Dowty’s:

John is making me a millionaire.

The problem is that this sentence, if true, could be made true by a wide variety of activities, none of which has any regular relationship with my becoming a millionaire. In the case of ‘cross’ we know exactly what kind of event to look for to see if Agatha is now crossing the street, but in the case of John’s making me a millionaire we have little idea what kind of event to look for – except that it must be one which, were things to go in certain ways, would result in me becoming a millionaire.

I think that Dowty is right to find examples of this sort puzzling, but I do not find the source of the puzzle to lie with the progressive. My intuition is that the puzzle comes from the special character of the example that has been chosen. This example is a special case of a “causative-inchoative” construction in English – a construction whose truth involves the notion of causality plus that of a final state. A simpler

example is 'John opens the door', which means something like:

John opens the door =
John does something which causes the door to become open.

If such a sentence is true, then there must be three things:

- (1) Something John does to cause the door to open
- (2) Something that the door does: it opens
- (3) A final state of the door: it must end up open.

The first of these may, *but need not* be, a type of event that regularly ends up with a door's being open. Traditionally, John's opening of the door has been analyzed in terms of his doing something which causes an opening of the door, and an opening of the door has been analyzed in terms of the coming to be of a state of being open. In this example, we have English words for all parts of the process: A transitive verb (spelled 'open') for what John does, an intransitive verb (spelled 'open') for what the door does, and an adjective (again spelled 'open') that describes the final state of the verb. In other such triads the spelling changes by a regular pattern: *Mary fells* the tree; the tree *falls*, and it ends up *fallen*.¹⁷

I believe that Dowty's problem arises inevitably for any causative-inchoative verb. The progressive sentence 'John is opening the door' requires for its truth that a certain event hold. Which event is this? It is an event which is "causing an opening". This is a fairly abstract description of a kind of event, which is what Dowty is bothered by. But it is an accurate description. Its roundabout nature is not forced on us by the proposed analysis of the progressive; it is forced on us by the causative-inchoative nature of the verb in question. It will be difficult in many cases to decide whether a given event is indeed causing another event of the appropriate sort. But this is the nature of the situation. The same is true of "making me a millionaire". John is doing that now if he is engaged in an activity of *some* kind that is now causing me to become a millionaire, whether I eventually become one or not.

In summary, it is indeed difficult, in the case of causative-inchoatives, to describe the *causing* event picked out by the verb in a manner independent of the verb that will also make clear its connection with what is being caused. This is a fact about causative-inchoatives, but it is not unique to the progressive, and it is not incompatible in any way with the proposed account of the progressive, and so it cannot be taken as an objection to it.

Unfinished Objects

The second major objection that has been aimed at this analysis has to do with the objects of verbs in the progressive. According to the analysis given above, if x is A-ing a B then there is a B that x is A-ing. So long as we avoid intentional verbs (such as 'imagine') then this pattern seems correct. Somehow, at least, we need to explain why if Mary is pushing a cart, then there is a cart that she is pushing, and if Harry is slicing a cantaloupe, then there must be a cantaloupe that he is slicing. (In general, these examples tell against the progressive being a kind of intensional operator.) But "verbs of creation" raise a special and interesting objection. According to the analysis, if Mary is building a house, then her building event has an object which is a house, and so there is a house that she is building.¹⁸ Now suppose that Mary is struck down by lightning with the house only one fourth finished. The objector then takes me to the location and demands, "Where is the house? All I see is a foundation and portions of some wall framing!" My answer is that we are looking at the house. It is a house – an incomplete or unfinished one. This will no doubt raise some eyebrows, but I think that it is correct. That is, given the linguistic conventions of English, it is proper English to describe the object before us as a "house".

In Northern California there is a state park – Jack London State Park. One can go there and see the house that Jack London was building when he died. At least this is what the tourists say. It isn't much of a house – only a foundation and parts of some walls. But native speakers of English call it a house. What evidence could there be that they are wrong?

Two paragraphs above I asked you to suppose that "Mary is struck down by lightning with *the house* only one-fourth finished". Your response was not to ask "Why did he say 'a house'? If no house got finished then there is no house at all!" Ordinary language seems to be governed here by something like Plato's theory of forms: those material things that "aspire after" ideals are named after those ideals, in spite of their failure to live up to the ideal itself. In short, people describe unfinished houses as "houses", and the analysis under consideration merely assumes that this is correct usage.

Notice that the problem facing us is not an ontological one. Everyone agrees that the thing in question exists; the only question is whether it is or is not a house. I take it that this is primarily a question of the proper use of words – whether an unfinished house is or is not properly called "a house".

This gives rise to various worries. How much of a house needs to be

built before it is correctly describable as a house? Suppose that Mary had only drawn up the plans; would this be enough for there to be a house? My answer again lies in English usage. If we were willing to say that Mary was building a house, and maintain this in the face of ordinary sorts of criticism, then that would be enough. In the case where Mary had planned to build a house, but the construction had not yet begun, I think that the accurate description of the situation is that Mary is still in the planning stages, and is not yet building a house. In that case, the analysis does not require there to be a house, finished or unfinished, since 'planning to A' does not imply 'A', no matter how 'A' is analyzed (see below).

Still, there is a suspicion that some cleverly chosen example might drive this theory into ontological excesses. Let me discuss this, disposing initially of the easy issues. First, there will be no problems for the analysis based on intentional verbs. Granted, 'Mary is imagining a unicorn' should not entail that there is a unicorn, and it is not at all clear how such constructions should be analyzed. But this is not a problem for the progressive *per se*, since for verbs like 'imagine' the very same problem arises for the non-progressive 'Mary imagined a unicorn'.¹⁹

Second, for similar reasons there will be no problem for the present analysis due to infinitival expressions such as 'plan to'. Certainly, it should not follow from 'Mary is planning to build a house' that there is a house (that she is planning to build). But this is because of the opacity of 'plan to'; it already must not follow from 'Mary planned to build a house' that there was a house that she planned to build. Whatever problem there is here is a problem for these infinitival constructions, and not a special problem for the progressive.²⁰ Examples of this sort include 'try to', 'start to', 'be going to', 'want to', etc.

Next, there is a "futurate" use of the present tense which should not confuse us.

"What are you doing this morning?"

Answer: "I'm making a cake."

This may announce the intention of making a cake, long before the ingredients are even purchased. And some people would hold such a sentence true if the plan to make a cake is sincere, even though "the cake" never gets made. (This is not my reaction, but some people view it this way.) Again, this is not a problem that is special to the progressive. Suppose the answer had been:

"First I clean the bedroom, then I make a cake, then . . ."

The phenomenon is the same, though the progressive is missing.

Suppose that the cake-making endeavor has started, though; won't there be a time at which it is true to say that I am making a cake even though there is not yet any cake? Let us suppose that before you measure out the first ingredient it is not yet true to say that you are making a cake (you are only preparing to make a cake), but that once the first ingredient is measured out it is then true that you are making the cake. It seems to be true at that time that the question "*Where* is the cake?" has no answer. But, then, doesn't this show the analysis to be false?

I do not think so. There may very well be a problem here, but it is a general problem about the ontological presuppositions of the things we are inclined to say, and is not peculiar to the progressive. Consider the following claims:

Sam put the cake in the oven.

After he blended and mixed it, he put it in the oven.

The first seems to commit us to there being a cake before it was baked, and the second seems to commit us to there being a cake even at the point of blending. Neither of these involves the progressive. I think this shows that we ordinarily assume that there are such things as cakes even during the early stages of their creation, and even perhaps before they have well-defined spatial locations. If this assumption is false, then claims such as:

He put the cake in the oven

are, strictly speaking, false. This would then reveal a discrepancy between our ordinary assumptions and the truth, but it would not cast doubt on the given analysis of the progressive.

The above considerations may shed some light on the following issue. We do seem to use the progressive in two sorts of cases. We use it when the process in question has clearly begun, and we also use it when we are preparing to begin that process. I think that we may sometimes say "I'm making a cake" when we have not yet started to make the cake, but when we are making preparations, such as getting out the bowls. I see this as a form of the "futate" use of the progressive, used in a situation in which the literal present tense version is false. It is often difficult to locate a clear borderline between the preparatory conditions and the process itself, and this will raise uncertainty over *any* analysis of the progressive. But it should not tell against any particular analysis over the others.

Inertia Worlds Again

At this point I assume that some readers are longing for a revitalized version of the inertia worlds approach, as a way to avoid the issue of

unfinished objects. The reason for this is that the inertia worlds analysis construes the progressive morpheme as an operator having scope. If its scope is always over the verb alone, then it requires unfinished objects, as does the analysis of the progressive that we are examining.²¹ But its scope can instead be taken to extend over the object position as well, so that the form of:

Mary is building a house

is:

PROG($(\exists x)$ [x is a house & Mary builds x]).

This would be true on the inertia world account if Mary builds a house in every inertia world, even if in the actual world there is no house at all.

However, the “objects” of progressive verbs cause problems for this approach too. To illustrate this, suppose that the notion of inertia world has been developed so that it works as intended. In particular, in Mary’s soon to be aborted house-building, suppose that the inertia worlds include only worlds in which her house-building goes on to culmination, so that the inertia world theory says that this is true:

(1) Mary was building a house

(since ‘Mary builds a house’ becomes true in every inertia world) and this is never true:

(2) Mary built a house.

(since she never finishes in the actual world). This then escapes the imperfective paradox, and does not require a house. But there is another problem. Since in every inertia world a house gets finished, the theory says also that this sentence is true:

(3) Mary is building a house that she will finish.

But there is no reading of this sentence that would be true in the circumstances envisaged.

Note that this will be a problem for any analysis that analyses the progressive in terms of an operator that operates on verb phrases or sentences. As long as quantified objects of progressive verbs (such as ‘a house’) are forced to come outside the scope of the progressive operator, then one gets unfinished objects. But if they are allowed to come inside, they will encounter the “finish” issue.

Since in practically all cases ‘ x is A-ing a B’ entails ‘there is a B that x is A-ing’, and since the ontological and terminological issues raised by

verbs of creation arise with the nonprogressive as well as the progressive, I think that the analysis in terms of underlying events works as well as any alternative.

Aqvist's Analyses

For those who are still uncomfortable with unfinished things, and equally troubled by the consequences of the inertia world analysis, it may be worth seeing what an intermediate position looks like. Leonard Aqvist (in Aqvist (1977)) worries about sentences such as:

- (4) Mary is drawing a circle.

The problem is, of course, that if she is interrupted then no circle gets completed. And many will insist that an incomplete circle is no circle at all; it is only an arc with uniform curvature. Aqvist agrees with me that there is a present object of the drawing activity, but agrees with the critics that this object is not a circle. He says:

... it is perfectly possible for an agent *a* to be drawing an object *b* in such a way that it is becoming more and more the case that this object *b* is a circle without its therefore being the case either that *b* was a circle at some past time, or that *b* is ever going to be a circle in the future ... (Aqvist, 1977, p. 38)

Aqvist's analysis of (4) is, roughly, that Mary is drawing something (an arc) in such a manner that it is becoming more and more the case that that thing is a circle. (Michael Bennett makes a similar proposal in Bennett (1977), pp. 504–05, 508.)

This proposal, despite its obvious intuitive appeal, seems to me to have serious drawbacks. First, people do refer to unfinished houses as houses, and even – though more reluctantly – to unfinished circles as circles. Second, the verb 'draw' is a tricky one; you can draw a unicorn just as easily as you can draw a horse, and this has nothing at all to do with the progressive. But, most important, as Aqvist himself points out, this approach prohibits us from having a uniform account of all progressives. For example, the sentence:

- (5) Mary is pushing a cart

cannot be treated just like (4), for it is simply not true that the object she is pushing is becoming more and more a cart. This requires a different analysis, roughly to the effect that:

It is being the case that there is a cart that Mary pushes.

Aqvist also requires a third analysis for 'Mary is closing a door', which is

that 'Mary is closing something in such a way that it is becoming more and more a closed door'. One begins to wonder how many different analyses of the progressive are necessary. Aqvist seems to want to classify the analyses by verb types, but even this will not do. Compare:

Mary is drawing a circle,

with:

Mary is drawing an arc.

The former is analysed in terms of something becoming more and more a circle, but this will not do for the latter since an arc does not become more and more an arc just by getting longer.²² Still, in the end a piecemeal approach may be the only kind with any hope of accuracy.

My worry is that this does not really advance the issue. Let us return to the case in which we have just measured out the first ingredient for "the cake". Then, on Aqvist's analysis, there is something which is becoming more and more a cake. But where is this thing? And *what* is it, if not our old friend, the unfinished cake?

6. INTERVAL SEMANTICS: BENNETT'S REFINED ANALYSIS

In Section 1 above I mentioned the proposal that sentences might be evaluated with respect to whether or not they are true at intervals of time instead of at points of time. This proposal has now been adopted by a large number of researchers. The obvious advantage that this idea offers is its flexibility. But this increased flexibility is purchased at a price; the price is testability. Let me explain. In ordinary tense logic we have a rough intuitive test for whether or not a sentence is true at a moment of time; we imagine the sentence uttered at that moment and use our skill as native speakers to judge whether or not that utterance would be true then. In interval semantics we can do roughly the same for short intervals; just imagine an utterance of the sentence which occupies roughly that interval, and judge whether the utterance would be true. But for long intervals no such test is possible. So proposals for the truth-values of sentences at large intervals of time cannot be directly tested in this manner.

As an example, consider the following proposal (paraphrased from Dowty (1979), p. 169):

'*x* moves' is true at interval *I* just in case *x* is located at one place at the beginning of *I* and at another place at the end of *I*.

Now consider an object x that is moving in an ellipse, and consider an interval I of length 387 years during which the object makes exactly 17 revolutions, so that at the end of I , x is at exactly the same place that it was at the beginning of I . According to Dowty's analysis, the statement ' x moves' is false at interval I , even though x was in movement at every instant in I . Now does this show that the analysis is incorrect? Certainly the object was moving *throughout* I , but was it moving *at* I ? THERE IS NO WAY TO TELL. There is no way to tell, because the theoretical notion of "moving at an interval" has not been given any connection with the data for large intervals of time. (How do you tell whether ' x moves' is true *at November*?) In the absence of further information, there is simply no way to test the proposal. We can only test the whole theory of which it is a part, to see what that tells us about the truth-values of utterances. And this is typical of the whole subarea of tense logic which utilizes intervals as opposed to instants.

However, the peculiarity of this situation is that most people who work with interval semantics do not treat such analyses as untestable, or as requiring indirect test. They talk as if one can show piecemeal that a given proposal is or is not correct. This requires an explanation, which I will hazard below. The explanation is based on some remarks made by Michael Bennett as to how his own proposals are to be understood. His remarks occur in the context of presenting his own analyses of the perfect and the progressive; I turn now to those analyses.

The analyses in question appear in Bennett (1981), and they are based in part on an idea of Glen Helman's. As far as I can see, they escape all of the objections that have been discussed so far (though they, like the underlying event approach, require unfinished objects). Here is a portion of the discussion:

We give (1) as the truth condition for 'Jones has left'. (1) 'Jones has left' is true at interval of time I if and only if I is a moment of time, and there exists an interval of time I' (possibly a moment) such that I' is a closed interval, $I' < I$, and Jones is in the extension of 'leave' at I'

We give (2) as the truth condition for 'Jones is leaving'. (2) 'Jones is leaving' is true at interval of time I if and only if I is a moment of time, and there exists an interval of time I' such that I' is an open interval, I is included in I' , and Jones is in the extension of 'leave' at I' . Condition (2) has the consequence that 'Jones is leaving' neither implies 'Jones has left' nor implies, in effect, 'Jones will have left', as there is no guarantee that Jones is in the extension of 'leave' with respect to a CLOSED interval. (Bennett (1981), pp. 14-15)

The imperfective paradox is avoided, in short, because of a distinction between open and closed intervals; the truth of a sentence in the progressive depends on someone's being in the extension of a verb at an open interval, and the truth of a simple sentence not in the progressive

depends on someone's being in the extension of that verb at a closed interval. This invites the query: Given that we see that someone is in the extension of a verb at "an interval", by what means of scrutiny do we tell whether the interval before us is open or closed? Bennett acknowledges that the distinction is "subliminal" (*ibid.* p. 17), and earlier he says "Almost everyone initially finds the analysis to be mysterious – a 'logician's trick'."

But this is misleading. True, the analysis involves a logician's trick, and a rather nice one. But it does not depend on our ability to discriminate the subliminal, and it is not really mysterious at all, for in both Bennett (1977) and (1981) he explains quite clearly how the trick is done. One such explanation is contained in certain passages that were omitted from the quotations above. (I have added some italics):

One intuition motivating this analysis [i.e., (1) above] is that if Jones is in the extension of 'leave' at an interval *I*, then *the event* of Jones's leaving is regarded as starting at the beginning of *I*, taking place during *I*, and finishing at the end of *I*. This reflects our intuition that the truth condition should involve some past INTERVAL of time during which Jones is leaving and eventually *completes this act*. The requirement that the past interval be closed reflects the intuition that the present perfect tense always *describes a performance*; the perfect aspect *indicates a completion* . . .

The requirement that *I*' be an open interval in condition (2) reflects the intuition that the present progressive always *describes an activity*. (Bennett (1981), pp. 14–15)

A simple way of viewing the proposal is to see intervals as encoding eventualities:

Let us say that *activities* are represented by open intervals, . . . and that *performances* are represented by closed intervals. (Bennett (1977), p. 505)

Now Bennett's activities seem to be the same as my events which do not culminate, and his performances seem to be the same as my events which actually culminate. And so we can see that the distinction between open and closed intervals is simply a way of coding whether or not an eventuality culminates, without using any notions that are not definable by means of the resources of pure interval semantics. Suppose that we have pinned down the period of an eventuality precisely, except that we do not yet know whether this interval includes its end points. We do not decide this by more careful measurement. We just stipulate that if the eventuality culminates, then its subject is in the extension of the relevant verb at the closure of the somewhat ill-defined interval, and if the eventuality does not culminate then the subject is in the extension of the verb at the interval minus its end points. Piecemeal testability of the semantics then rests on the assumption that simple sentences pick out eventualities, and on the notion of *culminating* (Bennett's "completion").

And this appeal to eventualities is not peculiar to Bennett. Writers who endorse interval semantics almost always find themselves explaining the application of their ideas by talking in terms of events, states and the like (see Dowty (1979), Tedeschi (1981), . . .). Of course, whether this linking of eventualities with intervals makes for piecemeal testability of individual analyses depends on the particular theoretical framework in question.

As normally used, interval semantics does not refer to eventualities in the official formulation of the semantics, but only does so in the informal guidelines that come with the system, such as in the explanation of the primitive non-logical notions used. And many people with ontological scruples will prefer it this way, for they are wary of theories with excess ontological commitments. This is not a view that I share, but I will not debate the issue here. There remains a substantive question, however, of whether or not a "pure" interval semantics can be empirically adequate for various phenomena of ordinary speech without appeal to eventualities.

For one thing, there are all sorts of explicit references to eventualities in English, e.g., in 'There were three accidents last night'. Such sentences are sometimes true, and it is difficult to see how this can be admitted without holding that there are eventualities. But then a "theoretical" avoidance of commitment to eventualities would seem somewhat academic.

Second, there are certain constructions involving adverbs of frequency which seem to require more than just intervals of time. Bennett (1977, p. 511) considers the problem sentence:

Miles was wounded by a bullet twice yesterday.

The natural treatment of this sentence within interval semantics would be to propose something like:

For two distinct intervals, I_1 and I_2 , Miles was in the extension of 'be wounded by a bullet yesterday' at both I_1 and I_2 .

Unfortunately, such an analysis would entail that the woundings were not simultaneous, yet there is a natural reading of the sentence that does not say this. Bennett proposes tentatively, in response to this problem, that one might say instead that there are two contemporaneous *occurrences* of the generic event "Miles being wounded by a bullet". This, however, brings in quantification over "occurrences", which look suspiciously like events. His other suggestion is to paraphrase the original sentence by:

Miles was wounded by two bullets yesterday.

But this idea will not work for even simpler cases, such as:

Miles was wounded twice yesterday,

where no bullets need be involved at all.

Finally, it is unclear whether the pure interval approach, devoid of eventualities, can address the rich array of phenomena mentioned in Section 2 above.

7. MOTION ADVERBIALS AND THE PROGRESSIVE

As indicated earlier, one of the liveliest topics in the literature of the Aristotelian classification of linguistic items has to do with the so-called category switch which is brought about by certain cases of adverbial modification. As an example, a sentence such as:

Mary ran

is supposed to be a paradigm example of a process sentence, since 'run', by itself, does not seem to imply any particular notion of culmination, yet the sentence:

Mary ran across the street

is an event sentence with a clear culmination. How is it that modification of 'run' by 'across the street' can turn a process into an event?

What is the difference supposed to be between processes and events? An often-cited pair of tests for distinguishing them are these: that process sentences obey the principle:

A is Xing only if A has Xed,

whereas event sentences obey something like the principle:

A is Xing only if A has not Xed.

(These tests are originally due to Kenny (1963). Bennett makes a similar suggestion in Bennett (1977), p. 498.) But the first principle is doubtful for processes such as walking, when one has just begun to walk, and the second is, as Bach notes, literally false. (If Mary is painting a house, she might have painted it many times before.)²³ Not only are these principles tricky to spell out, there seems to be a real problem in practice in distinguishing between process and event sentences. (Recall the problems mentioned above that people have had trying to classify verbs such as 'run' and 'play'.)

The following seems to me to be a plausible account of the difference between processes and events. A process itself is actually a series or amalgam of events. A walking process is just a bunch of overlapping walking events – small ones, large ones, and so on. A so-called “process verb” is a verb which has the property that when it is true of an event e it is typically true of many culminated “subevents” of e which have the same subjects and objects. For example, a running is an event which typically consists of “shorter” events which are also runnings by the same person.²⁴ If Agatha runs to the store then she may do this by running four blocks along the way; the running-to-the-store is a running, and so are each of the block-runnings. We need only add to this that there is a convention in English usage to the effect that when we discuss an event which constitutes a process we usually have in mind a “maximal” event of its kind, so that if someone asks about “Agatha’s running” we assume it is the whole run they are discussing, not one of the parts. Typically a (maximal) running culminates when the subject intentionally stops running, or stops at a pre-planned point, though a running, like a street-crossing, may terminate before its culmination if something interferes. Unculminated runnings do not usually occupy our attention since they typically have “subrunnings” which do culminate, but they are important in avoiding the imperfective paradox (see below).

The only effect that this proposal has on the analysis that was stated earlier is to broaden its scope without affecting its formulation. We just treat process verbs as a special kind of event verb, and apply the principle as before. So ‘Mary ran’ will translate as:

$$(\exists t) \{t < \text{now} \ \& \ (\exists e) [\text{running}(e) \ \& \ \text{Subject}(e, \text{Mary}) \ \& \ \text{Cul}(e, t)]\}.$$

Since ‘run is an event verb, its progressive form will not receive the same translation as its non-progressive form; the progressive form uses ‘Hold’ where the non-progressive uses ‘Cul’.

What effects will this have? One effect has to do with the principle noted by Bach: if ‘Mary is running’ is true at a given time then ‘Mary has run’ should be true at that time also. This is not guaranteed in any way by the logical forms associated with the sentences. The result comes instead from the rough principle that if a process verb is true of an event, then it is also (typically) true of some (proper) subevents of that event, including some that culminate earlier than the one in question. If this were a universal principle, it could perhaps be elevated into a meaning postulate for the verbs in question. But there is some doubt about its applicability,

say, to very small segments of walkings (see Dowty (1979) for more on this).

Some further consequences of this approach are as follows: The sentence:

Mary ran across the street

entails both:

Mary ran,

and

Mary was running across the street.²⁵

In contrast to the above, the sentence:

Mary was running across the street,

though it entails:

Mary was running,

fails to entail:

Mary ran across the street,

and thus avoids the imperfective paradox.²⁶

What happens now to the much-discussed category switch that is supposed to be a consequence of modification of a process verb with an adverb of motion? It receives a very simple explanation. For example, 'run' is a process verb – that is, in our new terminology, 'run' is an event verb which, when it is true of an event, it is also typically true of other culminated subevents of that event having the same subject. But 'run to the store' is not a process phrase – that is, it is an event phrase which is *not* usually true of culminated subevents of the events it is true of. The reason for this is simply that 'to the store', all by itself, is not usually true of any culminated subevents at all of the events it is true of. And since the logical form of 'run to the store' conjoins the adverbial phrase with the verb, the so-called category change for the whole phrase comes out as a result of ordinary predicate logic.²⁷

In summary: with the analysis of processes in terms of events the entire framework is simplified, adverbials of motion cause no special problems, and the category switch which is due to adverbial modification receives a very simple explanation.

Probably the explanation of the progressive that has been outlined in this paper would not be plausible if there were not independent reasons

to attribute to English sentences underlying reference to events and states. Similarly, those other reasons for assuming underlying events and states that were cited in Section 1 above might not be enough to stand on their own. But the conjunction of applications makes the general hypothesis stronger, and gives reason to explore the framework further.

NOTES

¹ This paper is based on work that originated in a seminar that I had the good fortune to co-teach with Emmon Bach in the Spring of 1979 at the University of Massachusetts. It was also discussed in two subsequent seminars at the University of California at Irvine. I wish to thank Emmon and the rest of the participants for their attention and criticisms. I also wish to thank David Dowty for comments on earlier drafts. Some of the criticisms of alternative accounts of the progressive in this paper are found in Vlach (1981).

² The inertia world proposal has a formal part and a substantive part. The formal part says that Prog(S) is true at t iff S becomes true in every world that is an *I*-world at t . The substantive part says what an "*I*-world" is. I have suggested that Dowty's initial proposal for an explanation of *I*-world in terms of compatibility with the past produces an implausible account. The challenge for the *I*-world theory is to provide a better account of what an *I*-world is. Here are some constraints on that task:

First, it seems plausible that at any given time in the history of the world there is some progressive sentence that is true even though its nonprogressive counterpart does not become true in the actual world. If so, the formal part of the *I*-world theory requires that the actual world must never be an *I*-world. There must, however, be *I*-worlds among the possible worlds for every time t , since otherwise the formal part of the analysis would make all progressive sentences vacuously true at that time.

Second, the *I*-world account cannot possibly be the whole story about the progressive. In many cases we feel that we are in a position to make inferences from progressives to non-progressives. Suppose, for example, that 'The stars are moving' is true for an extended period of time (perhaps forever, to take an extreme case). We then naturally infer that at some time in the future 'The stars have moved' will be true. Yet this is not valid on the *I*-world account if the actual world is never an *I*-world. So some notions in addition to that of *I*-world will be required for a complete account of the progressive.

Additional problems for any "operator-like" approach to the progressive are discussed in Section 5 below.

³ I am temporarily ignoring tenses and times, as well as the question of whether the eventualities in question "hold" or "culminate"; see below.

For purposes of this paper I use 'Subject' and 'Object' as place-holders for appropriate relations between events and their participants. For example, in 'Brutus stabbed Caesar' the 'Subject' should be replaced by 'Agent', whereas in 'Mary fell' the 'Subject' should be replaced by 'Theme' ("Patient").

The displayed form is slightly different from Davidson's original proposal, in which all three conjuncts were combined into one single three-place predicate. For purposes of this paper, this difference is irrelevant; see Parsons (1985) and (in progress) for some ways in which the difference might be important.

⁴ The so-called "operator" approach, by itself, lacks the logical principles to yield the desired inferences. What would be needed would be a drop-off rule for certain operators, and a rule that would permit certain operators to permute with each other, thereby neutralizing the scope distinctions that operators naturally have. But it would not be enough to state the rules; some semantics would be needed that would justify them. This is discussed in more detail in Parsons (in progress).

See Bartsch (1976) for a detailed implementation of the underlying event approach to modifiers.

⁵ The logical forms are (simplifying somewhat):

- (10a) $(e) [e \text{ is a burning} \Rightarrow (\exists e') [e' \text{ is a consuming \& Object (oxygen, } e') \& \text{In}(e, e')]]$
 (10b) $(\exists e) [e \text{ is a burning \& } (\exists x) [x \text{ is wood \& Subject(Agatha, } e) \& \text{Object}(x, e)]]$
 (10c) $(\exists e) [e \text{ is a consuming \& Object(oxygen, } e)]$.

Note that the verb, 'burn', in (10b) and the noun, 'burning', in (10a) both receive exactly the same representation.

⁶ Again, see Parsons (in progress) for details.

⁷ Higginbotham and Vlach both defend versions of the underlying event analysis of (12). For a description of the semantics of (13) that links it to (12) see Parsons (in progress).

⁸ See note 3 above concerning "Subject" and "Object".

⁹ See Kenny (1963), Vendler (1967), Dowty (1979), Ritchie (1979), Bach (1981), Bennett (1981), Dahl (1981), Mourelatos (1981), Vlach (1981). I discuss some of these tests in Parsons (in progress).

¹⁰ For simplicity, I suppose that if e is an eventuality then the set of times at which e holds forms a continuous interval, and I will further suppose that if e culminates it does so at the end of that interval (that is, at its least upper bound). This presumes that there are no "gappy" eventualities, that is, eventualities that hold for a while, then fail to hold for a while, and then hold again. The main problem that this is relevant to has to do with the truth value of a sentence such as 'Mary is running', uttered at a time in the middle of her workout when she is taking a rest. There seem to be two different ways to take the sentence; in one way the answer is yes, and in the other way the answer is no. The same phenomenon is illustrated by the question "Is someone sitting there?" accompanied by a pointing to an empty seat. I would account for the yes answers to these questions by supposing that the running (or the sitting) is an extended gapless process that holds even during the "lulls". This is not a substantive claim, but rather an explanation of how I intend the technical term 'hold' to be understood.

¹¹ I assume that sentences with quantificational NP's are formed from these simpler structures by quantification with scope outside the simple sentences. In particular, I assume that the existential quantification over events that comes with the verb always has narrowest scope. This is not an open and shut issue – see Parsons (in progress) for more discussion.

¹² For example, the past tense sentence 'Mary built a bookcase' starts being true immediately after the reportive present tense version is true. One must keep in mind certain standard implications, which are not part of the logical forms in question, such as the implication that for a future tense event sentence, the "whole" event must be in the future, not just its culmination. See Parsons (1985) for a discussion of these points. One problem was noted there concerning past tense process sentences, and the solution to that problem was promised to be given in this present paper; it is given in the last note below.

¹³ See Vlach (1981) for a similar critique of the inertia worlds approach. Vlach suggests that what needs to be taken into account is not what would be the case in general in other inertia worlds, but what would be the case involving the state and actions of the subject of the sentence. I suspect that something like the following might be correct, using 'cross' as an example:

x is crossing the street iff x is doing something which is such that were it to culminate, x would thereby cross the street.

(The "something" that x is doing is, of course, the crossing.) I think that the inertia worlds analysis gets its plausibility from being understood in the manner just described. I see no way to retain this plausibility while eliminating the implicit reference to the crossing.

¹⁴ This incorporates the idea, prominent in linguistic folklore, that progressives themselves are automatically stative.

There must also be added to the rule a special provision for “percolation” of the state reading down into the objects of perceptual statements. For example, the sentence:

I was watching Mary build a bookcase

entails that Mary was building a bookcase, not that she built one. Putting the verb ‘watch’ into the progressive has the same effect on ‘build’ even though this does not show up syntactically.

¹⁵ This is easy to verify for the logic of modifiers; verifying the others depends on details of the formulation of explicit reference to events and the treatment of perception sentences. These are given in Parsons (in progress).

¹⁶ In the theory under discussion, a sentence such as ‘Mary is crossing the street’ requires for its truth that the crossing event itself holds (though not necessarily that it culminates). Another account that might be equally plausible would be one which holds that for every event that is ever in progress, there is a uniquely associated state which holds as long as the event is in progress. Specifically, the idea is to replace ‘Hold(*e*, *t*)’ in the proposed analysis by ‘Hold(In-prog(*e*), *t*)’, where ‘In-prog(*e*)’ denotes the state uniquely associated with *e*. This conforms to the idea that it is only states that can properly be said to “hold”, never events. I do not explore this variation in the present paper, but I think it may be equally as good, or even better, than the account under discussion.

¹⁷ An extensive discussion of causatives and inchoatives appears in Dowty (1979) within a framework of intensional logic, and in Parsons (in progress) within a framework of underlying events.

¹⁸ Strictly, this depends on how quantified NP’s are to be treated. The mentioned consequence would not be a consequence if, for example, the NP ‘a house’ was “directly inserted” within a theory such as that of Montague (1973). But this proposal would be subject to the criticism given below (in the text) of the inertia world approach. I am assuming that in all constructions under discussion, quantified noun phrases represent quantifiers that take simple sentences inside their scopes. So, for example, we generate:

Mary is building a bookcase

by first generating a logical form for:

Mary is building *x*,

and then placing this form within the scope of quantifier phrase representing a bookcase, so that the logical form is (ignoring tense):

(∃*x*)[*x* is a bookcase & (∃*e*)[*e* is a building & Subject(*e*, Mary) & Obj(*e*, *x*) & Hold(*e*)]].

¹⁹ The problem about building a house would disappear if ‘build’ and similar verbs were themselves intensional words, such as ‘imagine’ or ‘seek’. But they are not. If Mary built a house, then there is no way to read this so as to avoid the conclusion that there was a house that she built.

²⁰ For ways to analyze such constructions see Partee (1976), Thomason (1976).

²¹ If the scope of the progressive morpheme in the inertia world analysis is always taken to be over the verb alone, then it is not obvious that there is any incompatibility between it and the underlying event approach – though the approaches are so different in spirit that their equivalence would be quite surprising.

²² There are other problems as well. If Mary is drawing a circle by drawing and erasing and so on, there will be times during the drawing when the thing is becoming less and less a circle, though it is true then that she is drawing a circle.

²³ The intuition behind the second principle is that if Mary is painting a house then that painting is not yet over with. This explanation, as Bach points out, requires the assumption of underlying events.

²⁴ Bennett (1977) makes a similar proposal in terms of interval semantics.

²⁵ Actually the claim that 'Mary ran' entails 'Mary was running' involves the assumption that the hold-time of the event extends through its time of culmination, if there is one. This might be doubted for so-called "achievement" phrases, such as 'reach the summit', which supposedly do not have true progressives, and perhaps have no hold-times at all. (Though the claim that they do not have true progressives is far from obvious.) If this is so, 'Mary ran' does not entail 'Mary was running' as a matter of logical form, and an additional principle is needed for nonachievement verbs such as 'run'. The required principle seems to be that there are no instantaneous isolated runnings; runnings can only be runnings if they go on (hold) for a while.

²⁶ In conjunction with a prohibition on isolated instantaneous runnings it would also entail 'Mary ran'.

²⁷ The assimilation of process sentences to event sentences lets us escape a certain problem that arose in Parsons (1985) regrading tenses. The problem was that a process sentence in the past tense seems to imply that the present tense version is not true, though the natural rule for the past tense did not require this, and instead typically made the past tense sentence true in virtue of a process that is still going on. For example, the rule makes 'Mary ran' true while Mary is still running. But once process sentences are treated as event sentences, there is a different effect. The past tense sentence must be made true by a process that has already culminated, and the usage principle mentioned above, that when we use a process sentence we implicitly limit our quantifiers to maximal processes, yields the implication that there is no other process of the same kind that is still going on. This implies that 'Mary ran', though true, will have a false implication if it is true in virtue of the initial part of a running that is still going on.

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