

The Progressive and the Structure of Events

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Abstract

In the analysis of the progressive proposed in the paper, two notions play a crucial role. On the one hand, since the same event can be 'embedded' into several possible developments that are relevant to the truth-conditions of the progressive, a first task of the analysis is to account for the *part-of-relation* which connects an event with its possible continuations. On the other hand, this kind of connection is largely dependent on *contextual* factors, and a second task of the paper is to analyze this notion of context both in terms of events in the *world* (the 'concomitant facts' selected as relevant) and in terms of the *situation of the discourse* (the conversational background that makes those facts relevant).

After presenting, in section 2, the so-called imperfective paradox, in section 3, I address a problem of ambiguity engendered by the *underdetermination of the data*, whilst a related issue is discussed in section 4. The new examples analyzed in this section are an interesting illustration of the intensional character of the progressive. In section 5, I discuss the role of *mereological relations* in the semantics of the progressive, whilst in section 6, I take into consideration the use of this aspectual form in connection with *improbable courses of events*. In the final sections, all these problems are considered from the point of view of a semantics for the progressive in which a 'mereological' analysis of eventualities (based on the part-of relation) is combined with a contextualist approach.

1 INTRODUCTION

In logic and philosophy of language there have been lively discussions on the truth-theoretical status of the future tense. One of the main problems is that, whilst the truth of sentences in the past tense depends on facts that have *already* occurred, the truth of sentences in the future tense involves facts that have *not yet* occurred. As stated in Prior (1957: 87), 'it is not now a fact that x will ϕ , nor is it now a fact that x will not ϕ ; that is, the statement that x will ϕ is not now true, nor is it now false.' A consequence of Prior's philosophical analysis was his idea that the Future is not the simple 'mirror' image of the Past and that it deserves a different kind of semantic treatment.

Contrary to Prior's expectations, natural language semantics makes no distinction, in principle, between sentences in the future tense and sentences in the past tense, since they are arguably associated with the same kind of truth-conditions: *it will be the case that P* is true at a time t iff

there is a time t' later than t at which it is true that P , exactly as *it was the case that P* is true at t iff there is a time t' earlier than t at which it is true that P . The implicit justification for such a solution, which represents a departure from Prior's approach, is the assumption that the task of truth-theoretical semantics is to account for the conditions on which a sentence is true, independently of the cognitive tools we have to verify it: if I say at a time t that a certain event *will* occur, my statement is true if and only if this event occurs at a time later than t , no matter how I can justify this statement.

A similar problem arises in the case of sentences in the progressive form, whose truth can depend on events not yet realised. If I say that Leo is proving a theorem, this statement entails that the proof at issue is an event whose completion lies in the future. Therefore, one might hope that the same semantic realism adopted to deal with the future tense will work nicely with the progressive as well, and that the same kind of plain truth-conditions can be associated with this aspectual form. Unfortunately, the progressive raises further problems. If I say that Leo will prove a theorem, this statement makes no essential reference to any *current* event: what is relevant for its truth is only what happens in the future, not at the present time. If an event of Leo's proving a theorem occurs n days after the present time, the statement is true, and that's all. But consider a progressive sentence such as *Leo is proving a theorem*. This time, the simple reference to a future event of Leo's proving a theorem is not enough, because the truth of the sentence entails that a part of that event has already occurred. Unlike the future tense, the progressive aspect makes an essential reference to a current state of affairs, by connecting events occurring at the present time (as Leo's writing some formulae on the blackboard) with an event (if any) occurring in the future (as Leo's completing the proof). So, the straightforward approach characterizing the semantic treatment of the future tense would not be justified here, for we have to account for a more complicated situation, in which some current event is seen as *part* of a more extended event (if any) whose temporal extension stretches over the future. The difficulty is that a progressive sentence involves both the present and the future, and that this double reference is determined by the idea that if an event is in progress, then part of it has already been realized. That is why the part-of relation between eventualities (or some other equivalent relation) plays an important role in the semantics of the progressive which will be presented here.

The idea is that our perception of an event involves a bunch of possible developments of that event. My going to the blackboard and taking a piece of chalk can be considered as *part* of a number of alternative events, as putting the room in order, writing some instructions, proving a theorem,

and so on. This is a central issue of the progressive, because we have just remarked that what is peculiar to this aspectual form is the connection that it establishes between something occurring at the present time and something occurring in the future. It is in this sense that my writing a formula on the blackboard can be seen as part of my proving a theorem and can justify the statement that I am proving a theorem. Since the same event *e* can be 'embedded' into several possible continuations, the context is a determining factor in selecting the relevant ones. If *e* is considered *in connection with* a given set of concomitant facts, then its possible extensions are events of a certain type. But if another set of concomitant facts is selected as the relevant background, then the type of the global event which is considered in progress will be different. This is why, as shown in section 3, the same situation can be described by alternative progressive sentences. As in some classical examples discussed by Gestalt-oriented theories of perception, different backgrounds can lead us to see the same entity as part of different configurations. One of the tasks of the paper is to account for this notion of context both in terms of events in the *world* (the 'concomitant facts' we have just mentioned) and in terms of the *situation of the discourse* (the conversational background that makes a particular set of facts relevant).

The articulation of the paper is essentially based on the discussion of five problems. In section 2 I present the so-called *imperfective paradox* and its solution in the possible world semantics, as developed in Landman (1992). This theoretical framework leaves two questions open: in section 3 I address a problem of ambiguity engendered by the *underdetermination of the data*, whilst a related issue (what I call the *multiple-choice paradox*) is discussed in section 4. The new examples presented in this section are an interesting illustration of the intensional character of the progressive. Questions of a different kind are presented in connection with a contextualist approach. The first issue has to do with the role of *mereological relations* in the semantics of the progressive (section 5). The second is represented by the use of this aspectual form in connection with *improbable courses of events* (section 6). In the final sections all these problems are considered from the point of view of a semantics for the progressive in which a 'mereological' analysis of eventualities (based on the part-of relation) is combined with a contextualist approach.

2 THE IMPERFECTIVE PARADOX

The so-called imperfective paradox is based on the following remark, made first in Kenny (1963). When activity predicates are involved, from sentences in the progressive form such as:

- (1) Leo is pushing the cart
- (2) Leo is writing

it is often possible to infer the corresponding sentences in the perfect tense:

- (3) Leo has pushed the cart
- (4) Leo has written.

The idea is, that if the time interval taken into consideration is representative enough, the sequence of events that justifies the statement that an activity is in progress can already be seen as an instantiation of that activity. But this is not true of accomplishment predicates, as shown by the fact that the inference from:

- (5) Leo is proving the theorem

to:

- (6) Leo has proved the theorem

is not sound. Therefore, a first problem is to find an explanation for these different behaviours.

The main feature of the approach to the progressive in possible world semantics is the following idea: presenting an event *e* as an event in progress in the actual world (at a given time) means that, *if nothing anomalous happens*, *e* is expected to be fully realized (at a later time). This intuition is captured in the truth-conditions proposed by Dowty (1979):

- (7) *Mary is building a house* is true in a world *w* at an interval *i* iff in every inertia world *w'* for *w* at *i* this interval *i* is a subinterval of a larger interval where *Mary build a house* is true.

Here, an inertia world *w'* for *w* at *i* is a world which is identical to *w* up to *i* and where, from there on, no unexpected events occur. So, the notion of *normality* is crucial here, as is explicit in this reformulation of Dowty's truth-conditions suggested by Landman (1992):

- (7') *Mary is building a house* is true at an interval iff under normal circumstances there would be a larger interval where *Mary build a house* is true.

It is easy to see how the imperfective paradox is solved in such a theoretical framework: a sentence as (5) is true only if in every inertia world the event of Leo's proving the completeness theorem is fully realized. But this condition can be satisfied even if the event at issue is not realized in the actual world, as required by (6). So, (5) does not entail (6).

The problem, with this kind of analysis, is that it makes the following

prediction: the progressive cannot be applied to events whose completion is presented as *inherently unrealizable*, for these events can be realized in no state of affairs which represents a reasonable alternative to the actual one. Yet it is not so unusual to find sentences in the progressive form which do refer to events whose realization is presented as *already* impossible at the utterance time. Consider the following example:

- (8) *Leo is making the Christmas cake.* When he finds out that the stove has just broken down, he will give up.

Suppose that this sentence is uttered on Christmas eve in some remote cottage and that, for several reasons, there is no way to fix the stove in time or to find any other stove in the vicinity. Well, in these conditions the event at issue turns out to be unrealizable, even if the progressive sounds natural here.

What characterizes the ongoing process in (8) is not only its failure in the actual state of affairs (which is not problematic in Dowty's treatment of the progressive), but its *necessary* failure in any 'normal' course of events which shares with the actual one all the past occurrences.¹ As a consequence, since there is no 'inertia' world where Leo succeeds in making the Christmas cake, in Dowty's semantics (8) turns out to be false, against our intuition.

To solve such a problem Landman (1992) presents a more sophisticated theory, where the idea of normality still has a crucial role, even though in a different way. The essential idea is that in determining what is a 'normal' continuation of a given stage 'we have to abstract away from facts about the world that are external to that stage. Thus . . . we are interested in its chance of continuing *solely on the basis of what is internal*, inherent to that stage' (p. 25). The formal tools Landman resorts to in order to implement this idea are taken from both event semantics and possible world semantics. In his treatment, the progressive is seen as a relation between an event *e* and an event type *V*, such that:

- (9) $\text{PROG}(e, V)$ is true in a world *w* iff in some world in the continuation branch of *e* in *w* some event realizes the event type *V*.

A continuation branch for an event *e* in *w* is a set of pairs of events and worlds. The intuitive idea is that we have to follow the development (if any) of *e* in our world *w*. If *e* stops in *w*, then we follow it in the closest world *w'* where it does not stop, provided that *w'* is a reasonable option² for *e* in *w*.

According to the truth conditions stated in (9), *Mary is building a house* is true in the world *w* iff an event *f* of the type *Build-a-house (Mary)* occurs in some world, a stage³ of which occurs in *w*, where this stage is an event *e* which develops into *f* on the continuation branch for *e*.

As for sentences such as (8), in Landman's semantics they are simply true

(as desired), because the fact that the stove has broken down is an 'external' accident that can be ignored, and in every world in which everything works normally Leo succeeds in making the cake.

Let us now consider two problems that this theoretical approach leaves open.

3 THE UNDERDETERMINATION OF THE DATA

Suppose Leo has just begun a journey in France. As a first stage, he drives from Milan to Dijon, where he arrives on 14 July, at a quarter to three p.m. He does not stop there because he has planned to spend his first night in France in one of the following cities: Besançon, Metz, Paris. Actually, he must make a decision, since three different routes correspond to these alternatives. But at a quarter to three p.m., while driving round the Dijon ring road, he has not yet decided where to go: he is thinking it over because, for several reasons, all these cities attract him exactly in the same way.

Take the sentence:

(10) Leo is going to Metz

and imagine you must evaluate it at this exact moment, i.e. at a quarter to three p.m. In Dowty's semantics for the progressive, (10) turns out to be false because the condition that in every 'inertia' world there is an interval, temporally including the evaluation time, where *Leo go to Metz* is true is not satisfied (recall that there is no way, *at this moment*, to discriminate between the different alternatives: they really are on the same level; so there are inertia worlds in which Leo does *not* go to Metz). The problem, here, is that, for the same reasons, the following sentences are also false at the given moment:

(11) Leo is going to Paris.

(12) Leo is going to Besançon.

So (10)–(12) are all false with respect to the local evaluation time. In particular, the following holds in Dowty's framework:

(13) The sentence *Leo is going to Besançon* turns out to be false on 14 July, at a quarter to three p.m.

At first sight, everything is in order. But suppose that at last Leo decides to go to Besançon, where he arrives two hours later. Well, the day after someone asks Teo: what was Leo doing yesterday, at a quarter to three p.m.? Teo's answer is simple and effective:

(14) Yesterday, at a quarter to three p.m., Leo was going to Besançon.

Is Teo a liar? I do not think so or, at least, I believe that there are many circumstances in which (14) is a reasonable answer. But, in this case, how to make the truth of (14) on 15 July compatible with (13), which describes a situation predicted by Dowty's theory?

Such a problem does not arise in Landman's analysis. What holds, in the circumstances we have just described, is not (13), but its negation, that is:

(15) The sentences *Leo is going to Besançon* is true on 14 July, at a quarter to three p.m.

As a consequence, the truth of (14), the day after, is no problem any longer. Let us examine the reasons why, under these circumstances, (15) holds in Landman's semantics for the progressive. The point is that, before turning to the possible developments of an event *e* in other worlds, we have to follow its evolution in the actual world *itself*. So, if in this world the stage of Leo's journey we are considering (at a quarter to three) develops at last into an event of Leo's going to Besançon, then it is true at a quarter to three that Leo is going to Besançon, as stated in (15). If one should object that at *this* moment the situation is not determinate enough to justify such a statement (because where Leo is going is still an open issue), one might reply that it is not the first time that semantics refers to idealized situations, where all the necessary data are assumed to be available, although they actually are out of the reach of *situated* speakers. This is the case of sentences in the future tense, which in most model-theoretic treatments (contrary to the analyses developed by Peirce and Prior) turn out to be true *now* if the event at issue occurs at an interval *later* than the present one, in spite of its inaccessibility to the present speakers.

So far, so good. Yet, with respect to the case of the future, there is something peculiar to the progressive which is sacrificed here. Consider the following more detailed description of the facts. The journey goes on without interruptions. At three o'clock, Leo decides to go to Metz and, ten minutes later, he has already taken the freeway leading from Dijon to that city. He reckons on being there in a couple of hours and this is a reasonable hypothesis: his intention is now completely definite, he is not tired, he is on the right freeway, etc. Under these circumstances, the following statement sounds quite natural:

(16) The sentence *Leo is going to Metz* is true on 14 July, at ten past three p.m.

Nobody, I suppose, will question (16). So, let us follow the final developments of the story. Leo is not a lucky man. At twenty past three

he runs into a road block. He does not stop, but he follows the suggested detour and, half an hour later, at ten to four, he finds out that Besançon is now much nearer than Metz. Without stopping, he takes the freeway to Besançon, where he arrives one hour and a half later. And that is the end of this tormenting story.

Exactly as (16), this other statement sounds very natural in the scenario we have just described:

(17) The sentence *Leo is going to Besançon* is true on 14 July, at five to four p.m.

As desired, this statement holds in Landman's theory. In fact, suppose e is the stage of Leo's journey up to five to four p.m. As imposed by the corresponding definition, e has a *unique* continuation branch in the actual world w , and in this branch we have *first* to follow the evolution (if any) of e in w . Since in w the final result of this evolution is an event f of the type *Go-to-Besançon (Leo)*, the pair $\langle f, w \rangle$ belongs to the continuation branch for e in w , and as a consequence (17) holds. But, against our intuition, for the same reasons (16) *cannot* hold in this reconstruction: the stage of Leo's journey up to ten past three develops without interruptions into the event f of Leo's going to Besançon in w itself, so that, according to Landman's definition of continuation branch, we have to take into account no other development in alternative worlds. Do not forget that it was exactly this peculiarity that allowed Landman's semantics to evaluate (15) as true and, as a consequence, to justify the truth of (14) as well.

That (16) cannot hold in Landman's theory is shown by its inconsistency, in this theory, with the following statement, which does hold:

(18) The sentence *Leo is going to Besançon* is true on 14 July, at ten past three p.m.

So, the problem, in Landman's theoretical framework, is to make the truth of *Leo is going to Metz*, at ten past three, consistent with the truth of *Leo is going to Besançon*, at the same time. To overcome an analogous difficulty, in the appendix of his paper Landman hints at the notion of perspective, illustrated by the following example.

Suppose I was on a plane to Boston which got hijacked and landed in Bismarck, North Dakota. What was going on before the plane was hijacked? One thing I can say is: 'I was flying to Boston when the plane was hijacked.' This is reasonable. But another thing I could say is: 'I was flying to Boston. Well, in fact, I wasn't, I was flying to Bismarck, but I didn't know that at the time.' And this is also reasonable . . . What we carve out as an event and what we decide to regard as stages of that event depends on our perspective in a certain context.

Yet, it is not clear how to incorporate this vague notion of perspective in Landman's theory and how to avoid a floating or arbitrary ontology where

one can 'carve out' events as much as one pleases. So, I shall stick to the original, explicit version of Landman's theory, where it is quite problematic to account for the validity of (16).

4 THE MULTIPLE-CHOICE PARADOX

Before presenting a theoretical framework in which this kind of difficulty can be overcome, let me address the following problem:⁴ does the progressive create an intensional context? To answer this question, consider this variation of our basic example. Suppose that, as before, Leo has decided to spend the night in one of the following cities: Besançon, Metz, or Paris. At three o'clock he has already left Dijon and is travelling on a freeway that has Besançon, Paris, and Metz as possible destinations. At this moment, thanks to his cellular phone, he makes a hotel reservation in each of those cities. Unfortunately, a few minutes later, before Leo makes a decision about his final destination, his journey is definitively interrupted because the engine breaks down. Now imagine that Metz, Besançon, and Paris are the only cities, in France, where today there is a concert of Baroque music. Take this sentence, uttered by a well-informed observer shortly before the engine's breakdown:

(19) Leo is going to a French city where today there is a concert of Baroque music.

There surely is a sense in which, in this situation, (19) is *true*. In fact, although it is false (or simply not-true) that Leo is going to Metz, or that he is going to Besançon, or that he is going to Paris (because none of these cities can be selected as the destination at issue, given the present stage of the journey and its future developments), it is anyway true that he is going to a city with such and such characteristics, i.e. the characteristics satisfied only by the three cities we have just mentioned. According to this weak interpretation of the sentence, (19) is true even if there is *no particular* city with a concert of Baroque music where Leo is going. But (19) can also be interpreted in a different way. On this stronger reading, a necessary condition for the truth of (19) is that *there* is a particular city (i.e. Metz, Besançon, or Paris) where Leo is going. But such a condition, as we have just remarked, is not satisfied in the given situation. So, on this reading, which is equivalent to:

(20) There is a French city *x* where today there is a concert of Baroque music, such that Leo is going to *x*.

our sentence (19) is *false*.

In other terms, (19) is ambiguous, and this ambiguity between a 'specific' and a 'non-specific' reading is due to the presence of a particular intensional context determined by the progressive. This peculiarity of the progressive can be stressed by considering the different behaviour of the future (as predicted by our remarks on this topic in the introductory section). In fact, the future counterpart of (19):

(21) Leo will go to a French city where today there is a concert of Baroque music

has *only one* reading, which is equivalent to the future counterpart of (20):

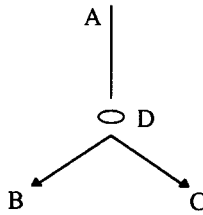
(22) There is a French city *x* where today there is a concert of Baroque music, such that Leo will go to *x*.

This means that, in the given situation, (21) cannot be true unless it is true of Besançon (or Paris, or Metz) that Leo will go there. Unlike the progressive, in the same circumstances the future allows no 'weak' reading.

As I suggested in the introduction, the reason why (19) can be ambiguous in this sense, whilst (21) cannot, is that the characteristics of the present state of affairs can be relevant to the evaluation of the progressive, whilst the evaluation of a sentence in the future tense is independent of them. For (19) to be true on its stronger reading, there must be, *at the evaluation time* (the utterance time, in this case), an ongoing event determinate enough to be described as an event of Leo's going to Besançon, or as an event of Leo's going to Metz, or as an event of Leo's going to Paris. But the requirements that the weaker interpretation of (19) imposes on the present situation are less restrictive, and the characteristics that the ongoing event must have do not entail the reference to a particular city as a possible, final destination. This is why (19) can be considered as true or false, with respect to the same situation, according to the intended reading. On the other hand, such a reference to the present situation has no role to play in the truth conditions for the sentence in the future tense: what counts is only what happens at some time *t* later than the evaluation time, and no ambiguity⁵ of the kind illustrated before is allowed.

One might object that the source of this peculiar kind of intensionality, in the example we have just discussed, is not the progressive, but the intentional character of the event, due to the presence of a human agent with his beliefs, desires, etc. But it is easy to see that the same 'paradox' arises in situations where the subject is no human agent. Consider, for instance, the case of an avalanche which normally descends a gorge *A* and then, because of the conformation of the ground, can continue its run only in two distinct, alternative ways: it falls either into a first valley *B* or into a second valley *C*. Statistically, both alternatives are equally probable. But

suppose that, on a particular occasion, since both valleys were temporarily populated by chamois, the avalanche was destroyed at place D by a special cannon shortly before taking either path:



In this situation, the sentence

- (23) The avalanche was descending to a valley populated by chamois when it was destroyed by a special cannon

is true, on its 'non-specific' reading, even if it is false (or simply not true) both that the avalanche was descending to valley B and that it was descending to valley C. But the sentence is false on its 'specific' reading, which entails the existence of a particular valley x (populated by chamois), such that the avalanche was descending to x . So, the same problem of ambiguity we have detected in Leo's example arises in this case, where the subject is no human agent.

To conclude these remarks, it should be noted that such examples are problematic for Landman's theory, which easily accounts for the stronger reading of (19) (or (23)), but not for the weaker one. In our example, Leo's journey stops when the engine breaks down. Let e be the event corresponding to this part of Leo's journey. Since e stops in our world, we must follow its developments in other possible worlds (in *the* continuation branch of e) until we find a world w and an event f in w such that e is a stage of f and f is an event of Leo's going to Paris, or an event of Leo's going to Metz, or an event of Leo's going to Besançon. *Only one* continuation branch of e is admitted, and *only one* of these alternatives is realized in this continuation branch. So, suppose that f is an event of Leo's going to Paris. In Landman's theory, this means that it is true that Leo is going to Paris: it follows that there is a city x , where today there is a concert of Baroque music, such that Leo is going to x . The problem is that, in Landman's theory, such a conclusion represents a *necessary* condition for the truth of (19). But we have just seen that this prediction is not correct when the weaker reading of (19) is considered.

Therefore, besides the so-called imperfective paradox, another apparent paradox must be accounted for by any adequate theory of the progressive. The difficulty, this time, has to do with disjunction and existential

quantification for, if our analysis is correct, it can be true that a is going to b or c although it is not true that a is going to b and it is not true that a is going to c ; and, for the same reasons, it can be true that a is going to a place with such and such characteristics although it is not true that there is a particular place x , with such and such characteristics, such that a is going to x . Let us call this predicament the *multiple-choice paradox*.

5 EVENTS, PARTS, AND CAUSES

We have just seen that one of the merits of Landman's theory is the recognition of the role that the mereological structure of eventualities must have in the semantics of the progressive. But we have also seen that what is left unexplained is the way different *perspectives* on the same data can be relevant to individuating different types of events in progress. An explicitly contextualist approach like Asher's⁶ is more adequate from this point of view. I will not go into the technical details of Asher's theory, where the notion of *perspective* has a crucial role. In a nutshell, a perspective is a function from worlds, contexts and states to propositions (i.e. sets of worlds): the idea is that, given a context c and a state s in the world of evaluation w , a perspective π selects a set of worlds that verify some relevant characteristics of s in w . In intuitive terms, perspectives are different ways of considering the state s associated with the progressive form by singling out, each time, some particular properties of s and by selecting the set of worlds p in which these properties are attributed to s . Finally, given p and the world of evaluation w , it is possible to fix the set N of the 'normal' p -world from the point of view of w . The truth conditions for the progressive can be paraphrased as follows:

- (24) $\text{Prog}(\phi)(s)$ is true [in a world w and with respect to a context c] just in case there is a perspective π such that in all the worlds in which s is normal with respect to the property attributed to s in π , there is an event e cotemporaneous or later than s such that $\phi(e)$.⁷

(Here ϕ is a property of events, and 'Prog' an operator that takes an event-predicate ϕ and returns a state-predicate $\text{Prog}(\phi)$.)

Since different perspectives can apply to the situation described in section 3, in this theoretical framework it is possible to account for the truth of both (16) and (18): i.e. it is possible to solve the problem of the underdetermination of the data. And the same holds for the multiple-choice paradox.

A first problem with this characterization of the truth conditions for the

progressive is that, as it stands, the lack of an appropriate relation (as, for instance, the part-of relation) between the relevant eventualities leads to false predictions. In fact, consider an event of Leo's going up the stairs from the first floor to the third floor of his house. Everything is perfectly in order and, in fact, he reaches the third floor without any problem. Now take a moment t during his going up the stairs from the first to the second floor. In the given circumstances, what is true at t is not only the statement that Leo is going up the stairs from the first floor to the second floor, but also the following statement:

(25) Leo is going up the stairs from the first floor to the third floor.

If for example someone asks me, at t , what Leo is doing, (25) is a perfectly appropriate answer. So, according to the above truth conditions, there must be a perspective π which selects some particular characteristics of Leo's current state s such that in all the possible worlds which are 'normal' with respect to π there is a (complete) event e , later than s , of Leo's going up the stairs from the first to the third floor. Since this is so, in all these worlds there must also be an event f , later than s , of Leo's going up the stairs from the second floor to the third floor (in fact, reaching the second floor first is a necessary condition for reaching the third floor). As a consequence, in this situation, according to the truth conditions stated in (24) the truth of (25) entails the truth, at t , of the following statement.

(26) Leo is going up the stairs from the second floor to the third floor.

But this is absurd.

One might think that this difficulty is caused by the lack of causal relation between the current eventuality (i.e. Leo's going up the stairs from the first to the second floor) and the eventuality of Leo's going up the stairs from the second floor to the third floor and that requiring the existence of such a relation between the state s and the event e in the truth conditions (24) might solve the problem.⁸ But this is not correct. Suppose that the water of a brook which has just been diverted is approaching a little meadow and that, at the moment t (long before it reaches the meadow), I utter this true statement:

(27) The water is descending to that meadow.

As before, there must be a state s and a perspective π which selects some particular characteristics of s such that in all the possible worlds which are 'normal' with respect to these characteristics there is a (complete) event e , later than s , of the water's descending to the meadow. For obvious reasons, in all these worlds there must also be an event f , later than s , of the water's

wetting the meadow (for, if the water reaches the meadow, it wets it). As a consequence, in virtue of (24), the truth at t of (27) entails the truth at t of:

(28) The water is wetting that meadow.

But this entailment, predicted by the truth conditions in (24), is not acceptable. Even if there is a causal connection between the state of the water at t (i.e. its being in the process of descending to the meadow) and the event of the water's wetting the meadow, in the given situation (27) is true at t , whilst (28) is simply false.⁹ This problem is even more dramatic in the case of non-telic event-types. In this connection, Asher introduces an interesting idea, which I will take up in the last section: 'for non-telic event-types, all the information needed to decide upon the occurrence of the culminating event is already present with the state characterised by the progressive. The only relevant perspective for evaluating the truth of $\text{Prog}(\phi)$ at a world w where ϕ describes a non-telic event-type is the singleton of w itself' (Asher, 1992: 481). But, given the truth-conditions in (24), it turns out that *any* state s (in the real world), if it is simply followed by a complete event of a non-telic type ϕ , satisfies $\text{Prog}(\phi)$.¹⁰

6 UNEXPECTED EVENTS

What is essential, in this theoretical framework, is the fact that the notion of normality is characterized by the following axiom schema:

(29) $\forall s[\text{Prog}(\phi)(s) > \exists e[s \leq e \wedge \phi(e)]]$

which states that, unless we are told otherwise, the truth of the non-progressive (or perfective) form follows from the truth of the progressive form. In (29) ' $>$ ' stands for a conditional which supports non monotonically valid inferences as, for instance, defeasible *modus ponens*. To go back to a previous example, (29) is the formal counterpart of 'default' statements as the following:

(30) When you are making a cake, you typically make a cake eventually.

So, all you have to check, for the truth of the progressive, is whether the characteristics of Leo's actions justify the reference to such default assumptions, independently of the fact that the event at issue is already presented as one whose realization is not possible.

But making the notion of 'normality' more flexible by connecting it to default and generic statements may not be sufficient, as shown by the following example. Suppose that an international sailing association

organizes a competition whose goal is the circumnavigation of the globe. After a very thorough selection, a hundred boats are admitted and they sail at the scheduled date. Some days later, during a public presentation of the competition, the spokesman of the association says:

(31) A hundred boats are circumnavigating the globe. Most of them will fail.

In the given circumstances, the statement is not only consistent, but also true (since the spokesman's assertion is based on experience, and as a matter of fact only fifteen boats will manage to circumnavigate the globe). But in Asher's theory, (29) is an axiom schema of the logic of the progressive, so that, since (31) attributes to every boat x (in the competition) the progressive 'state' of circumnavigating the globe, the truth of the following default (or generic) statement is a necessary condition for the truth of the progressive sentence (31):

(32) For every boat x (in the competition) which is circumnavigating the globe, x typically circumnavigates the globe eventually.

Yet (32) is simply false, although the progressive form sounds quite natural in (31). More in general, the problem is that in some cases the use of this aspectual form does not conform to the idea that the state denoted by the progressive 'must have some characteristics that would lead to a completion [of the event at issue]'.¹¹

A different problem¹² is raised by those situations in which the completion of the event at issue is quite improbable, almost impossible, but in the end this completion is realized. Suppose that an observer A, who sees Leo write some formulas on the blackboard, asks another observer B what Leo is doing. Since the answer is:

(33) Leo is proving Goldbach's conjecture

A objects: 'You are lying! It is awfully difficult, perhaps impossible, to prove that conjecture.' So, the problem is: which of the observers is right? There is a temptation to say that A's reaction is justified because it is highly improbable that Leo will manage to prove Goldbach's conjecture, and B has no serious reason for justifying the plausibility of (33). But suppose that, some hours later, he completes the proof (perhaps because the solution is suggested by a dream he has during a break). Well, at this moment we may agree with B who says: 'Do you see? It was *true* that Leo was proving Goldbach's conjecture!'

What is interesting, in this final comment, is B's implicit reference to what happens in the actual course of events, although it *was* out of the reach of common-sense assumptions at the utterance time. Why is this reference

so important? Because, once realized, this course of events provides the schema of a consequential chain of eventualities where the original event observed by A and B is associated with other concomitant eventualities leading to an event of proving Goldbach's conjecture. The moral is that if common-sense assumptions fail to identify the characteristics that a set of events must have to be qualified as a process of proving Goldbach's conjecture, reality can provide the necessary information. The theoretical reasons that justify B's attitude might be condensed by the maxim: wait and see! This possibility of referring to the actual course of events as an approximate source of information for the truth of the progressive will be discussed in the last section, in connection with the existence of 'totally realistic' frames.

One might object that, since the reference to what will *really* happen (independently of its plausibility at the utterance time t) is crucial here, then, at least in such situations, the difference in truth-conditions between the progressive and the future is not as dramatic as suggested in the introduction. At the moment t at which B says that Leo is proving Goldbach's conjecture there is no 'generic' or default statement which makes the completion of the event plausible and the possibility of him succeeding turns out to be highly improbable: so, it might seem that what makes B's assertion true at t is the mere fact that Leo proves the conjecture at some subsequent moment (which is a necessary and sufficient condition for the truth of the corresponding statement in the future tense). To see that such a conclusion is not correct, suppose that, a few moments after B's utterance, Leo gives up and that he succeeds in proving Goldbach's conjecture *in different circumstances* (e.g. two months later, after realizing that what he was doing at t was completely wrong). In this case, B's statement would be false at t because there is no way, at t or later than t , of connecting the event of Leo's proving Goldbach's conjecture with his actions in the context of the events occurring at t . As I have just emphasized, the reasons that justify such a connection may be available only at a time t' later than t , but in any case they are a necessary condition for the truth, at t *itself*, of B's statement. No requirement of this kind is entailed by the corresponding statement in the future tense.

7 THE ROLE OF CONTEXT

From the above discussion we can draw the following temporary conclusion: both an account of the 'mereological' structure of eventualities (based on the notion of part-of or something equivalent) and a contextualist

approach are necessary ingredients of the semantics of the progressive. To see how these two aspects can be integrated into a unitary framework, let us go back to our original example.

We have seen that, since the event of Leo's driving from Milan to Dijon has different, but equipollent, possible continuations in the future, considering a statement in the *present* progressive as true or false with respect to a *local* evaluation time (14 July at a quarter to three p.m., in our example) might be problematic. We have also remarked that if an analogous statement (but in the *past* progressive) is uttered at a later time (the day after, in the same example), treating it as plainly true can be quite natural (at least in many contexts). A plausible reason for this dissymmetry might be the following.

On 14 July, at a quarter to three p.m., how Leo's journey will evolve is still an indeterminate issue, since the first stage of the journey (from Milan to Dijon) can develop into several, distinct events (going to Metz, or to Paris, or to Besançon), all of which are on the same level. At this moment, the context is not determinate enough to reduce this set of alternative event types and if we refer to this context all the developments just mentioned are still *relevant*. A little more exactly, we might say that, given an event e (as, for instance, Leo's driving from Milan to Dijon), it is possible to associate with e , at a given interval t and on the basis of the relevant context of facts, a set D of courses of events, where every course of events in D contains events with which e is in the part-of relation, i.e. possible developments of e . Let us call this structure *the embedding set for e at the interval t in the context c* . The intuitive idea is that an event e in the world is surrounded by a bunch of possible developments in different scenarios, some of which become actual, whilst others are discarded as time goes by. The point of view that we can take on e by selecting some properties of e acts as a constraint on the class of developments that can be associated with e , depending on other relevant circumstances. For example, suppose (against the above assumptions) that it is already certain that Leo will not go to Paris because he cannot afford to live in such an expensive city. Well, in this case the embedding set at issue will turn out to be more restricted than the one described above, because all the courses of events containing an event of Leo's going to Paris will be discarded. The interesting thing is that by assuming different points of view it is possible to attribute different embedding sets to the same eventuality. Going back to our example, the set of developments contextually associated with the event of Leo's driving from Milan to Dijon contains heterogeneous courses of events on 14 July, at a quarter to three p.m.: what characterizes the evolution of the ongoing event is its indeterminacy. (Notice that this is not simply due to a cognitive failure: it is a *real* fact that at the given time Leo has made no decision yet, is deliberately following a route which leaves

all the relevant alternatives open, is not too tired and can continue his journey, etc. So, it is this particular state of affairs, not our state of ignorance, that allows for such a proliferation of relevant options.) But the day after, most of these options are no longer relevant, since Leo's decisions and actions related to the continuation of his journey after getting to Dijon are now in the past. As a consequence, the present point of view can *now* assign to the *same* event *e* of Leo's driving from Milan to Dijon a reduced set of open developments (at the given time). In connection with examples (16) and (18), we shall later discuss the case in which different perspectives on a given eventuality are relevant at the *same* time.

It should be clear why the conversational background has a crucial role in determining when an event can be considered as a stage of another event of a given type. Consider, for instance, a situation where the professor of logic goes to the blackboard, takes a piece of chalk and writes some formulas. Well, the available information can be rich enough to justify the statement *The professor is proving the completeness theorem*. But suppose that the same sequence of actions is performed by Leo, a lazy freshman who knows very little of logic but wants to show off his alleged ability. In this case the statement *Leo is proving the completeness theorem* turns out to be quite problematic.

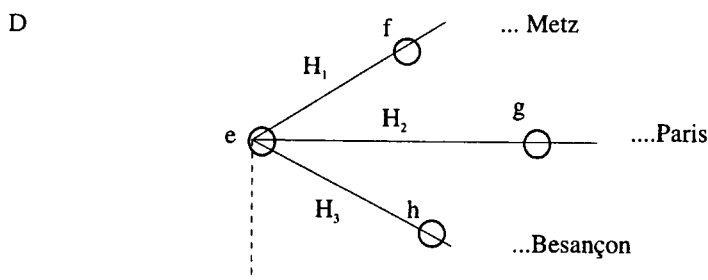
Why are we willing to say that, in these circumstances, the former sentence is true whilst the latter is false? Referring to the mere facts is not enough, for we have just remarked that Leo, the lazy freshman, and the professor perform the same sequence of actions. One might add that other, *concomitant*, facts are important here: for example, that the professor, but not Leo, has studied enough to prove the theorem, or that Leo, but not the professor, hates logic, and so on. This is correct, of course, but we must also explain *why* these other facts are relevant. There must be something which leads us to say that the same type of event (writing some formulas on the blackboard) is an event which can be considered as a stage of an event of proving the completeness theorem (even if the latter will abort) in the case of the professor but not in the case of Leo.

To answer this question, I suggest that what must be available in the background assumptions is the schema of an ideal or stereotypical¹³ course of events, according to which if an event *e* of a certain type is realised, and other concomitant eventualities are also realized, then *e* can be seen as part of an event *f* of the intended type (as, in our case, proving the completeness theorem). The term 'ideal' means that in a course of events of this type all the external factors that might block the completion of the event are ignored. Such a stereotype can be formulated in terms of a *constraint* on courses of events, which says that if any course of events H contains an event *e* of a given type A, and some particular conditions are satisfied in H,

then H will contain an event f of type V , such that e is part of f . Therefore, to account for the difference in truth-value between the two sentences at issue, we can say that the different contexts in which the same actions take place justify the reference to the intended stereotype in the former case but not in the latter.

8 FRAMES

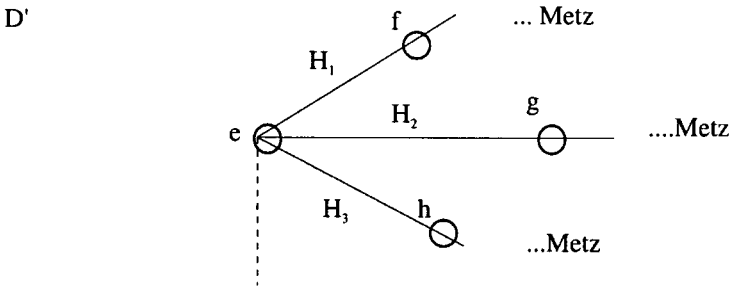
Let us try to make these ideas more precise by sketching a first, tentative version of the truth-conditions for the progressive. We can reason as follows. As we have seen on 14 July, at a quarter to three p.m., the event e of Leo's driving from Milan to Dijon can be seen as part of other events; these events belong to *different* types, or sets, of events, even though the context puts drastic restrictions on the range of alternatives. For example, e can be seen as a part of a journey to Auxonne, which is part of a journey to Dole, which is part of . . . , which is part of a journey to Besançon. But e can also be seen as part of a journey to . . . , and then to . . . , and finally to Metz. And the same can be said about Paris. Formally speaking, all these events can be seen as elements of potential courses of events H_1, \dots, H_n which can be associated with e in the context c . In the situation we are discussing, the set D of these courses of events can be represented as shown in D .



(The circles, in the different courses of events H_1, \dots, H_n, \dots , are events with which e is in the part-of relation. f , g , and h are respectively events of Leo's going to Metz, to Paris, and to Besançon.)

When is it reasonable, in such a picture, to say for instance that Leo is going to Metz? My idea is that this statement is true when the relevant information provided by the context is sufficient to force every ideal development of the event at issue to satisfy the given event type. In other terms, we must find an event of Leo's going to Metz in every course of events in D' , the set of developments that can be associated with e in the given context. This means that the characteristics of the ongoing event

and of the concomitant eventualities are definite enough to force the embedding of that event in an event of type *Go-to-Metz (Leo)*, i.e. to qualify every course of events H_n as a situation leading to an event of Leo's going to Metz.



(Here, f, g and h are all events of Leo's going to Metz. So, there is an event of Leo's going to Metz in every course of events in D' . Recall that there can be different events of the type *Go-to-Metz (Leo)*, for there are several ways to go to Metz from Dijon.)

These remarks are mirrored in the truth-conditions I am going to propose, where the contextual approach illustrated above is suitably refined by referring to the notion of conversational background.¹⁴

A *course of events* is a structure $H = \langle E, \sqsubset \rangle$, where E is a set of eventualities and \sqsubset , the part-of relation, is a partial order on E . Given a course of events H , a context C_H is a set of eventualities included in H .

A *stereotypical conversational background* (or a *frame*) is a function F from eventualities and contexts such that $F(e, C_H)$ is the set of courses of events (containing e and the eventualities in C_H) in which the event e , in view of the concomitant facts in C_H , follows its natural course. More exactly, any course of events H' in $F(e, C_H)$ satisfies stereotypical constraints of the following kind:

If:

- (I) H' contains an eventuality e of type A ;
 - (II) for every type A_1, \dots, A_n , H' contains an eventuality of that type;
- then
- (III) H' contains an eventuality f of type V such that $e \sqsubset f$.

The idea is that if an eventuality e has the characteristics denoted by the predicate A , and if other concomitant eventualities, whose characteristics are respectively A_1, \dots, A_n , are realized, then e is part of an event of the intended type V in all the stereotypical developments of e . A_1, \dots, A_n are the types of the concomitant facts in the context C_H (the 'background', in the sense of Gestalt-oriented theories I will discuss below) that are

necessary to force the perception of e as part of an event of type V. So, a stereotype F can be seen as a particular way of considering the possible developments of the event e in view of the relevant facts in C_H . For example, suppose that e is an event of Leo's writing some formulas on the blackboard and that the concomitant eventualities in C_H are the following: Leo is a professor of logic; proving the completeness theorem is included in the program of his course; he has already explained all the necessary notions, etc. What the stereotypical frame tells us, in this situation, is that e must be considered as a stage of an event of Leo's proving the completeness theorem, in the sense that all its ideal developments lead to a complete event of Leo's proving the theorem.

There are at least two senses in which the notion of *context* turns out to be fundamental in this reconstruction. First of all, what is crucial here is not only the characteristics of the event as such, but also the set of concomitant facts C_H (i.e. a context provided by the *world*) by which the event is surrounded. Secondly, which characteristics of the event and which concomitant facts are relevant depends on the existence of a suitable frame or conversational background (where the appropriate constraint fixes the type A of the event e and the types A_1, \dots, A_n of the concomitant facts), and this is a context or background provided by *the situation of the discourse*. These two main ingredients determine the following truth-conditions for the progressive (where τ is a function which assigns temporal extensions to eventualities):

$$(34) \quad |\text{Prog}(e, V)|_{H,t} = 1 \text{ iff } \exists F \exists C_H [\forall H' [H' \in F(e, C_H) \rightarrow \exists f [t \subset \tau(f) \wedge f \in H' \wedge V(f) \wedge e \sqsubset f]]].$$

Given a course of events H and a time interval t, it is true in H at the time t that e is an eventuality of type V in progress if and only if there is a context of concomitant facts C_H and a stereotypical frame such that, in all the courses of events selected by this frame with respect to this context, there is an event f such that the time of evaluation is included¹⁵ in the temporal extension of f , f is of type V and e is part of f . For example, *Leo is going to Metz* is true in a course of events H (at a time t) of an eventuality e iff there is a point of view on e , with respect to a context of concomitant facts, such that in all the courses of events compatible with this point of view there is an event f of the type *Go-to-Metz (Leo)* such that e is part of f . Intuitively speaking, this means that *Leo is going to Metz* is true iff there is an event whose characteristics, with respect to the some features of the world and a given stereotypical constraint, force the perception of e as *part* of a process of Leo's going to Metz, whatever developments may originate from e . (Notice that, as desired, this is compatible with the existence of various ways of achieving the task: for example, although the situation is at this point

completely definite because Leo has decided to go to Metz, has all the necessary means to do that, etc., there can still be different chains of events leading to an event of Leo's getting to Metz. He might take a toll road or a freeway, stop at X rather than Y, and so on. This is why we have to refer to a plurality of courses of events, even though the type of the event which is going on is already definite. At the given time i there can be lots of different events of the type *Go-to-Metz (Leo)* which are extensions of the given event of type *Go-to-Dijon (Leo)*.

9 POINTS OF VIEW

To see how the truth-conditions in (34) work in more interesting situations, let us go back to the example of Leo's journey. Consider the following sentences:

- (35) Yesterday, at ten past three p.m., Leo was going to Metz
 (36) Yesterday, at ten past three p.m., Leo was going to Besançon.

As we saw, there are contexts in which (35) is perfectly natural; but there are also contexts where (36) is a suitable description of the facts (*a posteriori*). It is tempting to say that in a sense (35) is true *de dicto* and (36) *de facto*. The problem, here, is that on the one hand we would like to make the truth of *both* sentences possible, but on the other hand we do *not* want the truth of (35) and (36) to entail the truth of:

- (37) ? Yesterday, at ten past three p.m., Leo was going to Metz and (was going to) Besançon.

In fact, the truth of this sentence would be quite counterintuitive in the given situation, since there is no moment, in the story, at which it is plausible to think that Leo is going to both cities (they are *alternative* destinations).

Before considering how the present framework is equipped to deal with such an issue, notice that this other sentence is not problematic:

- (38) Certainly, yesterday, at ten past three p.m., Leo was going to Metz. But, in a different respect, it is also true that he was going to Besançon.

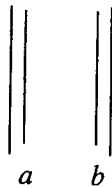
What is the reason for this difference between (37) and (38)? First of all, let us explain why the simultaneous truth of (35) and (36) is no problem. The intuitive idea is that the contextual considerations implicitly assumed as relevant to justifying (35) concern for instance Leo's intention to go to Metz, his taking the freeway to this city, his position at ten past three, and so on.

The relevant stereotypical constraint, here, is that if an event e such as Leo's journey up to this moment is realized at t , and if other concomitant eventualities are realised at t (as, in this situation, Leo's taking the freeway to Metz, his position at t , etc.), then in all the courses of events compatible with this constraint (where the road block does not occur), the event e develops into an event of Leo's reaching Metz. So, (35) is true with respect to a frame with *this* stereotypical constraint and to *this* set of concomitant facts. As for the justification of (36), other concomitant facts and another constraint are relevant, so that (36) can be true with respect to a different frame, i.e. a different point of view. (It should be stressed that having different 'perspectives' on a given event is possible not only when this event is in the past—as in the case we are discussing—but also if it is located in the present interval. For instance, we can imagine a situation in which two observers, referring to different sources of information, are *both* justified, at ten past three p.m., in asserting respectively that Leo is going to Metz and that Leo is going to Besançon. In other terms, time can be important in licensing different perspectives, but it is not the only factor involved.)

What is crucial, here, is the fact that the same event (e.g. Leo's going from Milan to Dijon) can be seen as part of different events with respect to different contexts. Such a situation is quite familiar in the domain of cognitive phenomena, where the context or background has an essential role in selecting the entities in which a given entity can be 'embedded' as a recognizable part. Take, for instance, the case of perception. In the following figure, discussed by Köhler (1940),



line a is naturally seen as part of a group of two lines which includes b . But in this other figure

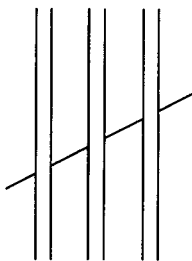


the same line a , in a different context, is naturally seen as part of a different group of two lines.

There is a further sense in which the context (i.e. a set of concomitant facts) is relevant to selecting the appropriate mereological structure of events both in cognitive phenomena such as perception and in the semantics of the progressive. As a matter of fact in both situations it is the context that allows for the reference to *virtual* entities, i.e. entities that are not realized in the actual world. We have just seen that if we consider Leo's journey up to a given moment (that is Leo's going to Dijon) *with respect to some given facts* (his intentions, his current position, etc.) then this event is seen as an event of going to Metz even if this second event does *not* occur in the real world: it is simply a possible (but not actual) event. But we have also seen that, with respect to a different context (i.e. with respect to other relevant facts) the event of Leo's going to Dijon is not seen as part of an event of going to Metz. Here, the role of context in fixing the appropriate mereological relations is quite similar to the role it has in perception. The segments in the following figure are simply seen as parts of a discontinuous line.



But the same segments can be seen as parts of a continuous line in a different context, where the completion of the line *behind* the stripes is a 'virtual' event determined by the appropriate mereological constraints.



A similar dependency upon the relevant context (i.e. the 'concomitant facts' in C_H mentioned in the truth-conditions (34)) can be observed in the case of the progressive. Coming back to (35) and (36), the idea is that two different contexts are to be selected, so that two different frames are relevant: (35) is true with respect to a given context of concomitant eventualities and a given frame (where Leo's journey up to ten past three is seen as part of a journey to Metz), whilst (36) is true with respect to a different context of eventualities and a different frame (where Leo's journey up to ten past three is seen as part of a journey to Besançon). The oddity of

(37) is due to the fact (stressed by Kamp and Partee (1995) in connection with a different problem) that the default case, for direct conjunction, is the reference to the *same* context. This is the origin of the inconsistency detectable in (37). But this inconsistency can be removed by associating the first conjunct to a given context (and the corresponding frame) and the second to another. This is exactly the move suggested in the case of (38), which is quite acceptable: distinct sentences, in the development of the discourse, can be supported by different frames.

The truth-conditions stated in (34) enable us to account for the different types of reasons that make a progressive sentence *false*. For instance, consider a sentence such as:

(39) Leo is emptying the Atlantic Ocean with a bucket.

The reason why (39) is false is simply that there is *no* frame *F*, in the background assumptions, which selects courses of events leading to the realization of an event of Leo's emptying the Ocean with a bucket.

But take this other sentence:

(40) Leo is emptying the bathtub with a bucket

and imagine a situation in which Leo correctly moves the bucket, but the bucket has a large hole on the bottom. In this case we have the frame *F*, the relevant event *e*, but what is missing is a concomitant fact in A_1, \dots, A_n , i.e. the fact that the bucket has no hole. Since not all the requirements in A_1, \dots, A_n are satisfied, there is no guarantee that in every course of events associated with the intended frame the event of Leo's emptying the bathtub is realised, so that (40) turns out to be false.

It should be noticed that this conclusion is possible because we have not considered the state of the bucket as one of the eventualities that can be ignored in order to determine the set of ideal courses of events. But in a different situation this option would be available, so that (40) would turn out to be true. It may depend on the size of the hole, on the time at which the bucket broke, on Leo's awareness of the situation, and so on. A continuum of contiguous but slightly different cases is imaginable here, and it is not difficult to refer to situations in which our intuitions about the truth of a progressive sentence such as (40) waver. In general, the theory does not predict whether an eventuality *e* must be considered as an inherently missing condition of type A_1, \dots, A_n or as an 'external' mishap that can be ignored. But leaving some parameters indeterminate is probably an essential feature of any analysis of the progressive, in order to mirror the flexibility of its use in different circumstances.

10 CONCLUSIONS AND OPEN PROBLEMS

In the analysis of the progressive proposed in the paper two notions play a crucial role. On the one hand, since the same event can be 'embedded' into several possible developments that are relevant to the truth-conditions of the progressive, a first task of the analysis was to account for the *part-of relation* which connects an event with its possible continuations. On the other hand, this kind of connection is largely dependent on *contextual factors*, and a second task of the paper was to analyse this notion of context both in terms of events in the *world* (the 'concomitant facts' selected as relevant) and in terms of the *situation of the discourse* (the conversational background that makes those facts relevant).

Combining a 'mereological' analysis of eventualities with a contextualist approach allows for a better comprehension of problems discussed in the paper. Let us see why.

1. As for the *imperfective paradox*, suppose that it is true that Leo is proving the completeness theorem. In the semantics of the progressive presented here, this means that there is an event e (e.g. the event of Leo's proving that every Hintikka set is satisfiable) which develops into an event of Leo's proving the completeness theorem in all the courses of events selected by the relevant frame F , i.e. in all the courses of events which belong to the set $F(e, C_H)$. But the actual course of events H may not belong to this set and, as a consequence, the event of proving the completeness theorem may abort in H . This means that the truth of the sentence *Leo is proving the completeness theorem* does not entail that Leo has actually proved, or will have proved, that theorem.

2. As for the second question, connected with the *underdetermination of the data*, we have just seen how in the present framework it is possible to account for the fact that *both*:

(16) The sentence *Leo is going to Metz* is true on 14 July, at ten past three p.m.

and

(18) The sentence *Leo is going to Besançon* is true on 14 July, at ten past three p.m.

can be true. The idea is that (16) refers to a frame or point of view which selects some facts in the world as the relevant ones, whilst *other* facts are relevant in the case of (18).

3. An easy solution can also be found in the case of the *multiple-choice paradox*. As you will remember, the ongoing event d and the context of concomitant facts are determinate enough to individuate a restricted set

of possible destinations (i.e. the set whose elements are Paris, Besançon, and Metz: the cities where today there will be a concert of Baroque music), but not to select a particular city, in this set, as the intended destination. In the semantics presented here, this means that there is a frame F such that in all the courses of events selected by F , i.e. in all the courses of events in $F(e, C_H)$, there is an event f such that d is part of f and f is an event of Leo's going to Paris, or an event of Leo's going to Metz, or an event of Leo's going to Besançon. That is, in the given situation, in all these courses of events there is an event f such that d is part of f and f is event of Leo's going to a city where there is a concert of Baroque music. Therefore, on its weaker reading, the sentence

- (19) Leo is going to a French city where today there is a concert of Baroque music

turns out to be true. But since there is no city x such that, in all courses of events in $F(e, C_H)$, there is an event f such that d is part of f and f is an event of Leo's going to x , (19) turns out to be false on its stronger reading.

4. Let us consider again the fourth problem. As we saw, in the given situation

- (27) The water is descending to that meadow.

is true, whilst

- (28) The water is wetting that meadow

is obviously false. In the framework under discussion the truth of (27) is due to the existence of an event e (e.g. the water's reaching a certain position in its descent towards the meadow) which is seen as part of an event of descending to the meadow. But e is not part of an event of the water's submerging the meadow (in fact, at the evaluation time there is no event that is part of an event of the water's submerging the meadow), and since this is a necessary condition for the truth of (28), this sentence turns out to be false.

5. The problem raised by sentences such as:

- (31) A hundred boats are circumnavigating the globe. Most of them will fail

was that the default assumption, for each boat, is not that the circumnavigation will be completed, but that it will abort, although (31) turns out to be intuitively true in the given circumstances. But the truth conditions stated in (34) do not entail the existence of such default assumptions. For (31) to be true it is *not* necessary that *most* boats are supposed to complete the circumnavigation. What is sufficient is that there is a frame or point of

view according to which, since the boats have particular characteristics, have been officially selected by an authoritative sailing association, etc., what these boats are doing can be seen as part of an event of circumnavigating the globe, even though most of the boats will fail and the completion of the event is not entailed by any kind of generic or default statement. As I have already remarked, a stereotype does not entail that the realisation of the event at issue must be probable or 'plausible' (in the sense of default inferences).

In the same section we also considered a different but related problem: the case of events whose completion is highly improbable, even prodigious, although it occurs in the actual world. How to account for the fact that when, in the circumstances described above, B utters the sentence:

(33) Leo is proving Goldbach's conjecture

he says something true? We remarked that the only justification for the (intuitive) truth of this sentence at the utterance time is that the event at issue *will* occur in the actual course of events H. The theoretical attitude we can associate with B's statement is: wait and see! Ideally, we are asked to look only at H (independently of what might happen in other, more reasonable worlds) in order to check whether the event of proving Goldbach's conjecture is realised in H. In the present framework such a situation is nicely accounted for by referring to a *totally realistic* frame, that is a frame in which the set of the relevant courses of event is the singleton of the actual course of events H. This means that the only course of events to be taken into consideration is H itself, which is exactly what happens in the case of (33). In a sense, this is the case in which the truth conditions of the progressive (condensed by the maxim: wait and see!) are very close to the truth conditions of the plain future. But, as predicted by the informal remarks developed in the introduction, an important difference remains: unlike the future, the progressive requires that *part* of the event has *already* been realised at the evaluation time. This requirement is correctly accounted for by the truth conditions stated in (34).

At this point, we might ask ourselves whether there is a systematic connection between types of eventualities and types of frames. Since the former classification (in the sense of Kenny–Vendler tradition) is not the topic of the present paper, I will content myself with some informal and tentative remarks. Take the case of accomplishments, as for instance the type of events of proving a theorem. Referring, in general, to a *plurality* of courses of events accounts for the idea that we have to look not only at the evolution of the current situation in the actual course of events H, but also in other, alternative courses of events. This is essential when (in contrast with the example we have just discussed) the event at issue is not fully

realised in the actual world. That is why, *in general*, a non-totally realistic frame is appropriate in the case of accomplishments. What happens in the plurality of alternative courses of events selected by the frame is relevant in this case.

What about activities?¹⁶ An exact answer to this question presupposes a more adequate account of the relation between the time of evaluation t and the temporal extension of the event at issue which is not in the scope of the present paper. Roughly speaking, the idea is that, in the case of an activity predicate such as *running*, in general what is relevant is exactly the totally realistic frame, because there is no need to look at the future developments of the present situation and, as a consequence, no need to look at alternative courses of events in order to evaluate the progressive statement. Referring to the actual course of events is sufficient. Let us see why.

An activity predicate V (unlike accomplishment predicates) is characterized by the property of 'Divisivity':

$$(41) \quad e \sqsubset f \wedge V(f) \rightarrow V(e).$$

If f is an eventuality satisfying the activity predicate V and e is a (relevant) part of f , then e itself satisfies that predicate.¹⁷

According to (34), a necessary condition for the truth of a sentence such as *Leo is running* is that the eventuality e we are considering is *part* of an event of Leo's running: but what (41) tells us is that if e is part of an event of Leo's running, then (under some conditions) e is itself an event of this type! (Notice that such a situation *cannot* hold in the case of accomplishments.) So, in order to check whether an event of Leo's running is in progress there is no need to look at the future, possible developments of e . All we need is already available at the present moment, in the actual course of events.

The relevance of the mereological structure of eventualities for the semantics of the progressive can be seen from another point of view. Take, for instance, the activity of a water-scooping machine whose engine is designed to draw up water for twenty minutes and then to make a cooling pause for five minutes before starting again. Suppose that this machine worked from two to nine o'clock. So, the following statement is not problematic:

$$(42) \quad \text{The water-scooping machine drew up water from two o'clock to nine o'clock.}$$

But imagine that, between four and five past four the machine stopped to cool down, because the engine is designed to do so at regular intervals. In this situation, there surely is a sense in which the following statement is true:

(43) Between four and five past four the water-scooping machine was not drawing up water.

On the other hand, there are contexts in which we are justified in saying:

(44) Between four and five past four the water-scooping machine was drawing up water.

To account for the fact that *both* sentences can be true although they seem to contradict each other, we have only to remark that, in the theoretical framework under discussion, it is possible to refer to different frames, i.e. different points of view on the same situation. What is crucial here is the fact that the five-minute pause is considered as part of the global event of the machine's drawing up water in the case of (44), but *not* in the case of (43).

Such flexibility of the progressive is one of the reasons of the 'productivity' of this aspectual form, which can be properly used in different situations. Suppose that, while walking in the courtyard of our department, two students see the professor of logic and that one of them, pointing at that teacher, asks the other:

(45) What's he doing?

Even if it is quite clear that at the moment the professor is idly walking around and *not* working, a perfectly natural answer might be the following:

(46) He is proving the completeness theorem

where the intended meaning is that, at the present stage of the course in logic, the professor has already started that proof and he will go on in the next few lectures. This is possible because proving a theorem can be a discontinuous activity, with lots of dead times, and such kind of information is surely part of the conversational background. So, there is a relevant constraint that makes (46) true, although the last lecture took place three weeks ago, before the Christmas holidays.

On the contrary, even if the professor has just left his cycle in the courtyard and both students know that he is resuming his cycle riding in a few moments, such an answer would be quite odd:

(47) ? He is pedalling.

Although the interruption at issue is very short, an activity such as pedalling has a 'dense' characterization which (as in the case of the water-scooping machine) calls for an adequate analysis of the internal structure of eventualities.

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NOTES

- 1 What is peculiar to this situation is that an event of a given type is presented as an event in progress even if the cause that makes it unrealizable is *already* an accomplished fact. Whilst in other similar examples, but in the *past* tense (like *Mary was crossing the street when a truck hit her*), the event is presented as going on *up to* the occurrence of the obstructing causes, here it is presented as going on *after* that occurrence. This means that the event is unrealizable not only in the actual world, but in every world coinciding with the actual one up to the present moment.
- 2 According to Landman's characterization, v is a reasonable option for e in w iff 'there is a reasonable chance on the basis of what is internal to e in w that e continues in w as far as it does in v ' (p. 25). Intuitively speaking, the problem is that if we resort to a possible world v where an event e is more developed than it is in w , there must be some specific reasons, in this world v , for such an increment, and since these reasons are not present in w , there is no reasonable chance that the event has the same extension in both worlds. Actually, the concept of 'reasonable option' should be taken as a primitive notion in Landman's theory.
- 3 Both the part-of relation (between eventualities) and the stage-of relation are required in Landman's theory. But

whilst the former notion is quite clear, the latter is intuitively more complicated. The idea is that 'not every part of e at an interval is a stage of e ; to be a stage, a part has to be big enough and share enough with e so that we can call it a less developed version of e . . . We cannot say that when an event stops in a world, there is no bigger event of which it is part in that world, but we can say that, when it stops, there is no bigger event in the world of which it is a *stage*' (Landman, 1992: 23). But consider the publication of the first volume of Proust's *Recherche*. On the one hand, there surely is an event e of publishing this volume which *stops* at a given date (14 November 1913). On the other hand, since the publication of this volume is a stage of the event of publishing the whole *Recherche*, we must also have an event f which (as a stage of the bigger 'event') does *not* stop. So, in this theory, there must be *two* distinct entities: the event e which stops at the given date and the event f , which does not stop. (The same can be said of my proving lemma A as a stage of my proving theorem B. As an event of its own, the event of proving lemma A stops at a given moment, but as a stage of the event of proving theorem B, it cannot stop, and we must have a distinct event.) In the framework adopted in the present paper, where

- only the part-of relation is relevant, such a duplication is not necessary.
- 4 This problem is explicitly discussed in Landman (1992), where some arguments are developed against the thesis, argued for in Parsons (1990), that the progressive creates *no* intensional context.
 - 5 Needless to say, other kinds of ambiguity can be caused by the future tense. For example, in the sentence 'Leo will go to a French city run by a socialist mayor' the indefinite description can be interpreted as referring to a city which has a socialist mayor at the evaluation time or at the (future) moment at which Leo goes to that city. But notice that, in the former case, we can infer that there *is* a city with the intended characteristics; in the latter, we can infer that there *will* be a city with the intended characteristics. (Interestingly enough, a similar reasoning can be repeated if the future tense is replaced by the past tense.) This means that on *both* interpretations some kind of existential generalization is allowed. On the other hand, we have just seen that, on its weak reading, (19) allows *no* inference about the existence (at the evaluation time, or in the future) of the city at issue.
 - 6 See Asher (1992).
 - 7 Asher (1992: 486).
 - 8 The need for a stronger connection between *s* and *e* (instead of the temporal connection in (24)) is mentioned in Asher (1992: 486): the suggestion is that *s* must be causally necessary for the production of *e*.
 - 9 Provided that (28) is considered on its genuine progressive reading, and not on its 'future' or 'imminent' reading (which is ruled out by the context). This is even clearer in Italian, where the progressive cannot have this second kind of reading. The Italian translation of (28), i.e. *L'acqua sta bagnando il prato* cannot have an 'imminent' reading and this sentence is false even if uttered shortly before the event of the water's wetting the meadow.
 - 10 Let *s* be any current state in the real world *w*, say the state of Leo's being sleepy, and π a perspective that selects some arbitrary property that *s* has in *w*. Since the set of worlds circumscribed by this perspective is simply the singleton of the real world *w*, according to (24) all we have to do, in order to check whether *s* is of type $\text{Prog}(\phi)$, is simply to check whether there is an event *e* of type ϕ which is cotemporaneous or later than *s*. As a consequence, if it is true that Leo will smoke tomorrow at 3.15 p.m., then it is true that he is smoking now, because there is an event of Leo's smoking which is later than the state of Leo's being sleeping. Once more, what is missing is an account of the mereological relations that must exist between the state *s* and the event *e*.
 - 11 See Asher (1992: 475). In other terms, what is problematic, in my opinion, is the idea that 'plausibility' is a necessary condition for the truth of a progressive sentence.
 - 12 Since the event at issue is realized in the actual world *w*, this kind of situation is not problematic for Asher's theory because one can refer to the 'perspective' which coincides with the singleton of *w*. Nevertheless, at the end of the previous section we saw that referring to this type of perspective raises some problems in Asher's theoretical framework.
 - 13 The existence of a stereotype does not entail that the realisation of the event at issue must be highly probable or 'plausible' in the sense of default reasonings Asher's theory refers to. For instance, in the case of example (31) we have the stereotype of a complex event whose realization is considered improbable.
 - 14 See Kratzer (1981) for a treatment of this notion in terms of a possible world semantics. In the present framework, stereotypical conversational

backgrounds are considered from the point of view of event semantics.

- 15 Actually, this is a very rough stipulation of the temporal relation between the time of evaluation and the whole eventuality *f*. See Klein (1994) for an accurate description of the relations between the time of utterance, the 'topic' time and the time of the eventuality. For the sake of simplicity, from now on we shall ignore the temporal parameter.
- 16 The argument I am going to develop also applies to (non-permanent) states compatible with the use of the progressive.
- 17 See Moltmann (1991) for this principle and for the necessary restrictions.

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