Progressive

The Imperfective Paradox

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1   What is the Imperfective Paradox?

The Imperfective Paradox is no paradox. Unlike what is called a paradox in the logical literature, it is no apparently valid argument with apparently true premises and an apparently false conclusion. The name was introduced by Dowty (1979) to refer to the puzzle posed by the following question:

How is it possible that a statement of the form ⌜x was F-ing⌝ is true and yet there is no time at which ⌜x was F-ed⌝ is true?

An instance of the puzzle is this: how is it possible that (1a) is true and yet there is no time at which (1b) is true?

(1)   a.   Mozart was finishing the *Requiem*.
       b.   Mozart finished the *Requiem*.

The puzzle arises for predicates, like "finish the *Requiem*," that introduce a *telos* – that is, describe events directed to an end – while it does not arise for predicates, like *walk*, that fail to introduce an end point. Thus, unlike for (1a) and (1b), if (2a) is true, it seems that (2b) must be true:

(2)   a.   Mozart was walking.
       b.   Mozart walked.

The puzzle has been known at least since Aristotle made the following observation in the *Metaphysics* (Aristotle 1995, book IX, ch. 6, 1048^b1, 20–30):

at the same time we are seeing and have seen, are understanding and have understood, are thinking and have thought: but it is not true that at the same time we are learning and have learnt, or are being cured and have been cured.

It surfaced again in recent times in Kenny (1963, 121) and Vendler (1967, 100), and entered the formal semantics literature through Bennett and Partee (1972) and Dowty (1977; 1979).

Why is it a puzzle? We may appreciate the difficulty by considering a simple way of stating the truth conditions of progressive sentences and simple past sentences in interval semantics (a proposal along these lines was suggested by Bennett and Partee 1972):

⌜PROG φ⌝ is true at an interval t iff φ is true at an interval t' including t.
⌜PAST φ⌝ is true at an interval t iff φ is true at an interval t' preceding t.

The immediate (incorrect) prediction is that, if Mozart was finishing the *Requiem*, then there is an interval t at which it is true that Mozart finished the *Requiem*.

The attempt to solve the Imperfective Paradox has generated several proposals about the semantics of the progressive, namely of predicates of the form ⌜be F-ing⌝. Viable theories may be organized around two issues. One is whether a solution to the Imperfective Paradox requires treating the progressive as an intensional operator (i.e. an operator whose semantics involves reference to a possible state of affairs) or an extensional interpretation (which involves no such reference) is preferable. The other concerns the division of labor between semantics and pragmatics that is needed for an optimal account. I'll discuss the issue of the intensionality in section 2 and I'll make some observations on the context dependence of the progressive in section 3. Finally, in section 4, I'll examine some ideas that were left out by the preceding discussion.

2 Is the progressive intensional?

2.1 Evidence for the intensionality of the progressive

If predicates of the form ⌜be F-ing⌝ are intensional, we expect them to share some features with other intensional predicates we know of. Forbes (2006a; 2006b) lists the following properties of prototypical intensional transitive verbs:

1. resistance to interchange of co-extensive expressions;
2. lack of existence entailments;
3. relational/notional ambiguities with quantified direct objects.

The first property is illustrated by the fact that (spoiler!) the intensional verb *seek* does not validate the inference from (3a) and (3b) to (3c):

(3) a. Smiley seeks the Soviet mole.
　　 b. The Soviet mole is Smiley's wife's lover.
　　 c. Smiley seeks Smiley's wife's lover.

The second property is illustrated by the fact that (4a) is true, though there is no such thing as a wind of aether such that Michelson and Morley sought to detect the motion of matter through it. Similarly, (4b) can be true although there is no Medusa such that Richard was looking for her:

(4) a. Michelson and Morley sought to detect the motion of matter through a wind of aether.
　　 b. Richard is seeking Medusa.

Finally, the third property is illustrated by the fact that (5) may mean either that there was a particular horse Richard was trying to find (relational reading) or that Richard's search would have been successful if he found any horse (notional reading):

(5) Richard sought a horse.

(The terms "notional" and "relational" were used originally by Quine 1956.[1] Notice that, under the notional reading, (5) fails to entail the existence of a horse Richard sought, so properties 2 and 3 are related. However, lack of the existence entailment occurs not just with indefinite objects of intensional verbs, but also with proper names, as (4b) shows.)

  In using properties 1–3 to test for the intensionality of ⌜be F-ing⌝, some caution should be exercised, since, as Forbes points out, some predicates that are regarded as intensional possess only some of these properties. For example, the verb *need* allows for substitution of co-extensive expressions (thus failing to exhibit property 1), as shown by the fact that (6a) entails (6b), but exhibits notional/relational ambiguities in (7):

(6) a. Richard needs water.
　　 b. Richard needs H_2O.

(7)   Richard needed a horse.

Facts of this kind open up the possibility that properties 1–3 might be explained by different underlying devices, so we shouldn't necessarily expect ⌜be F-ing⌝ to exhibit all of the markers of intensionality displayed by the paradigmatic intensional verb *seek*. On the other hand, the presence of at least some of these markers may provide evidence for the intensionality of ⌜be F-ing⌝, since purely extensional approaches may have difficulties in explaining them. Clearly, if progressive predicates fail to display some of the properties in 1–3, adequate intensional accounts of the progressive should explain why.

So, do predicates of the form ⌜be F-ing⌝ exhibit properties 1–3? Property 1 appears to be missing, since the inferences in (8)–(9) are valid:

(8)   a.   Karl is directing *Don Giovanni*.
      b.   *Don Giovanni* is Mozart's *opera buffa* that premiered in Prague.
      c.   Thus, Karl is directing Mozart's *opera buffa* that premiered in Prague.

(9)   a.   Richard is writing to the author of *The Principles of Psychology*.
      b.   The author of *The Principles of Psychology* is Henry's brother.
      c.   Thus, Richard is writing to Henry's brother.

On the other hand, predicates of the form ⌜be F-ing⌝ seem to display lack of existence entailments when F contains a verb of *creation*. For example, progressive sentence (10a), unlike its perfective counterpart (10b), fails to entail the existence of a house:

(10)   a.   Mary was building a house.
       b.   Mary built a house.

Parsons (1989; 1990) suggests that if (10a) is true, there is an unfinished house that Mary was building, and unfinished houses are houses. However, appeal to unfinished objects does not help in accounting for some cases in which the existence entailment fails. As Landman (1992) points out, (11) may be uttered truly and yet one cannot claim that it existentially quantifies over unfinished unicorns, since there are none:

(11)   God was creating the unicorn when he changed his mind.

Moreover, Higginbotham (2004) observes that the existence entailment fails not only with verbs of creation, but with verbs of *selection* as well. Thus, for instance, (12) below (due to A. Kratzer and reported in von Stechow 2001) may be true, unlike (13), without there being any pumpkin that they were picking out (indeed, it does not make sense to reply to an utterance of (12) by asking "which pumpkin?"):

(12)   They were picking out a pumpkin.

(13)   They picked out a pumpkin.

Finally, a different kind of example showing that the existence entailment fails with progressive predicates is proposed by Bonomi (1997). Suppose Leo was driving from Turin and intended to reach a French town without having chosen a particular one yet (he was undecided among Nice, Lyon, and Aix). In this case, (14) is true and does not entail that there is a French town Leo was driving to (by contrast, this entailment holds for (15)):

(14)   Leo was driving to a French town.

(15)   Leo drove to a French town.

   Sentence (14) also illustrates the presence of relational/notional ambiguities with progressive predicates. In the scenario described above, one may utter (16) truly, while the corresponding simple past sentence makes no sense:

(16)   Leo was driving to a French town, though not to a particular French town.

(17)   ?? Leo drove to a French town, though not to a particular French town.

Thus, in this context the notional reading of (14) is selected. On the other hand, if we change the context by assuming that Leo was driving from Turin intending to reach Nice, the relational reading of (14) is selected, according to which Leo was driving to a particular French town. In the absence of contextual bias for one or the other reading, (14) is ambiguous.
   While (14) indicates that some progressive predicates side with intensional transitives as far as the occurrence of relational/notional ambiguities is concerned, it should be noticed that for other progressive predicates the notional reading is not readily available. For example, (18) is odd even if, at the time when it is uttered, Mary has built just a wall (this is observed by Gendler Szabó 2008):

(18)   ?? Mary is building a house, though no particular house.

An adequate account of the progressive should explain why these differences arise.
   Let's sum up. The fact that progressive predicates share features 2–3 with other intensional predicates may be taken as prima facie evidence that progressive morphology creates an intensional context. In the next section, I discuss some accounts based on this assumption.

2.2   Intensional accounts of the progressive

In natural language semantics, intensional phenomena are usually dealt with by resorting to possible worlds. The intensional features of ⌜be F-ing⌝ observed in the previous section suggest the following solution to the Imperfective Paradox:

> It is possible that ⌜x was F-ing⌝ is true and ⌜x F-ed⌝ false because the truth of ⌜x was F-ing⌝ requires ⌜x F-ed⌝ to be true at every/some world in a *selected set*, which need not include the real world.

For intensional accounts, the devil is in how the selected set should be specified. Here, I shall consider three intensional accounts that have been proposed. For each of them, I'll show how it tries to solve the paradox and deals with the evidence for the intensionality of the progressive.

2.2.1   Dowty's account

In Dowty (1979) the selected set is the set of worlds that, up to the evaluation time of the progressive sentence, are identical to the real world, and in which the course of events later on develops in ways most compatible with the course of events in the real world up to (and including) the evaluation time. Dowty calls the worlds in this set *inertia worlds*: they are worlds in which nothing unexpected or out of the ordinary happens given the course of events in the real world up to the time of evaluation. Dowty's truth conditions for ⌜x is F-ing⌝ are stated as follows (assume, as we did in section 1, that progressive morphology is represented at LF by the operator PROG):

> ⌜PROG φ⌝ is true at an interval i in a world w iff for some interval i' that includes i as a nonfinal subinterval and for every inertia world w' relative to $<i, w>$, φ is true at $<i', w'>$.

The idea is that *Mary is building a house* is true in a world w at an interval i iff Mary builds a house at a larger interval i' including i in those worlds identical to w up to i in which later on nothing out of the ordinary happens. If in w after i lightning strikes Mary down before the house is completed, w is not among the inertia worlds; thus *Mary is building a house* may be true in w at a time although there is no time at which it is true in w that Mary builds a house. Since *Mary was building a house* is true iff Mary is building a house at some past time, while *Mary built a house* is true iff Mary builds a house at some past time, it follows that *Mary was building a house* may be true, although there is no time at which *Mary built a house* is true.

   Notice that the account may also explain why, with activity predicates like *walk*, we normally infer (2b) (*Mozart walked*) from (2a) (*Mozart was walking*): if Mozart walks in the inertia worlds at an interval i' including the past interval i as a nonfinal subinterval, then, assuming that i is long enough to allow walking, Mozart walks at i in the inertia worlds, and, given that the real world at i is identical to the inertia worlds, Mozart walks at i in the real world. Thus, if (2a) is true, we may normally infer that (2b) is.

   It may be useful, at this point, to see how this account, besides providing a solution to the Imperfective Paradox, captures some of the properties of the progressive mentioned in section 2.1. Let's consider substitutability of coreferential expressions. Suppose (8a) and (8b), repeated here as (19a) and (19b), are true at the present moment i in the real world:

(19)   a.   Karl is directing *Don Giovanni*.
       b.   *Don Giovanni* is Mozart's *opera buffa* that premiered in Prague.
       c.   Thus, Karl is directing Mozart's *opera buffa* that premiered in Prague.

Then, by Dowty's account, Karl directs *Don Giovanni* at an interval including *i* in the inertia worlds. Moreover, given that the inertia worlds are identical to the real world at *i* (and nothing unexpected occurs in them after *i*), *Don Giovanni* is Mozart's *opera buffa* that premiered in Prague in the inertia worlds at *i* as well. Thus, Karl directs Mozart's *opera buffa* that premiered in Prague at an interval including *i* in the inertia worlds. Thus, (8c), repeated above as (19c), is true in the real world at *i*. So, the substitutability of co-extensive expressions observed in (19) is expected under this account. A similar explanation may be given for (9) above.

Failure of the existence entailment is also expected in this account. For example, in order for (10a) to be true, the semantics of the progressive requires Mary to build a house in the inertia worlds, but, as we saw, the real world may not be among them.

Finally, the presence of relational/notional ambiguities with the progressive may be accounted for as follows. In principle, in Dowty's account there are two possible logical forms for (20):

(20)   Leo is driving to a French town.

(21)   a.   PROG (Leo drives to a French town).
       b.   There is a French town x such that PROG (Leo drives to x).

Logical form (21a) is true iff in every inertia world, Leo drives to a French town, possibly a different one in different worlds. On the other hand, (21b) is true iff there is a French town such that, in every inertia world, Leo drives to it. So, (21b) requires Leo to bear a relation to a particular French town and corresponds to the relational reading of *Leo is driving to a French town*, while (21a) does not require Leo to bear a relation to a particular French town and corresponds to the notional reading. In the scenario described by Bonomi (1997), at the relevant past time Leo has not formed the intention of reaching a particular French town yet, so the course of events up to that time is compatible with his reaching different French towns; thus in different inertia worlds relative to that time Leo drives to different French towns. Thus, (21a) is true at that time, but (21b) is not. Thus, in that scenario it is true that Leo was driving to a French town (under the notional reading), but it is false that there is a French town such that Leo was driving to that town.

Now recall that (18), repeated here as (22), is odd, which seems to indicate that the notional reading is not available for the progressive predicate *is building a house*:

(22)   ?? Mary is building a house, though no particular house.

In principle, Dowty's account predicts a relational/notional ambiguity for this predicate as well. So how can the oddness of (22) be explained in his account? One possibility is that *no particular* riders aren't simply markers of notional readings, but markers of the degree of *modal determinacy* (to use a term coined by Forbes 2006a) of these readings. Suppose Leo wants to buy a pair of shoes. There is no pair of shoes he has set eyes on yet, but not any pair of shoes will do: he wants some vegan brown corduroy shoes with padded inner soles by Bourgeois Boheme

(this maker produces different models with these features). In this scenario, *Leo wants to buy a pair of shoes* is not understood relationally, yet (23) is odd, since the identity of the pair of shoes is to some extent constrained in the worlds in which Leo gets his wish:

(23)   ?? Leo wants to buy a pair of shoes, but no particular pair of shoes.

If this is correct, *no particular* doesn't just mark notional readings, but requires moreover that the property it takes as argument be relatively unconstrained by context. Now come back to (22). If, at the time of utterance of (22), Mary has only built a wall, there is no house we can point at and say that Mary is building that house. So the first conjunct in (22) must be understood notionally and not relationally. However, in the inertia worlds a house will be built with that wall, in that place, and, as usually there is a plan, according to the plan. This is why it is odd to add *though no particular house*.

Before pointing out some problems for the inertia-world account, let's take notice of a further prediction that it shares with other intensional accounts: progressives of impossibles like (24) are correctly predicted to be false (once we assume that the set of inertia worlds is not empty), since inertia worlds are possible worlds and there is no possible world in which someone squares the circle.

(24)   ?? John is squaring the circle.

We'll come back to this last point later on. Let's now turn to two problems that have been raised for Dowty's account. One was pointed out by Vlach (1981). Sentence (25) below may be uttered truly and yet in the worlds that are like the real world up to yesterday at 3p.m. and in which nothing out of the ordinary happens (no miracles, same laws of nature as in the real world), the bus hits Mary (and she never gets across). Thus, (25) is incorrectly predicted to be false. This problem is dubbed by Landman (1992) *the problem of interruptions*.

(25)   Yesterday at 3p.m. Mary was crossing the street when the bus hit her.

Another problem for the inertia-world account is what Landman calls *the problem of non-interruptions*. Suppose that Mary, a mediocre swimmer, wants to swim across the Channel. She starts swimming from Dover toward Calais, she swims for an hour and sinks. In this case, it is false that she was swimming across the Channel. The inertia-world approach predicts this, since in the inertia worlds Mary's capabilities and the Channel's width are the same as in the real world, so, if everything goes as expected, she does not get across in the inertia worlds. Now, change the scenario. Suppose that Mary miraculously succeeds in swimming across the Channel. In this case, one may truly claim that Mary was, after all, swimming across the Channel. Under the inertia-world approach, however, this claim is false, since, in the worlds where nothing out of the ordinary happens, Mary does not get across. The problem here is that, while (26) does not entail that there is a time

when (27) is true, (27) seems to entail there is a time when (26) is true, no matter how unlikely it is:

(26)   Mary was swimming across the Channel.

(27)   Mary swam across the Channel.

2.2.2   Landman's account

These problems for Dowty's account have led to a number of alternative intensional accounts. Here, I briefly outline two of them, the account proposed by Landman (1992) and the one proposed by Portner (1998). Both accounts are event-based (i.e., they take verbs to be predicates of events); in particular, they analyze progressive morphology as expressing a relation between an event and a property of events. Thus, for instance, (10a) (*Mary was building a house*) is represented as (28) and (10b) (*Mary built a house*) as (29):

(28) $\exists e(\tau(e) < now \land PROG(e, being\ an\ event\ of\ Mary's\ building\ a\ house))$
       (There is an event occurring before now and standing in the PROG relation with the property of being an event of building a house.)

(29) $\exists e(\tau(e) < now \land being\ an\ event\ of\ Mary's\ building\ a\ house(e))$
       (There is an event of Mary's building a house occurring before now.)

According to Landman, $\ulcorner PROG(e, P) \urcorner$ is true in a world w iff for some event–world pair $<e', w'>$ in the continuation branch for the event denoted by e in w, e' belongs to the set denoted by P in w'.

   In order to define the continuation branch for an event in a world, Landman introduces the notion of event stage: an event e is a *stage* of an event f iff f is a more developed version of e. If an event e is a stage of an event f, e is a *part of f*, but a part of an event is not necessarily a stage of that event. For example, Wilfred Owen's death is part of the First World War, but is not a stage of it, since the First World War is not a more developed version of his death. Let's say that an event e *stops* in a world w iff there is no event of which e is a stage that goes on in w. An event e *continues* in a world w iff e is a stage of some event in w. Finally, let's say that a world w' is a *reasonable option* for an event e in w iff, on the basis of what is internal to e in w, there is a reasonable chance that e continues as far as it does in w'. Now the *continuation branch* for e in w, for short $C(e, w)$, may be defined as the smallest set of event–world pairs that is obtained by applying the following procedure:

1.   For every event f such that e is a stage of f in w, add $<f, w>$ to $C(e, w)$.
2.   If f is an event of which e is a stage and f stops in w, then, if there are no worlds at which f continues, you are done.
3.   If f is an event of which e is a stage, f stops in w and there are worlds at which f continues, but they are not reasonable options for e in w, you are done.
4.   If there are worlds at which f continues that are reasonable options for e in w, go to the world w' among them that is closest and for every event g in w' such that f is a stage of g, add $<g, w'>$ to $C(e, w)$.

5. If m is an event of which g is a stage and m stops in w', then, if there are no worlds at which m continues or the worlds at which m continues are not reasonable options relative for e in w, you are done.

6. If there are worlds at which m continues that are reasonable options for e in w, go to the world w'' among them that is closest and for every event n in w'' such that m is a stage of n, add $<n, w''>$ to $C(e, w)$.

7. And so on, until you are done.

Under this account, again, *Mary was building a house* may be true, while there is no time at which *Mary built a house* is true. The reason is that formula (29) above translating the simple past sentence is true at a time iff there is a real-world event of Mary's building a house preceding that time, while formula (28) translating the past progressive sentence is true iff there is a past stage that continues into an event of house building in one of the worlds on the continuation branch of that stage. Since the world on the continuation branch in which the stage develops into an event of building a house doesn't have to be the real world, the proposition that Mary was building a house fails to entail that there is a time at which Mary built a house.

The problem of interruptions raised by (25) (*Yesterday at 3p.m. Mary was crossing the street when the bus hit her*) is avoided, since the closest world w in which Mary's crossing continues that is a reasonable option relative to the real world is one in which no bus hits her (recall that reasonable options are determined by what is internal to the crossing, thus one should ignore the bus). So she gets across in w and (25) is correctly predicted to be true. The problem of non-interruptions raised by (26) (*Mary was swimming across the Channel*), on the other hand, does not arise, since, in the scenario in which Mary gets across, if we follow the development of Mary's swimming in the real world, we end up with an event of Mary's swimming across the Channel, so (26) is also correctly predicted to be true. Finally, reasonable options are appealed to in order to explain why (26) is false in the scenario in which Mary sinks after she swims for an hour. If we follow the development of Mary's swimming by jumping to the closest worlds in which she keeps swimming, eventually we reach worlds that are not reasonable options, given her capabilities in the real world. So, in building the continuation branch, we never reach a world in which she gets across and thus (26) is correctly predicted to be false.

Now, let's turn to the properties of the progressive described in section 2.1. Consider the valid inference in (8) again, repeated here as (30):

(30) a. Karl is directing *Don Giovanni*.
  b. *Don Giovanni* is Mozart's *opera buffa* that premiered in Prague.
  c. Thus, Karl is directing Mozart's *opera buffa* that premiered in Prague.

Suppose (30a) and (30b) are true. Then, by the truth of (30a), there is a real-world event e whose continuation across the closest worlds that are reasonable options results in a complete event of directing *Don Giovanni* by Karl. Since (30b) is true, and in following the continuation of e across worlds we only make minimal changes to remove interruptions (go to the closest world!), it follows that also in these worlds

Don Giovanni is Mozart's *opera buffa* that premiered in Prague. Thus, if *e* develops into a complete event of Karl's directing *Don Giovanni* in one of these worlds, *e* also develops into a complete event of Karl's directing Mozart's *opera buffa* that premiered in Prague in it. Thus, (30c) is true.

In Landman's account, (20) (*Leo is driving to a French town*) is in principle ambiguous between (31a) and (31b) (ignoring tense), where (31a) is the candidate to represent the notional reading:

(31) a. ∃*e PROG*(*e*, *being an event of Leo's driving to a French town*)
     b. ∃*e* ∃*x* (*French town*(*x*) ∧ *PROG*(*e*, *being an event of Leo's driving to x*))

Accounting for the notional reading of (20), however, is less straightforward in Landman's theory. First, in order to capture this reading, Landman must give up the uniqueness assumption by which, given an event stage *e* in a world *w*, there is at most one world closest to *w* at which the event continues. Why? By the uniqueness assumption, there is at most one world in which the event of Leo's driving is completed. Suppose in that world he ends up in Nice. Then (31a) is true because (31b) is true, contrary to the assumption that (20) is understood notionally. On the other hand, suppose the uniqueness assumption is given up, and we require that *PROG(e,P)* is true iff for every branch we build by following the development of *e* in the closest worlds that are reasonable options, *P(e)* is true in some world on that branch. Then (31a) may be true because Leo's real-world driving may develop into an event of driving to Lyon in one world, into an event of driving to Nice in another world, into an event of driving to Aix in yet another world, and these worlds are all equally close. In this case, although (31a) is true, (31b) is false, consistently with the notional reading of (20).

Giving up the uniqueness assumption is not particularly troublesome for Landman. Even so, a problem remains. Suppose Leo starts driving at 3p.m. without having chosen a particular French town as a destination, and that, after driving for a while, he decides to go to Nice and gets there. Intuitively, at 3p.m. (20) is true under the notional reading. The problem is that, in this scenario, (32) is also true at 3p.m. by Landman's account, since Leo's driving is a stage of a trip to Nice in the real world (recall that, if the driving does not continue in other worlds, you are done):

(32) Leo is driving to Nice.

Again, this has the consequence that (31b) is true at 3p.m., contrary to what we expect from the notional reading. Let's leave this problem aside for the moment; I'll come back to it in section 3.

Finally, (18) (?? *Mary is building a house, though no particular house*) may be accounted for in Landman's theory by exploiting the suggestion we made for Dowty's theory. A stage of an event of building a house typically consists of building some walls, a window, in a certain place, according to a certain plan. As we follow the development of a house-building stage in the closest world that is a reasonable option, these features of the stage are preserved, and thus the

properties of the house are to some extent constrained by the activity that goes on in the real world. This is why the *no particular* rider is odd in (18).

2.2.3   Portner's account

Portner (1998) assumes the same logical representation as Landman for progressive sentences. Thus, the logical form of (10a) (*Mary was building a house*) is (28), repeated here as (33):

(33) $\exists e(\tau(e) < now \ \wedge \ PROG(e, \ being \ an \ event \ of \ Mary's \ building \ a \ house))$

However, PROG is interpreted differently. Portner assumes that, as modal operators in Kratzer (1977; 1981; 1991), the interpretation of PROG is relative to two contextually supplied parameters: a *modal base* and an *ordering source*. The modal base for PROG is a *circumstantial* modal base (a set of relevant facts) sensitive to the event description.[2] More precisely, the modal base for PROG is a function from event–property pairs to sets of propositions: given an event *e* and a property of events *P* the modal base determines a set of propositions that are relevant to whether *e*, relative to the event type *P*, is completed or not. The ordering source for an event *e* is the set of propositions that must be true in order for *e* not to be interrupted. The ordering source determines an ordering on the worlds of the modal base: a world *w* is *better than* a world *w'* relative to an ordering source if and only if every proposition in the ordering source that is true in *w'* is true in *w* but not vice versa. A world *w* in a set of worlds *X* is *best* relative to an ordering source iff there there is no *w'* in *X* that is better than *w* relative to the ordering source. In order for *PROG(e, P)* to be true, *P(e)* must hold true at all the worlds in this set:

> the worlds, among those in which the propositions of the modal base are true, that are best relative to the ordering source.

For example, in the case of *Mary is building a house*, the modal base may contain true propositions that are relevant to determine whether the building event can be completed, such as:

> Mary has enough money to build a house, she is in good health, the lot she bought can be built upon, and so forth.

The ordering source will contain the propositions that must be true in order for the building event not to be interrupted, such as:

> Mary is not struck by lightning, there will be no earthquake, Mary does not get killed by a madman, and so forth.

Relative to this modal base and ordering source, *Mary is building a house* is true if Mary is struck by lightning later on, since, other things being equal, a world in which the propositions of the modal base are true and in which she is not struck by lightning is better than a world in which the propositions of the modal base are true and in which she is struck by lightning. By this reasoning, in the worlds that make the propositions of the modal base true that are best relative to the ordering

source, all obstacles are removed and Mary builds the house. If, on the other hand, the modal base contained propositions such as

   Mary has enough money to build a house, her heart is in very poor condition, she will not make it to the end of the month, and so forth.

some of the best worlds in which these propositions are true may not be worlds in which she builds the house; thus *Mary is building a house* is false with respect to this modal base.

   How does Portner's analysis solve the problem of interruptions raised for Dowty's analysis by the truth of (25) (*Yesterday at 3p.m. Mary was crossing the street when the bus hit her*)? Notice that, if the proposition that Mary gets hit by a bus were in the modal base, (25) would be predicted to be false, since, although the ordering source ranks the worlds in which no interruptions occur as best, the best worlds according to the ordering source in which the proposition that Mary gets hit by a bus is true are still worlds in which she gets hit by a bus. Portner's idea is that the bus is not part of the process Mary is engaged in (relative to the event type of crossing the street), and thus no propositions about the bus will be included in the modal base. The result is that the set of worlds in which the propositions of the modal base are true that are best relative to the ordering source are worlds in which Mary gets across. Thus, (25) is correctly predicted to be true.

   Notice that in Portner's account the truth of (25) is compatible with the truth of (34):

(34)   Yesterday at 3p.m. Mary was walking into a collision with an oncoming bus.

The reason is that, though presumably the event of Mary's crossing is the same as the event of her walking into a collision with a bus, that event, relative to the property of walking into a collision with an oncoming bus, will select a modal base containing the proposition that yesterday at 3p.m. a bus was traveling down the street on a path to hit Mary. Thus, the best worlds among those in which the propositions of the modal base are true will be worlds in which she gets hit by the bus.

   Finally, the problem of non-interruptions posed by (26) (*Mary was swimming across the Channel*) is solved in the following way. In the first scenario we considered, Mary is a mediocre swimmer; she tries to swim across but sinks after one hour. In that case, the modal base will contain the proposition that she is unable to go on swimming for several hours. Thus, the worlds in which the propositions of the modal base are true that are best relative to the ordering source (which excludes interruptions) will be worlds in which she is not attacked by a shark, hit by lightning, or run over by a boat, but nonetheless worlds in which she does not get across. Thus, (26) is correctly predicted to be false in the first scenario. On the other hand, if she miraculously gets across, we must conclude that the modal base we assumed in the first scenario is in need of revision, since it contained the false proposition that she could not go on swimming for several hours. In view of the fact that she swam across, a revised modal base including the facts that are relevant to whether her swim across the Channel will be completed or not must

include the proposition that she is able to go on swimming for several hours. If so, the worlds in the modal base that are best with respect to the ordering source are those in which she swims across. Thus, (26) is correctly predicted to be true in the second scenario.

The lack of existence entailment is expected under Portner's account, since, for (10a) (*Mary was building a house*) to be true, a complete event of building a house must occur at the worlds of the modal base that are best relative to the ordering source (no interruptions), but the real world may not be among them if Mary is actually struck by lightning.

Prima facie, the substitutability of coreferential expressions in the scope of the progressive is not predicted by Portner's account. As we saw, both in Dowty's account and in Landman's account the validity of (8), repeated below as (35), follows from the condition that the worlds relevant for the evaluation of progressive sentences must be close to the real world as far as the removal of interruptions allows.

(35)   a.   Karl is directing *Don Giovanni*.
       b.   *Don Giovanni* is Mozart's *opera buffa* that premiered in Prague.
       c.   Thus, Karl is directing Mozart's *opera buffa* that premiered in Prague.

However, in Portner's analysis no requirement of closeness to the real world is present. What is required of the modal base for (35a) is that it contain true propositions that are relevant to whether Karl's directing of *Don Giovanni* is completed or not. Presumably, the fact that *Don Giovanni* is Mozart's *opera buffa* that premiered in Prague is not among them, even if (35b) is true. Thus, among the worlds in which the propositions of the modal base for (35a) are true there may be worlds in which *Don Giovanni* did not premiere in Prague. Since selecting those worlds that are best relative to an ordering source that bans interruptions does not eliminate these worlds, the set of worlds relevant for the truth of (35a) may also contains worlds in which *Don Giovanni* did not premiere in Prague. On the other hand, the worlds in the modal base for (35c) that are best relative to an ordering source that bans interruptions will only contain worlds in which Karl directs Mozart's *opera buffa* that premiered in Prague. Thus, (35c) is not a necessary consequence of (35a) and (35b).

Now, let's turn to (20) (*Leo is driving to a French town*), uttered at 3p.m. in the scenario in which Leo is driving toward the French border, but is still uncertain whether he wants to go to Nice, Lyon, or Aix. In Portner's theory, as in Landman's, (20) is in principle ambiguous between (31a) and (31b), repeated below as (36a) and (36b), with (36a) representing the notional reading:

(36)   a.   ∃e PROG(e, *being an event of Leo's driving to a French town*)
       b.   ∃e ∃x (*French town*(x) ∧ PROG(e, *being an event of Leo's
            driving to x*))

The modal base for (36a) will include the proposition that Leo has money to buy gas, that the car is working, that at 3p.m. he has not chosen to drive to Nice, or

to Lyon or to Aix, but he intends to drive to one of these towns, and so forth. Presumably, the ordering source for (36a) (the set of propositions that must be true for Leo's trip to a French town not to be interrupted) will include the proposition that Leo doesn't have a car accident, is not struck by lightning, and so forth. So, the set of worlds in which the propositions of the modal base are true that are best relative to the ordering source will include worlds in which Leo drives to Nice, worlds in which Leo drives to Lyon, and worlds in which Leo drives to Aix. Thus, (20), under the representation in (36a), may be true without it being true that there is a French town such that Leo is driving to it. So Portner's account correctly predicts that the notional reading of (20) is true.

What happens, however, if later on Leo decides to go to Nice and gets there? Recall that at 3p.m. he has not yet formed the intention of going to Nice. Does Portner predict that (32) (*Leo is driving to Nice*) is true at 3p.m.? Notice that, unlike for the case of Mary's crossing the Channel, the modal base assumed for (36a) in this scenario contains no false proposition (and the ordering source is still appropriate for (36a)), so a revision of the modal base is not required to get rid of false propositions. Yet a new relevant fact has emerged, namely that some time after 3p.m. Leo has chosen to drive to Nice. If this proposition enters the modal base and we keep the ordering source fixed (no interruptions), the best worlds relative to the ordering source in which the propositions of the revised modal base are true are worlds in which Leo drives to Nice. So, if we evaluate (32) relative to this modal base and ordering source, we should conclude that (32) is true at 3p.m., which seems incorrect, since at 3p.m. Leo has not yet formed the intention of driving to Nice.

One way out of this difficulty for Portner's theory is the following. Notice that, while we seem to speak falsely if we utter (32) (*Leo is driving to Nice*) at a time when Leo has not yet chosen where to drive, intuitions change if one utters (37) later on:

(37)   Leo was driving to Nice.

Indeed, if Leo chose to go to Nice in the end, both answers in (38) seem acceptable:

(38)   What was Leo doing at 3p.m.?
    a.   He was driving to a French town, but not to a particular French town, since he had not decided whether he would go to Lyon, to Nice, or to Aix.
    b.   He was driving to Nice, though he did not know it at the time.

If this is correct, then a natural thing to say, from the point of view of Portner's theory, is that the modal base for evaluating a progressive sentence *should only include facts that are accessible at the time of utterance*. Sentence (32) (*Leo is driving to Nice*) is false if uttered at 3p.m., because at 3p.m. Leo has made no decision about where to drive; thus it cannot be known where he intends to drive; so the modal base for (32) at 3p.m. does not include the proposition that some time after 3p.m. Leo chooses to drive to Nice. On the other hand, after Leo has chosen to drive to Nice, this fact is in principle accessible, so it becomes a candidate for entering the modal base of (37). For Portner, which accessible facts enter the modal base is to some extent context

dependent and it may reflect the point of view of the conversational participants. So the intuition that (38b) is true reflects the choice of the conversational partici- pants to assume that the relevant modal base contains the proposition that Leo has chosen to drive to Nice, while the intuition that (38a) is true reflects the choice to consider as relevant a modal base that does not contain this proposition.

To sum up, we have seen how different intensional approaches try to solve the Imperfective Paradox and account for the data presented in section 2.1. I'll come back to some of these issues in sections 2.5 and 3. I now turn to the evidence against the intensionality of the progressive.

2.3   Evidence against the intensionality of the progressive

As we pointed out at the beginning of section 2.2, the intensional accounts of the progressive all claim that ⌜x is F-ing⌝ is true iff the corresponding nonprogressive sentence is true at every/some world in a selected set. Under the assumption that the selected set is non-empty, one consequence, as Gendler Szabó (2008) phrases it, is that "nothing is happening unless it can eventually happen." As we saw, this is why Dowty's account (and also the other accounts I presented) can explain why (24) (?? *John is squaring the circle*) can never be asserted truly.

Gendler Szabó, however, points out some facts that make this consequence, and thus any intensional account of the progressive, problematic. First, consider the case of George, who has only a few months to live because of an incurable heart disease and ends up dying because of a gunshot (the example is adapted from Higginbotham 2004). While he is at the hospital after he gets shot, (39a) is true, but (39b) false, contrary to what the intensional accounts lead us to expect:

(39)   a.   George is dying from a gunshot and heart disease.
       b.   George can die from a gunshot and heart disease.

Then, consider the case of Antoni, an architect working on a cathedral, who realizes that it won't be finished within his lifetime, although others will continue his work. In this case, (40a) is true, but (40b) false, again contrary to what the intensional accounts lead us to to expect:

(40)   a.   Antoni is building the cathedral.
       b.   Antoni can build the cathedral.

Finally, consider the case of Frank, a bright nine-year-old who decides he wants to enumerate the primes. He starts with 2, then 3, then 5 … . According to Gendler Szabó, (41) is a natural way of reporting Frank's activity, contrary to what the inten- sional accounts predict (similar examples are also proposed by Wulf 2009):

(41)   Frank is enumerating the primes.

Gendler Szabó does not regard these counterexamples as conclusive, but suggests that they undermine the motivation for intensional accounts of the progressive and warrant the search for alternative extensional accounts.

Another problem for the intensional accounts is raised by Wulf (2009) in relation to *unless*-clauses. According to Declerck and Reed's (2000) semantics for *unless*-clauses, ⌜P unless Q⌝ is true (in the non-irrealis interpretation) iff if ⌜not-Q⌝, then P and if Q, then ⌜not-P⌝ (where the conditionals are understood indicatively). Now, suppose Shannon is mixing ingredients to make a pumpkin pie, but her neighbor often shows up unexpectedly and pulls her away to play bridge. According to Wulf, one may report this case by uttering (42):[3]

(42)　Shannon is making a pumpkin pie, unless her neighbor pulls her away (again) to play bridge.

Then, if Shannon's neighbor pulls her away to play bridge, we should conclude, by Declerck and Reed's semantics, that (43) is false:

(43)　Shannon is making a pumpkin pie.

The problem is that the intensional accounts predict that (43) is true in the situation described, since they are designed to make progressive sentences true despite the existence of interruptions.

2.4　Extensional accounts of the progressive

Suppose that, in view of the above evidence, we decide that the progressive is not intensional. How can we treat the progressive extensionally and solve the Imperfective Paradox? In the next sections, I briefly outline the main extensional proposals for the semantics of the progressive.

2.4.1　Parsons' account

The mother of all extensional accounts of the progressive is Parsons' (1989; 1990). Parsons' solution to the Imperfective Paradox is this:

> It is possible that ⌜x was F-ing⌝ is true and yet there is no time at which ⌜x F-ed⌝ is true because ⌜x was F-ing⌝ says that an event of x's F-ing *holds* at some past time, while ⌜x F-ed⌝ says that an event of x's F-ing *culminates* at some past time.

More precisely, according to Parsons, (1a) (*Mozart was finishing the Requiem*) and (1b) (*Mozart finished the Requiem*) have logical forms (44a) and (44b), respectively (ignoring tense):

(44)　a.　$\exists e \exists t \, (finishing(e) \wedge Agent(e, Mozart) \wedge Theme(e, the\ Requiem) \wedge Hold(e, t))$
　　　　b.　$\exists e \exists t \, (finishing(e) \wedge Agent(e, Mozart) \wedge Theme(e, the\ Requiem) \wedge Cul(e, t))$

The relations *culminate* and *hold* (expressed by the predicates *Cul* and *Hold*) are illustrated by Parsons in this way: events of building a house, crossing the street, finishing the *Requiem* have a development portion, during which the building, the crossing, the finishing are going on, and, if all goes well, a culmination, when the house gets built, the street gets crossed, the *Requiem* gets finished. To say that events

of this sort hold at a time means that their development portions are in progress at that time; to say that they culminate at a time means that at that time the house gets built, the street gets crossed, and the *Requiem* gets finished. Some of these events hold, but never culminate (this happens when they get interrupted).

One immediate problem with this account is that, while it solves the Imperfective Paradox (since (44a) does not entail (44b)), it is not clear how it can capture the data that were mentioned in support of the intensional analysis of the progressive. Thus, if nothing more is said, the account predicts that (10a), repeated below as (45), entails (47), since (45) and (47) have the same logical form in (46):

(45)   Mary is building a house.

(46) $\exists e \exists t \exists x (building(e) \wedge house(x) \wedge Agent(e, Mary) \wedge Theme(e, x) \wedge Hold(e, t))$

(47)   There is a house and Mary is building it.

For the same reason, it also incorrectly predicts that (12) (*They were picking out a pumpkin*) entails (48) and (14) (*Leo was driving to a French town*) entails (49):

(48)   There is a pumpkin they were picking out.

(49)   There is a French town Leo was driving to.

We have already seen that Parsons defends the entailment from (45) to (47), and we have also seen that the defense is problematic, among other things because appeal to unfinished objects does not help explain why (12) fails to entail (48) and (14) fails to entail (49).

So the question is, what more could one say to account for these facts? Different options have been explored by Forbes (2006a) and Gendler Szabó (2008).

2.4.2   Forbes' account

Zucchi (1999) suggests that a possible way out of the difficulties raised for Parsons' proposal by creation verbs is to assume that creation verbs themselves are intensional and that they are distinguished from prototypical intensional verbs since they obey a principle by which, if the event they describe culminates, their object comes into existence. A proposal along similar lines has been adopted by Forbes, who claims that the logical form of (10a) (*Mary is building a house*) is not (46), but (50):

(50) $\exists e \exists t (building(e) \wedge Agent(e, Mary) \wedge Char(a\ house, e) \wedge Hold((inprogress(e)), t))$

Forbes reads (50) as "Mary is the agent of a building event characterized by the property of being a property of a house" or, more informally, as "Mary is the agent of an event classifiable as a-house-building." *Char* in (50) expresses a relation that marks the object of intensional transitive verbs. As I understand it, a postulate for *Char* guarantees that this relation holds of an event *e* and the property of being a

property of a house iff necessarily, for every course of events $\vec{e}$ of which e is part and that makes e culminate, there is an e' that is part of $\vec{e}$ that is a coming into existence such that there is a house that is the theme of e'.[4]

A similar story may be told for (12) (*They were picking out a pumpkin*) and (14) (*Leo was driving to a French town*): their logical forms assert not that the *Theme* relation holds between a choosing event and a particular pumpkin or between a driving event and a particular French town, but that the *Char* relation holds between a choosing event and the property of being a property of a pumpkin and between a driving event and the property of being a property of a French town.

2.4.3 Gendler Szabó's account

Gendler Szabó's main objection to Forbes' account is that, unlike what (50) predicts, progressive sentences with verbs of creation do not create existentially neutral contexts. The oddness of (18) (?? *Mary is building a house, though no particular house*), according to Gendler Szabó, indicates that an existential entailment is present. Further evidence for his claim is the following contrast:

(51)   a.   I am seeking a house.
      b.   ?? Oh yeah? Where is it?

(52)   a.   I am building a house.
      b.   Oh yeah? Where is it?

The fact that reply (52b), unlike reply (51b) (under the notional reading), is acceptable indicates that (52a) entails that there is some particular thing at a particular place that I am building.

Finally, evidence for this conclusion is also given by the fact that, if I began searching for a house last October and now I have found it, I cannot point at it and say (53a), while if I began building a house last October and now I have finished it, I can point at it and say (53b):

(53)   a.   ?? *This* is what I have been seeking since last October.
      b.   *This* is what I have been building since last October.

On the basis of these observations, Gendler Szabó proposes the following logical forms for (10a) (*Mary was building a house*) and (10b) (*Mary built a house*) (ignoring tense):

(54) $\exists e((IP(building))(e) \land Agent(e, Mary) \land \exists x ((IP(house))(x) \land Theme(e, x)))$
      (There is a building in progress by Mary of a house in progress.)

(55) $\exists e((IP(building))(e) \land Agent(e, Mary) \land \exists x ((IP(house))(x) \land Theme(e, x)) \land$
      $\exists s(being\ built(s) \land \exists y (house(y) \land Theme(s, y) \land CAUSE(e, s))))$
      (There is a building in progress by Mary of a house in progress and it causally led to a state of a house being built.)

While (54) fails to entail (55), (54) entails the existence of something, a house in progress (which need not be a house). This accounts for the oddness of the *no particular* rider in (18), the intelligibility of the question about location in (52b), and the availability of demonstrative reference in (53b).

One thing that remains to be explained is Landman's example in (11) (*God was creating the unicorn when he changed his mind*), which seems to entail that nothing comes into existence as a consequence of the creation activity. Another is the examples in (14) (*Leo was driving to a French town*) and (12) (*They were picking out a pumpkin*), which display failure of existence though they do not contain verbs of creation.

Gendler Szabó's claim is that (11) is not appropriate in the situation Landman describes. What would be appropriate is (56):

(56)   God was about to create the unicorn when he changed his mind.

As for (14) and (12), failure of existence entailments is attributed to the presence of an intensional context, but the intensionality, according to Gendler Szabó, comes not from the progressive, but from the verbs *drive to* and *pick out*. Thus, for instance, (14) has the following logical form, where *To* expresses a relation between an event *e* and the property of being a property of a French town:

(57) $\exists e((IP(driving))(e) \wedge Agent(e, Leo) \wedge To(e, a\ French\ town))$

The fact that perfective sentence (15) (*Leo drove to a French town*) entails that there is a French town Leo drove to depends on the fact that in the biclausal structure introduced by the perfective, the existentially quantified NP *a French town* also occurs in an extensional context:

(58) $\exists e((IP(driving))(e) \wedge Agent(e, Leo) \wedge To(e, a\ French\ town) \wedge \exists s(being(s) \wedge$
       $\exists y(French\ town(y) \wedge Theme(s, y) \wedge CAUSE(e, s))))$

2.5   Is the best account of the progressive intensional or extensional?

In this section, I'll present some (non-neutral) considerations bearing on the choice between intensional and extensional semantics for the progressive.

As we have seen, Gendler Szabó adopts a mixed approach to deal with the lack of existence entailments of progressive sentences. On the one hand, he challenges the view that creation verbs in the progressive lack these entailments by claiming that, if an agent is building a house, there is something that he is building, although this something is not a house, but a house in progress. On the other hand, for verbs like *drive to* and *pick out*, he suggests that failure of existential entailments in the progressive is real and is due to their being intensional verbs.

However, the evidence he gives for the claim that creation verbs in the progressive are not existentially neutral may be challenged. If our considerations in section 2.2.1 are correct, the oddness of *no particular* riders should not be taken as an indicator of existential entailment. As Mayerhofer (2014) points out, moreover, the question *where is it?* in (52b) may be understood as asking about the site where the house is being built (if I am house searching, on the other hand, I am normally

not searching for a house at a particular location, which explains why (51b) is odd). As for the availability of demonstrative reference in (53b), it is not obvious that *This* refers to an object. As Mayerhofer observes, it could refer to a property or a kind of object, as in *This is what I was looking for* when I find a hat that I particularly like, even though it would be false to say that I was looking for that object.

Moreover, Gendler Szabó's proposal is problematic on at least two counts. First, his way of dealing with creation verbs makes incorrect predictions with cardinally quantified objects (the observation is due to Mayerhofer). Suppose John plans on building five houses, has bought the material, and is in the middle of building the third. In this case, (59) is true:

(59)   John is building five houses.

Gendler Szabó is committed to saying that there are five objects each of which is a house in progress. But this seems implausible.

Second, if *drive to* is intensional, we should expect that Leo's wish in (60) be satisfied in a state of affairs in which there is no French town such that Leo drives to it, but this is not the case (compare (60) with (61), by which Leo's wish is satisfied if such a state of affairs obtains):

(60)   Leo wants to drive to a French town.

(61)   Leo wants to be driving to a French town.

A similar problem also arises for Forbes' account, since failure of the existence entailment for Forbes is also dependent on the intensionality of the verb. The conclusion is that the extensional accounts that we have seen run into trouble with explaining the apparent intensional properties of the progressive.

Intensional accounts, on the other hand, face the problem of dealing with the evidence against them presented in section 2.3. How could they cope with it?

In relation to the cases of Antoni's building a cathedral and of George dying from a gunshot and heart disease, Gendler Szabó himself agrees that they do not conclusively show that modal accounts are flawed. As Mayerhofer points out, if Antoni is working by himself, he cannot build a cathedral and it seems also false that he is building a cathedral. What makes the example a plausible case of Antoni's building a cathedral is the supposition that he is working together with others and thus he does after all have a chance to be building a cathedral, in which case it is also true that he can.

As for the case of George, who is dying of a gunshot and heart disease, one possibility, mentioned by Gendler Szabó, is that (39a) (*George is dying from a gunshot and heart disease*), unlike (39b) (*George can die from a gunshot and heart disease*), is interpreted as a clausal conjunction, which does not require the impossible feat of dying of a gunshot and heart disease in the same world (though this leaves the question open: why can't (39b) be interpreted as a clausal conjunction as well?). The claim that little Frank is enumerating the primes might prompt the reply: "He is not really enumerating the primes, he is only *trying* to do that!"

Finally, let's return to Wulf's claim that (42) (repeated below as (62)) entails that (43) (repeated as (63)) is false, if Shannon's neighbor pulls her away, while intensional accounts are designed to make (63) true in this case:

(62)   Shannon is making a pumpkin pie, unless her neighbor pulls her away (again) to play bridge.

(63)   Shannon is making a pumpkin pie.

Mayerhofer objects that *P unless Q* and *Q* do not entail *not-P*, contrary to what Declerck and Reed claim. Indeed, suppose I say (64):

(64)   I'll come, unless Gianni comes.

Clearly, if it is false that Gianni comes, I am committed to come. However, I could follow my utterance of (64) by saying: "Now, if Gianni comes, I have to think about what I'll do, it depends on who else will come." If this follow-up is appropriate, (64) and the fact that Gianni comes do not entail that I won't come. Yet this observation only shows that the truth of *Shannon's neighbor pulls her away* and of (62) is compatible with both the truth and the falsity of (63). However, if Wulf is right, intensional accounts predict that (63) should be true if (62) and *Shannon's neighbor pulls her away* are. In fact, I don't think they do. One possible reply to Wulf is that the presence of the *unless*-clause signals that the possible interruption it describes is not to be disregarded; namely, it signals that the truth of the progressive sentence is conditional on the falsity of the *unless*-clause, as in (65):

(65)   If her neighbor does not pull her away (again) to play bridge, Shannon is making a pumpkin pie.

Sentence (65) requires (63) to be true in the closest world in which her neighbor does not pull her away. In Portner's account, for example, this means that the modal base for (62) must contain both real-world facts relevant to whether Shannon's pie making can be completed and the proposition that Shannon's neighbor does not pull her away. If the best worlds relative to this modal base are worlds in which Shannon makes a pumpkin pie, then (65) is true. Of course, one may ask why one should bother uttering (62) or (65), instead of simply uttering (63). But this may be precisely because, given that Shannon's neighbor often interrupts her, it is not clear that the circumstances relevant to whether Shannon's pie making can be completed make it plausible to assert that she *is* making a pie.

3   The context dependence of the progressive

Suppose Leo is flying to London, but his plane gets hijacked and he ends up in Havana (the example is by R. Schwarzschild). Now let's ask: what was going on before the plane was hijacked? One possible answer is that (66a) is true, although

Leo didn't know he was flying to Havana. However, another possible answer is that (66b) is true:

(66) a. Leo was flying to Havana.
      b. Leo was flying to London.

The same observation may be made for the case in which Mary, miraculously, swims across the Channel. According to Landman, both (26) (*Mary was swimming across the Channel*) and (67) below are possible answers to the question: what was Mary doing before the miracle happened?

(67) Mary was sinking.

We have seen that Landman's theory captures the possibility of uttering (26) and (66a) truthfully, since in the real world Mary's swimming before the miracle is a stage of an event of crossing the Channel, and Leo's flight before the hijacking is a stage of an event of flying to Havana. So how should we account for the truth of (66b) and (67)? Landman's answer is that it is a context-dependent matter what is a stage of what. One might take a different perspective on Leo's flight before the hijacking and regard it as a stage of a possible complete event of flying to London and not as a stage of a real-world, complete event of flying to Havana. This would make it possible to utter (66b) truthfully. A similar story may be told for (67).

Let's pursue this way of locating the context dependence of the progressive a bit. Higginbotham (2004) points out that, while (66a) and (66b) can both be asserted truthfully in the situation described, their conjunction in (68) cannot:

(68) Leo was flying to London and (Leo was flying) to Havana.

Consider, on the other hand, the following case proposed by Higginbotham. V is a vandal who wishes to destroy B, a book in the Bodleian Library in Oxford, by ripping out one page a day. The book is also crumbling to dust because the pages are rapidly oxidizing. In this case, (69) is truthfully assertible since its conjuncts are:

(69) V is destroying B and the oxidation of its pages is destroying B.

If we allow different perspectives on what is a stage of what, we should expect that both (68) and (69) be truthfully assertible. So why is there a contrast? Perhaps the reason why we cannot assert (68) truthfully is that, in order to do so, we need to change perspective from one conjunct to the other. The pragmatic principle in (70) may thus account for (68):

(70) In interpreting a conjunction, one should not assume incompatible perspectives on the conjuncts (without signaling it overtly).

But then, why is (69) truthfully assertible? Higginbotham takes this fact as a reason against appealing to (70) in accounting for (68). The following considerations may, however, suggest that perhaps this conclusion is too hasty. In the context described

by Higginbotham for (69) both oxidation and the vandal are contributing to the book's destruction. Indeed, even if in the end the last pages are destroyed by oxidation or by the vandal, when the book's destruction is completed it seems that we may assert (71):

(71)   B was destroyed by V and (B was also destroyed) by oxidation.

In other words, to the extent that (69) is assertible, (71) also is. This means that (69) is not a case of progressive with incompatible outcomes. In Landman's terms, in the situation described, there is a process in the real world, which consists of the vandal's tearing out the pages and oxidation's making them crumble, which supports the truth of both conjuncts. Under this proposal, (69), unlike (68), does not require a shift of context in order to be assertible.

   This account, however, leaves a problem open since, as we saw, conjunction (39a) (*George is dying from a gunshot and heart disease*) is truthfully assertible, although in the scenario described by Gendler Szabó George ends up dying of a gunshot and not of heart disease. Higginbotham suggests that the reason why (39a) and (69) are assertible but (68) is not is that (39a) and (69) describe causally independent processes, while the processes described by (68) interfere with each other. Let's leave open the issue of how exactly this observation may be turned into a full-fledged account of the conjunction facts.

   Now, let's come back again to (20) (*Leo is driving to a French town*), uttered in the familiar scenario in which at 3p.m. Leo has not chosen his destination yet, and only later on decides to drive to Nice and gets there. We have observed that in this case (20) is true at 3p.m. under the notional reading and false under the relational reading, but Landman's theory fails to account for this intuition, since Leo's driving at 3p.m. is a stage of a trip to Nice in the real world.

   How could Landman cope with this problem? As we saw in section 2.2.2, giving up the uniqueness assumption (given an event stage e in w there is at most one world closest to w at which e continues) and modifying the semantics of the progressive accordingly is not sufficient to overcome the difficulty: the revised account still predicts that (32) (*Leo is driving to Nice*) is true at 3p.m. and so is (20) under the relational reading. One way out for Landman is to bite the bullet and say that, if Leo ends up in Nice, then (20) is true at 3p.m. and it seems false only because *it is not assertible* at 3p.m., given that at 3p.m. one lacks the information that Leo will end up in Nice.[5]

   Could we try to account for the notional reading of (32) by appealing to the context-dependent character of the notion event stage? If (20) is uttered at 3p.m., the fact that Leo ends up in Nice later on is not accessible to us; thus one might claim that the relevant perspective is one by which the event e of Leo's driving at 3p.m. is a stage of different complete events in different worlds: an event of driving to Nice in one world, an event of driving to Lyon in another world, and an event of driving to Aix in yet another world. Under this perspective, we should proceed as follows in building the continuation branches. We follow the development of e in the real world until we reach the stage f at which Leo chooses a destination. At this

point we should say: f continues in the real world w_r as a stage of an event of driving to that destination, but f stops in w_r as a stage of an event of driving to the other contextually available destinations and continues in other worlds. In the end, we obtain three branches, one in which Leo ends up in Lyon, one in which he ends up in Nice, and one in which he ends up in Aix. So (20) is true at 3p.m. in the notional reading under this perspective. Notice, however, that this strategy (assuming that it can be stated coherently) involves a radical departure from Landman's procedure: we can no longer say that an event stage stops in a world or continues in a world; we have to say that it stops in a world as an event of φ-ing or continues in a world as an event of φ-ing. So appealing to the context-dependent character of the notion of event stage to account for notional readings is not a natural option in Landman's theory.

Portner's account, as we saw, also makes the progressive context dependent: a locus of the context dependence is the modal base, the set of facts relevant to whether the process is completed or not. We saw how the context dependence of the modal base may play a role in accounting for the Bonomi (1997) example in section 2.1 (the account may also be extended to the Schwarzschild example at the beginning of this section). In particular, according to Portner (1998, 774), the modal base "is contextually determined, based on the actual facts of the matter at hand in combination with the knowledge and interests of the speaker and hearer." If this is correct, one expects that the truth of progressive sentences should depend on the same factors (actual facts plus the knowledge and interests of the speaker and hearer). Portner argues that our intuitions bear this out. Consider sentence (72), uttered when the coin is still up in the air (the example is from Dowty 1977 and was suggested by R. Thomason):

(72)   The coin is landing heads.

Suppose the coin eventually lands heads. Is (72) true or false when the coin is still up in the air? Portner's answer is that it depends on the kind of information the modal base contains. If the modal base contains information about the physical facts that are at stake and they entail that the coin will land heads, then (72) will be true relative to that modal base. If the modal base lacks this information and contains only the information that can be gathered by watching the coin spin in the air, (72) will be false relative to that modal base. In an absolute sense, neither modal base is the right one; which one is appropriate depends on the type of communicative exchange of which the utterance of (72) is part: in a conversation among Newtonian physicists the former modal base may be appropriate, while in a conversation among gamblers the latter may be appropriate.

It is not clear, however, that the truth value of (72) displays this kind of contextual variability. After the coin has landed heads, one can utter (73) truthfully, but it seems odd to utter (74):

(73)   The coin was landing heads, though we did not know it at the time.

(74)   The coin was not landing heads, since from what we observed it could also have landed tails.

Portner may reply that, once one learns that the coin has landed heads, this fact must enter the modal base, and thus the modal base that was making (72) false is no longer an option. Yet requiring that, once a relevant fact is learnt, it must enter the modal base would have the undesired effect of making answer (75a) (formerly (38a)) false once one has learnt that Leo ended up in Nice:

(75)   What was Leo doing at 3p.m.?
       a.   He was driving to a French town, but not to a particular French town, since he had not decided whether he would go to Lyon, to Nice, or to Aix.

Moreover, Portner's way of dealing with (72) suggests that the truth value of (72) may depend on what the conversational participants know about the physical facts that are at stake: the gamblers are ignorant of what the relevant physical facts are; thus a modal base that does not include these facts, and makes (72) false, is appropriate. But suppose that the coin is loaded to land heads and the gamblers are not aware of this fact. It seems that, if one of them utters a denial of (72), what she says is false. Yet this is not the case, according to Portner. If these observations are correct, the choice of the modal base may be less context dependent and more constrained than Portner suggests.

4   Other proposals

In my discussion, I focused on the issues of the intensionality of the progressive and its context dependence. My goal was not to provide a complete overview of the proposed solutions to the Imperfective Paradox; rather the choice of proposals was oriented by the points I wanted to raise about intensionality and context dependence. As a consequence, several accounts of the Imperfective Paradox were ignored, although they may contain valuable insights, among them Vlach (1981), Hinrichs (1983), Cooper (1985), Link (1987), ter Meulen (1987), Kearns (1991), Lascarides (1991), Asher (1992), Glasbey (1996), Nauman and Piñón (1997), Hamm and van Lambalgen (2003), and van Lambalgen and Hamm (2005). For reasons of space, I cannot discuss them all here (Landman's paper, however, contains a discussion of the ideas underlying some of these proposals). What I'll do instead is describe two general ideas underlying some of these accounts and briefly follow one of their implementations.

   One idea is that the inference from (76a) to (76b) below is a *non-monotonic inference* on a par with the one from (77a) and (77b) to (77c); that is, both are reasonable inferences that may be withdrawn in the presence of more specific information (like the information that a bus is about to hit Mary or that Tweety is a penguin and penguins don't fly):

(76) a. Mary is crossing the street.
      b. Mary will get to the other side.

(77) a. Tweety is a bird.
      b. Birds fly.
      c. Tweety flies.

Asher (1992) proposes a way of capturing defeasible inferences of the kind in (76). His truth conditions for the progressive may be stated informally as follows (where a perspective on an in-progress state s relative to a world w is a proposition that identifies a subset of the properties of s in w):

> PROG(φ)(s) is true just in case there is a perspective π such that in all the worlds in which s is *normal* with respect to the properties attributed to s in π, there is an event e cotemporaneous or later than s such that $\varphi(e)$. (1992, 486)

To illustrate how these truth conditions work, consider the problem of interruptions exemplified by (25), repeated here as (78):

(78) Yesterday at 3p.m. Mary was crossing the street when the bus hit her.

Asher's truth conditions allow for (78) to be true since, given that Mary is unaware of the bus, according to her perspective the in-progress state s in which she is a participant includes no buses coming down the street. So the normal worlds relative to her perspective on s are worlds in which there is a (complete) crossing. Unlike in Dowty's proposal, where the truth of a progressive sentence requires its nonprogressive counterpart to be true at worlds in which nothing unexpected happens after the time of evaluation (the inertia worlds), in Asher's account the nonprogressive sentence must be true at a set of worlds that are normal relative to some perspective among those that are contextually admitted. And normal worlds relative to a perspective, as we just saw, may not be inertia worlds.
  Asher's semantics is constructed to validate schema (79) below, where the truth conditions of ⌜if φ, then typically ψ⌝ are given in (80) (see Asher's 1992 paper for the constraints on perspectives and normality that allow the derivation of the result):

(79) If x is F-ing, then typically there is an event later or cotemporaneous with s where x F-s.

(80) ⌜if φ, then typically ψ⌝ is true at w iff the set of normal worlds, relative to w and the proposition expressed by φ, is a subset of the set of ψ worlds.

While, as we have seen, the appeal to perspectives in order to analyze the meaning of the progressive is not new, one feature of Asher's semantics that distinguishes it from other intensional accounts is that it makes (81) valid simply by virtue of the meaning of the progressive and the meaning of conditionals of the form ⌜if φ, then typically ψ⌝:

(81)   If one is crossing the street, then typically one gets across, eventually.

One objection to Asher's account is that instance (82) of schema (79) seems false, while (83) seems true:

(82)   If one is crossing a minefield, then typically one gets across eventually.

(83)   If one is crossing a minefield, then typically one doesn't get across eventually (typically one gets blown up eventually).

Asher's reply, as I understand it, is the following. Sentences (82) and (83) are ambiguous: in one reading the indefinite description *a minefield* has narrow scope relative to PROG, while in the other reading it has wide scope. In the wide scope reading, Asher argues, the set of normal worlds in which the antecedent is true is non-empty (since there is a perspective on the in-progress state s of the agent by which the theme of s is not assumed to be a minefield) and the agent gets across in these worlds. Thus, in the wide scope reading (82) is non-vacuously true (and (83) is false). In the narrow scope reading, on the other hand, the set of normal worlds in which the antecedent is true is empty (since in any perspective on the in-progress state s of the agent the theme of s is a minefield); thus (82) is vacuously true (and so is (83)).

   This reply raises some questions. Notice that by Asher's semantics, (82) and (83) are not contradictory; they are incompatible only under the assumption that the set of normal worlds in which the antecedent is true is non-empty (if there is a normal world in which the antecedent is true, it cannot belong both to a set and to its complement). So why do (82) and (83) feel contradictory? One possible answer is that they appear to be contradictory because speakers implicitly discard the reading that makes them both vacuously true. If so, however, speakers are implicitly considering only the reading that, according to Asher, makes (82) true and (83) false. So why does (82) seem false, and (83) true? Why are we inclined to accept (81) and reluctant to accept (82)? The intuitions about instances of (79) are the evidential basis for the claim that the semantics for the progressive should validate (79), so it is important that a satisfactory answer be given to these questions. An alternative proposal to capture the defeasible inference from (76a) (*Mary is crossing the street*) to (76b) (*Mary will get to the other side*) that allows for (82) to be false is presented in Hamm and van Lambalgen (2003) and van Lambalgen and Hamm (2005).

   Another idea mentioned in some of the works cited above is that a solution to the Imperfective Paradox may be achieved by considering the aspect shift induced by the progressive. Moens and Steedman (1988) make the following suggestion:

   the fact that … progressives coerce their input to be a process, so that any associated culmination is stripped away and no longer contributes to truth conditions, provides a resolution of the "imperfective paradox" (Dowty 1979), without appealing to theory-external constructs like "inertia worlds." (1988, 3)

A semantics for the progressive based on this idea is proposed by Lascarides (1991). In her proposal, the progressive requires a process proposition as input, so it cannot apply directly to the sentence *Mary cross the street*, which expresses an event proposition. The grammar of English, however, provides the complex operator PR_p, which applies to a sentence denoting an event proposition and yields a sentence denoting a process proposition. Thus, (76a) (*Mary is crossing the street*) is translated as (84):

(84) PROG(PR_p(cross(Mary, the street)))

Roughly, formula (84) is true in a model relative to a world–time pair $<w, t>$ iff the context provides a process proposition p that (a) is true in w at some interval properly including t and such that (b) whenever Mary succeeds in crossing the street in a world w' at a time t', p is true at w' right before t' (p is true at an interval t'' whose final bound is t'). Thus, (76a) fails to entail (76b) (*Mary will get to the other side*), since the truth at $<w, t>$ of the contextually provided proposition p that describes the preparatory process of the crossing does not require that Mary gets across the street at a time later than t in w.

   In Lascarides' semantics, as we have just seen, the process described by a progressive sentence is not characterized in terms of its eventual outcome in worlds in which it is not interrupted. This avoids the problem of interruptions Dowty's account runs into. It may be objected, however, that this is done at the cost of virtually letting any process count as one that might support the truth of a progressive sentence. Consider (85):

(85) Augustine is drinking a cup of coffee.

Clearly, if (85) and (76a) (*Mary is crossing the street*) are true, they must be true in virtue of different processes taking place. Yet in Lascarides' semantics nothing prevents the existence of a model in which (76a) is true in virtue of the fact that p in (84) is assigned a proposition describing a process of Augustine's drinking a cup of coffee (for example, a model in which all the worlds are such that whenever Mary crosses the street Augustine drinks his cup and vice versa).

   Lascarides may reply that no sensible context would assign to the parameter p in (84) a proposition that describes a process of Augustine's drinking his cup. This means, however, that the problem of characterizing the process described by a progressive sentence is moved to a *pre-semantic* level: once the context provides a reasonable characterization of the process of Mary's crossing the street (i.e., a suitable assignment to the process parameter p in (84)), the theory provides reasonable truth conditions for (76a). While one may sympathize with this deflationary strategy (as we have seen, any account of the progressive must recognize that the context plays a role in determining what counts as the process corresponding to a given event), Lascarides' account fails to capture some apparently valid inferences that hold in virtue of the progressive's meaning, for example the fact that whenever a sentence of the form ⌜x is F-ing⌝ is true, ⌜x is a participant in a F-ing process⌝

is also true. If this is indeed a valid inference schema, it seems that the propositions assigned to the process parameter in the translations of progressive sentences need to be constrained more than they are in Lascarides' account.

Finally, one familiar problem for accounts resorting to coercion also arises for Lascarides. According to her account, in the case of sentences denoting event propositions, a suitable input for the progressive operator can be delivered because the grammar provides the operator PR_p that allows us to build the process proposition corresponding (in context) to an event proposition. If so, why can't the same strategy apply to make (86) mean that a street-crossing process went on for a minute?

(86)   ?? Mary crossed the street for a minute.

It seems that, in order avoid semantic overgeneration, one needs to assume that it is the progressive morphology itself that turns an event predicate into a process predicate, an assumption that makes Lascarides' proposal closer to other accounts of the progressive we have seen here.

Notes

1. I adopt the terms "notional" and "relational" instead of the more common "intensional" and "extensional," since I am using "intensional predicate" to refer to a predicate class for which the presence of relational/notional ambiguities is only one of the characterizing properties.
2. Portner shares Asher's (1992) and Varasdi's (2014) view that which worlds are relevant for evaluating the progressive depends on the perspective taken.
3. To some speakers (42) feels unnatural. Although I share the same feeling concerning its Italian counterpart (*Sandro sta facendo una torta di patate, salvo che il suo vicino lo porti via di nuovo a giocare a scopa*), I'll assume that Wulf's judgment is acceptable for the purpose of this discussion.
4. For verbs of creation, Forbes (2006a) is not explicit about which relation must hold between e and $\vec{e}$ (in addition to e's being part of $\vec{e}$), nor does he provide an explicit sortal to characterize the event e' that has an object as a theme. I assume that a reasonable choice is to characterize e' as a coming into existence and $\vec{e}$ as a course of events that leads to the culmination of e.
5. This option fits less naturally in Portner's account (which is why I did not consider it in section 2.2.3), since according to Portner the truth of progressive sentences is to some extent dependent on the epistemic state of the conversational participants. I come back to this point at the end of this section.

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