



- Yet, we treat ‘Imperfect’ uniformly as morpho spell-out of IMPF.
- **Counterfactuals** involve both IMPF and FUT, both visible in French *conditionnel* (Iatridou 2000).
- IMPF makes a modal contribution (responsible for ‘ongoingness’) AND *presupposes* anteriority and framing hallmarks of the Imperfect (Giorgi&Pianesi 2004)
- Crucially, IMPF quantifies **vacuously** in counterfactuals (a consequence of stacking modals under Hacquard’s (2006) event-relative modality). **BUT:**
- Past + framing *presuppositions remain*, triggering *counterfactual* nature of conditionals with imperfect (Iatridou 2000, Condoravdi 2001, Ippolito 2003, Arregui 2005).

### The plan:

1. Hallmarks of the Imperfect in Romance
2. A Semantics of IMPF
3. The Imperfect and Counterfactuality

### 1. Hallmarks of the Imperfect in Romance

- **Anteriority:** prog/hab/gen uses (1a-c) require the event they describe to occur in the past.
  - **Ongoingness/homogeneity:** Prog (2a) and hab/gen (2b) uses require the event/habit they describe to go on in time: Paul’s piano playing is taken to last throughout an interval surrounding M’s arrival in (2a); his piano playing habit throughout an interval surrounding ‘those days’:
- (2)
- a. Quand Marie est arrivée, Paul jouait du piano.  
When Marie arrived-pfv, Paul played-**impf** of the piano  
*‘When Marie came in, Paul was playing the piano’*
  - b. A l’époque, Paul jouait du piano.  
In those days, Paul played-**impf** of the piano.  
*‘In those days, Paul played the piano’ (habitually)’*
- **Framing:** Sentences with Imperfect weird out of the blue (a): require temporal adverbial (b), *when*-clause (c), quantificational adverb (d), or contextually salient time interval (e):
- (3)
- a. ?? Paul jouait du piano.  
*Paul played-impf the piano*
  - b. A cinq heures,  
*At 5 o’clock,* Paul jouait du piano.  
*Paul played-impf the piano*
  - c. Quand Marie est arrivée,  
*When Marie arrived,* Paul jouait du piano.  
*Paul played-impf the piano*
  - d. A chaque fois que Marie arrivait,  
*Every time Marie arrived,* Paul jouait du piano.  
*Paul played-impf the piano*
  - e. A: Que faisait Paul à 5 heures?  
*What was Paul doing at 5?* B: Il jouait du piano.  
*B: He played-impf the piano*

- **Modal quantification:**

**Progressive:** *Inertia worlds* (Dowty 1979), *Continuation branches* (Landman 1992), *Non interrupted circumstantial worlds* (Portner 1998)...

**Generics:** *Normal/ideal worlds* (Krifka et al. 1995)...

**Habituals:** *Normal/ideal worlds* (Krifka et al. 1995), *Non interrupted circumstantial worlds* (Ferreira 2005)...

**Counterfactuals:** *Similar worlds* (Lewis 1973, Stalnaker 1968, Arregui 2005...), *Metaphysical alternatives* (Condoravdi 2001...)

**Towards some unification:**

- Progressives and habituals involve same modal element (Cipria&Roberts 2000, Bonomi 1997, Lenci&Bertinetto 2000, Ferreira 2005).
- Habituals as special case of generics: differences in requirement for verifying instances (Krifka et al 1995 and references therein).

**However:** *Counterfactuals* seem to involve a different modal element altogether.

## 2. A Semantics for IMPF

We adopt a semantics for a single IMPF operator, responsible for prog/hab/generic readings, which includes the following ingredients:

<b>IMPF</b> =	Past +Framing Presuppositions (Giorgi&Pianesi 2004)	+	Ongoingness + modality modal quantification (Portner's 1998 Progressive)
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**NB:** we take Portner (1998)/Ferreira (2005) line, as its event-relativity allows a straightforward implementation for our analysis of counterfactuals.

### 2.1. Modal Quantification

- We assume ongoingness requirement of imperfect is modal quantification (cf. Dowty 1979, Landman 1992, Portner 1998, Zucchi 1999, Cipria & Roberts 2000).
  - We adopt Portner's (1998) quantification over best circumstantial worlds (best relative to the property of the event in progress), where no interruptions occur.
- (4)  $[[\text{IMPF}(e,P)]^{c-g}]$  is true at  $w$  iff for all worlds  $w'$  in  $\text{Best}(\text{Circ}, \text{NI}, e, P)$   
there is an event  $e'$  which includes  $e$  as a nonfinal subpart s.t.  $P(w')(e')=1$
- (5) (A 5 heures), Paul jouait du piano.  
(At 5pm), Paul was playing the piano.  
*There's a past event  $e$  s.t. in all best circumstantial worlds where Paul isn't interrupted, there is a superevent  $e'$  of  $e$  which is an event of Paul playing the piano.*

- Following Ferreira (2005), we extend Portner (1998) to habitual/generic<sup>1</sup> cases by invoking plural events:
- (6) (A l'époque), Paul jouait du piano.  
(In those days), Paul played the piano.  
*There's a past event  $e$  s.t. in all best circumstantial worlds where Paul isn't interrupted, there is a superevent  $e'$  of  $e$  which is a plurality of events of Paul playing the piano.*
- In both cases, we have an extensional element ( $e_{Ext}$ ), an event that occurs in the actual world, which is part of a larger, completed event or series of events in the modal worlds.

⇒ What is this extensional element  $e_{Ext}$ ?

- A (topical) event that needs to be made salient by the context (and can be viewed as a reformulation of an Austinian *topic*).
- This topical event is in turn responsible for the *framing* requirement of IMPF.

## 2.2. Anteriority and Framing Requirements as Presuppositions

- Denotation in (4) (being that of progressive) doesn't capture past time nor framing requirements of imperfect. We take those to be *presuppositions* (Giorgi & Pianesi 2004).

*Our intuition:* requirement for temporal framing comes from extensional component ( $e_{Ext}$ ) of IMPF truth-conditions.

- Following Giorgi & Pianesi (2004), we assume the event's run-time must be contained in a topical interval (TOP-TIME( $c$ )), which must precede the local evaluation time,  $t_0$ .

- (7)  $[[IMPF]]^{c,g}$  is defined iff :
- $t(e) \subseteq \text{TOP-TIME}(c)$  framing requirement
  - $\text{TOP-TIME}(c) < t_0$  anteriority requirement

If defined,  $[[IMPF]]^{c,g} = \lambda e \lambda P_{et} \forall w \in \text{Best}(\text{Circ}, \text{NI}, e, P) [\exists e' e < e' \ \& \ P(w)(e')=1]$ .

**NB:** IMPF's denotation makes direct reference to event argument that serves both for presups and modal ordering (in line with Hacquard's 2006 event-relative modality; cf. section 3.1)

- (8)
- $$\begin{array}{c} \wedge \\ \lambda e_{Ext} \quad \forall w \in \text{Best}(\text{Circ}, \text{NI}, e, \lambda e. P_{\text{play\_piano}}(e)) [\exists e' e < e' \ \& \ P_{\text{play\_piano}}(w)(e')=1] \\ \wedge \quad \wedge \\ \text{IMPF} \quad e_{Ext} \quad \text{VP} \quad \lambda e. P_{\text{play\_piano}}(e) \\ \wedge \quad \wedge \\ \text{IMPF} \quad e_{Ext} \quad \text{Paul jouait du piano} \end{array}$$

<sup>1</sup> We take generics and habituals to involve the same operator. For special cases of generics that don't require verifying instances (e.g., *this machine crushes oranges*), we take the extensional element to be the *preparatory process*, i.e., a subpart of the event before culmination occurs, during which the preparations for its occurrence are completed (Moens & Steedman 1988, Cipria and Roberts 2000).

- (9)  $[[ (5) ]]^{c,g} = \text{defined iff there's a topical event } e \text{ contained in past topical interval.}$   
*If so, true iff in all best circumstantial worlds with least interruptions, e is a subevent of an event e' of P playing piano.*

**Framing requirement:** Given definedness conditions in (7), oddness of (3a) out of the blue results from *topic time* of context not being set.

**Anteriority requirement:** Similarly, if TOP-TIME(c) doesn't precede  $t_0$ : presupposition failure.

- (10) {Ce matin, \*Aujourd'hui}, Paul jouait du piano.  
 {this morning, \*today} Paul was playing the piano-impf  
*'This morning/\*Today, Paul was playing the piano.'*

### Setting the topic time:

- Temporal adjuncts and adverbs of quantification can all set the topic time<sup>2</sup> (by serving as temporal topics, shifting the evaluation time-- Giorgi&Pianesi 2004, or by successive update of the topical interval for adverbs).
  - As demonstrated in (3e) the framing adverb need not be syntactically present. Nor in fact need it be mentioned in the discourse, so long as it can be retrieved as lifetime of subject:
- (11) a. Les dinosaures mangiaient de la viande.  
 The dinosaurs eat-**impf** of the meat.  
*'Dinosaurs ate meat.'*
- b. ??Les femmes portaient des corsets.  
 Women wore-**impf** corsets.  
*'Women wore corsets.'*

### 3. The Imperfect and Counterfactuality

- Counterfactuals seem to lack imperfective hallmarks:
- (12) a. Si Paul arrivait demain, il rencontrerait Marie.  
 If Paul arrive-**impf** tomorrow, he met-**COND(fut+impf)** Marie  
*'If Paul arrived tomorrow, he would meet Marie.'*
- b. Si Paul écrivait a Marie, elle serait contente.  
 If Paul wrote-**impf** to Marie, she be happy-**COND(fut+impf)**  
*'If Paul wrote to Marie, she would be happy.'*

<sup>2</sup> Temporal adjuncts serve to set the topical temporal interval via a monstrous operator (cf. Bittner 2007):

(1)  $[[T-Adv XP]]^{c,g} = [[XP]]^{c',g}$ , where  $\text{time}(c') = [[T-Adv]]^{c,g}$ .  
 $[[T-Adv]]^{c,g} = \lambda P_{\chi}. 1$  iff  $P(\chi', t) = 1$  where  $\text{TOP-TIME}(\chi')$  determined by T-Adv &  $\chi'$  exactly  $\chi$  on other coordinates.

Putting (i) together with (7) yields the presupposition that  $t(e) \subseteq \text{TOP-TIME}(c)$ , which is now set to the time interval provided by temporal adverb. This is not the only possibility. We could pursue a dynamic approach, wherein IMPF is anaphoric to a salient past interval, either supplied by discourse or sentence-internally.

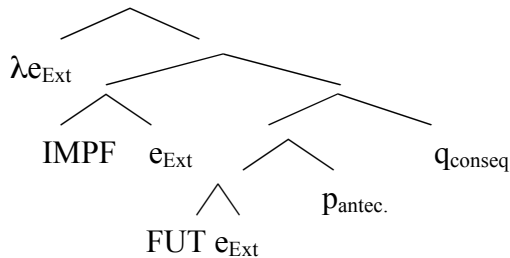


Now that we have both IMPF and FUT, how do we derive counterfactual meanings?

### Proposal in a nutshell:

- IMPF's modal element (which induces ongoingness with IMPF) is neutralized. Modal element at work in counterfactuals is FUT.
  - Neutralization via event-relative modality: IMPF & FUT relative to same event.

(16)



- Apart from IMPF, (16) amounts to a future *conditional*.
- What gives *conditionals* a *counterfactual* interpretation is ‘pastness’ (cf. Iatridou 2000, Condoravdi 2001, Ippolito 2003, Arregui 2005):

(17) If Paul marries Mary, he will move to New York.

(18) If Paul married Mary, he **would** move to New York.

- While IMPF's modal element is neutralized, its *presuppositions* of *past* & *framing* still enforced: *they* induce counterfactuality of the future conditional.

### 3.1. Basic Ingredients of Counterfactuality: IMPF and FUT

#### Assumptions:

- **IMPF** and **FUT** are event-relative modals:
  - Recall **IMPF**:

(19)  $[[\text{IMPF}]]^{c,g}$  defined iff  $t(e) \subseteq \text{TOP-TIME}(c) \ \& \ \text{TOP-TIME}(c) < t_0$ .

If defined,  $[[\text{IMPF}]]^{c,g} = \lambda e \lambda P_{et} \forall w \in \text{Best}(\text{Circ}, \text{NI}, e, P) [\exists e' e < e' \ \& \ P(w)(e')=1]$ .

- Following Condoravdi (2001), Copley (2003), Ippolito (2003), we assume **FUT** is *metaphysical* modal, which combines with two properties of times.
- To make FUT event-relative, we construct metaphysical alternatives w.r.t an event argument of the modal (we assume future shifting of the temporal *now* following Abusch 1998):

(20)  $[[\text{FUT}]]^{c,g} = \lambda e \lambda p_{ist} \lambda q_{ist} \forall w \in \text{Best}(\text{Meta}(e) \text{ where } p([t_0, \infty))(w)) [q([t_0, \infty))(w)=1]$ .

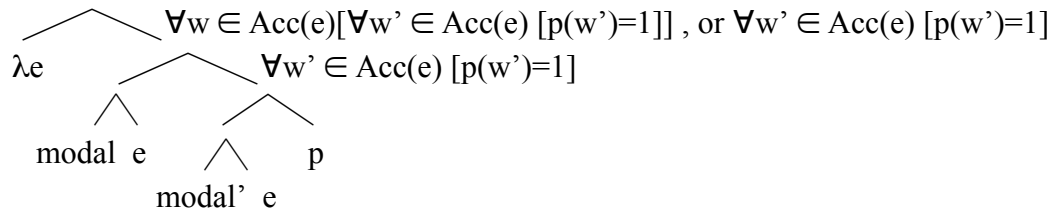
- IMPF and FUT will be relative to the same event.

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**Event-relative modality** allows two modals anchored to the same event binder.

- Without intervening material, this produces vacuous modal quantification by the first.
- This occurs because 2<sup>nd</sup> modal anchored to an evaluation event, not worlds quantified over by higher modal:

(21)



Hacquard (2006) argues this happens with epistemics under doxastic attitudes:

(22)

Asp  $\lambda e$  [dox-att e ] [CP ... [modal e ] ...]

- John believes that it might be raining.
  - [John believe(**e**) [CP that [ModP might (**e**) [TP it is raining ] ] ]
  - $\exists e[e \text{ in } w \ \& \ \text{Exp}(e,J.) \ \& \ \text{belief}'(e) \ \& \ \forall w' \in \text{DOX}(e):$   
 $\quad \exists w'' \in \text{DOX}(e): \exists e'[e' \text{ in } w' \ \& \ \text{rain}(e',w'')]$  ]
  - $\exists e[e \text{ in } w \ \& \ \text{Exp}(e,J.) \ \& \ \text{belief}'(e) \ \& \ \exists w' \in \text{DOX}(e): \exists e'[e' \text{ in } w' \ \& \ \text{rain}(e',w')]$  ]
  - There is a past belief state of J. s.t. it is raining in some world compatible with his belief state*
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### Summarizing assumptions:

- main clause: IMPF scoping over FUT conditional
- conditional clauses: properties of time (AspPs, with null Asp)

**Main intuition of derivation:** counterfactual is *past metaphysical conditional* (Condoravdi 2001; Copley 2003; Ippolito 2003)

- IMPF loses its modal force in this construction
- this is derivable by vacuous quantification in event-relative modality

### 3.2. Deriving Counterfactuality

IMPF & FUT relative to same event, hence modal element of IMPF quantifies vacuously.

**However:** IMPF's presuppositions survive, triggering past and framing requirements.

- (16) structurally parallel to (21), triggering vacuous quantification of IMPF's modal: *truth-conditionally*, (16) will be evaluated as a future conditional.



Anteriority and Framing presuppositions of IMPF allow us to hone in on that forking event in counterfactuals, and to derive contrary to fact implicature of the antecedent.

### 3.3 The Anteriority Presupposition

- (23) requires that *felicitous* use of a counterfactual conditional be made w.r.t. an event that occurred prior to  $t_0$ .
  - metaphysical modality of future modal relativized to world and time of this event.
- Condoravdi (2001)/Ippolito (2003): *counterfactual* component of counterfactual conditionals results from evaluating metaphysical alternatives *in the past*.
  - In this work, the anteriority of alternatives is a result of tense.
  - In the event-relative system, it is due to an *event* constrained to be in the *past*.
  - Settledness of the past is what yields the contrary-to-fact implicature.

### 3.4. The Framing Presupposition

Framing presupposition enforces run-time of extensional event within contextual topic time.

- For regular imperfects, this means a contextual time must be made salient by temporal adverbials, or, exceptionally, via lexical content of DPs which can pragmatically introduce topical intervals:
- (26) Les dinosaures mangaient de la viande.  
The dinosaurs eat-**impf** of the meat.  
'Dinosaurs ate meat.'
- Counterfactuals, however, seem to lack the requirement for a time adverbial.

**Proposal:** In parallel to (26), *antecedents* introduce a salient time interval, namely the time of the forking event that led to the settlement of the antecedent.

- Antecedent pragmatically sets TOP-TIME(c) to interval immediately bounding the run time of the event which settled p (cf. Ippolito's 2008 foreclosing of a historical issue).
  - Settling event then serves as a fork, producing divergence into p and  $\neg p$  worlds, and hence the metaphysical alternatives at the time of the event include both types of worlds<sup>6</sup>:
- (27) If McCain were President, GM would be bankrupt.

In (27), the settling event is the 2008 electing event.

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<sup>6</sup> There seem to be counterfactuals that can be asserted without reference to a particular forking event, but to a family of forking events. We leave these to future research.

## Summarizing

- **Non-counterfactual cases:** framing presupposition serves to temporally locate an extensional sub-event within some independent temporal interval provided by context (or context shifting of temporal adverbs).
- **Counterfactual cases:** framing presupposition individuates a forking event via the temporal interval evoked by the antecedent clause.

## Conclusion:

- Account for presence of Imperfect in counterfactuals, despite counterfactuals lacking its traditional hallmarks.
- Argue counterfactuals involve both a IMPF and a FUT, as suggested by morphology.
  - FUT provides modal quantification (modal quantification of IMPF neutralized via vacuous quantification due to event-relativity of modals)
  - IMPF provides anteriority and framing presuppositions.
    - Counterfactual implicature (that the antecedent doesn't hold) results from these presuppositions: they force a past topical event, the 'forking' event.

## Further issues:

- Why do counterfactuals and generics morphologically pattern together cross-linguistically, excluding progressive (Iatridou 2000)?
- Why do some languages use the past for counterfactuals and others the imperfect?
- Why do certain counterfactuals solely require the Imperfect (without a future element), cf. Ippolito's (2004) imperfect conditionals.

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