

Tense and Mood in Counterfactual Conditionals: The View from Spanish*

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1 Introduction

- The Spanish conditional sentences (3)-(4) give rise to the (defeasible) inference of counterfactuality, just like their respective English translations (1)-(2) [Lew73, And51]. Leaving Severe Tense Mismatch cases aside [Ipp03, Ipp13], we will refer to these structures as Counterfactual Conditionals (CCs).

- (1) If Juan had a hang-over (right now/today), he would be in bed. PRESENT
- (2) If Juan had gone to the party yesterday, the party would have been fun. PAST
- (3) Si Juan tuviese resaca (ahora/hoy), (pro) estaría en la cama. PRESENT
If Juan **had.SUBJ** hang-over (now/today), (he) **would-be** in the bed
- (4) Si Juan hubiese ido a la fiesta (ayer), la fiesta habría sido
If Juan **had.SUBJ** **gone** to the party (yesterday), the party **would.have been**
divertida. PAST
amusing.

- (At least) two pieces of verbal morphology are essential to produce a grammatical CC structure in Spanish and some other Romance languages.

- Like English, an **additional layer of past tense** –known as ‘fake’ tense– is needed.
- Unlike English, where there is no (productive) mood distinction between indicative and subjunctive, the antecedent clause has to appear in the **subjunctive mood**.

- If either of these two ingredients is removed, the sentences are not CC anymore.

- Removing the additional past layer from (3) and (4) leads to ungrammaticality and to a hypothetical interpretation respectively: (5)-(6).

- (5) * Si Juan tenga resaca (ahora/hoy), ...
* If Juan **has.SUBJ** hang-ver (now/today), ...
- (6) Si Juan fuese a la fiesta (ayer), la fiesta sería divertida.
If Juan **went.SUBJ** to the party (yesterday), the party **would.be** amusing.
 - Removing Subjunctive mood leads, as we’ll see, to structures that are grammatical in certain linguistic environments but have no counterfactual interpretation.

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- This paper exploratorily develops an analysis of Spanish CCs that assigns each of these two pieces of morphology a uniform semantics independently motivated across the grammar.
 - i. Additional past tense: not interpreted modally within the modal remoteness approach ([Iat00, Sch14]), but interpreted temporally within the temporal remoteness line ([Dud84, GvS09] a.o. and modifying [Rom14]), as independently needed for Sequence of Tense.
 - ii. Mood morphology: as imposing a restriction on the world pronoun, as independently argued for Romance complement clauses [Sch05].
- Roadmap
 - §2 Sequence of Tense [vS09], applied to indirect speech containing future indicative conditionals
 - §3 Mood in Romance complement clauses [Sch05]
 - §4 Proposal
 - §5 Conclusions

2 Additional past

- An additional layer of past tense morphology is used in past attitude reports in indirect speech, a phenomenon known as ‘Sequence of Tense’ (SoT) [Abu97, Kus05, vS09]: (7)-(9). A parallel pattern obtains in Spanish and other Romance languages.

(7)	a. Annalea said (last week): “Lucía is sick”.	Present
	b. Annalea said (last week) that Lucía was sick.	Simple Past
(8)	a. Annalea said (last week): “Lucía has arrived on time”.	Present Perfect
	b. Annalea said (last week) that Lucía had arrived on time.	Past Perfect
(9)	a. Annalea said (last week): “Lucía will come ”.	Future
	b. Annalea said (last week) that Lucía would come .	Conditional
- To make the similarity between SoT and our Spanish CCs (3)-(4) more apparent, we will see how certain indicative conditionals change their verbal morphology when transferred from direct to indirect speech.
- Future indicative conditional about hypothetical events *on* a certain salient date: Salient temporal *res*: e.g., today December 20, 2017.

(10)	Scenario: Ana was wondering in summer 2017 how things would be today, Dec 20, 2017. She thought: “If Juan has a hang-over (that day), he will be in bed”.
(11)	Si Juan tiene resaca (ese día), (pro) estará en la cama. If Juan has .IND hang-over (that day), he will.be in the bed ‘If Juan has a hang-over (that day), he will be in bed.’
(12)	Ella pensó que, si Juan tenía resaca, (pro) estaría en la cama. She thought that, if Juan had .IND hang-over, he would.be in the bed ‘She thought that, if Juan had a hang-over, he would be in bed.’

Our present CC (3) and the complement clause in (12) have exactly the same tenses and differ solely in the mood of the antecedent clause.

- Future indicative conditional about hypothetical events *prior* to a certain salient date:
Salient temporal *res*: e.g., today December 20, 2017.¹

- (13) Scenario: Ana was wondering in summer 2017 how things would be on Dec 20, 2017. She thought: “If Juan has gone to the party (the night before), the party will have been fun”.
- (14) Si Juan ha ido a la fiesta, la fiesta habrá sido divertida.
If Juan **has.IND gone** to the party, the party **will.have been** fun
- (15) Ella pensó que, si Juan había ido a la fiesta, la fiesta habría sido divertida.
She thought that, if Juan **had.IND gone** to the party, the party **would.have been** divertida.
fun
‘She thought that, if Juan had gone to the party, the party would have been fun.’

Our past CC (4) and the complement clause in (15) have exactly the same tenses and differ solely in the mood of the antecedent clause.

- Sequence of Tense analysis of embedded tenses: LF SYNTAX

- (Interpretable) tense morphology is treated like pronouns ([Par73] a.o.): $pro_i^{[PAST\ pro_j]}$.
- The temporal relation in the superscripted temporal feature is relative to an anchor time pronoun pro_j , due to relative uses of tense ([vS95, Abu97, Kus05], a.o.).
- Some pieces of temporal morphology may be left uninterpreted when licensed in a chain headed by an temporal pronoun with an interpretable past feature [GvS09, Rom14]. Such uninterpretable bits will appear crossed out in our LFs.
- The future indicative conditional is headed by a silent modal with a metaphysical modal base METAPHY and a stereotypical ordering source L (cf. [Kau05]).

- Application to LF of (12), with additional \exists -closure binding pro_4 :

- (16) LF of past tense morpheme *-ed*: $pro_i^{[PAST\ pro_j]}$
- (17) LF: $[\lambda 0\ Ana\ think\ at\ pro_1^{[PAST\ pro_0]} [\lambda 2\ MODAL_{METAPHY}^L\ pro_2$
 $[\lambda 3\ \cancel{past}\ \exists_4 [pro_4^{[FUT\ pro_3]} \lambda 7 [John\ have\ hang-over\ at\ pro_7]]]$
 $[\lambda 3\ \cancel{past}\ \exists_4 [pro_4^{[FUT\ pro_3]} \lambda 7 [John\ be\ in\ bed\ at\ pro_7]]]]]]$

- Sequence of Tense analysis of embedded tenses: SEMANTICS

- Temporal features are interpreted as imposing presuppositions on the value of the variable [Hei94, Kra98]: (18)-(20).
- We treat the value of a temporal(/mood) pro_i as a world-time pair, i.e., as an index.
- Temporal and accessibility constraints on indices are understood as in (21):

¹It is also possible to have the direct speech version (14) with Present Perfect (‘has been’) in the consequent clause (see [Kau05] on the difference between future indicative conditionals with and without *will*). The corresponding indirect speech version would be like (15) but with Past Perfect (‘had been’) in the consequent.

- (18) $\llbracket past \rrbracket^g = \llbracket pro_i^{[PAST\ pro_j]} \rrbracket^g$ is defined only if $g(i) < g(j)$;
if defined, $\llbracket pro_i^{[PAST\ pro_j]} \rrbracket = g(i)$
- (19) $\llbracket pres \rrbracket^g = \llbracket pro_i^{[PRES\ pro_j]} \rrbracket^g$ is defined only if $g(i) \circ g(j)$;
if defined, $\llbracket pro_i^{[PRES\ pro_j]} \rrbracket = g(i)$
- (20) $\llbracket fut \rrbracket^g = \llbracket pro_i^{[FUT\ pro_j]} \rrbracket^g$ is defined only if $g(j) < g(i)$;
if defined, $\llbracket pro_i^{[FUT\ pro_j]} \rrbracket = g(i)$
- (21) a. For any two indices $\langle w, t \rangle$ and $\langle w', t' \rangle$:
 $\langle w, t \rangle < \langle w', t' \rangle$ iff $w = w'$ and t is prior to t' .
 $\langle w, t \rangle \circ \langle w', t' \rangle$ iff $w = w'$ and t and t' overlap.
- b. For any two indices $\langle w, t \rangle$ and $\langle w', t' \rangle$:
 $\langle w, t \rangle \in \text{MOD}(\langle w', t' \rangle)$ iff $t = t'$ and w' is accessible from w via MOD.

■ Application to semantic derivation of (12)

We obtain the truth conditions in (22c). Note that the pronoun pro_4 ranges over indices i_4 (which share the world-member with i_3 and) whose temporal coordinate is a salient *res* time, namely, today December 20, 2017 in our scenarios.²

- (22) a. Antecedent clause: $\lambda i_3. \exists i_4 [i_3 < i_4 \wedge \text{John have hang-over at } i_4]$
b. Consequent clause: $\lambda i_3. \exists i_4 [i_3 < i_4. \text{John be in bed at } i_4]$
c. Sentence: $\lambda i_0: i_1 < i_0. \forall i_2 \in \text{Dox}_{\text{Ana}}(i_1) \forall i_3 \in \text{Metaph}^L(i_2):$
 $\exists i_4 [i_3 < i_4 \wedge \text{J have hang-over at } i_4] \rightarrow \exists i_4 [i_3 < i_4 \wedge \text{J be in bed at } i_4]$

■ Application to LF, with \exists_4 and \exists_6 , and semantic derivation of (15):

Besides the uninterpretable past layer licensed by the c-commanding ‘thought’, we have an interpretable tense layer: $pro_6^{[PAST\ pro_5]}$

- (23) LF: $[\lambda 0 \text{ Ana think at } pro_1^{[PAST\ pro_0]} [\lambda 2 \text{ MODAL}^L_{\text{METAPHY}}\ pro_2$
 $[\lambda 3 \text{ past } \exists_4 [pro_4^{[FUT\ pro_3]} [\lambda 5 \exists_6 [pro_6^{[PAST\ pro_5]} \lambda 7 [\text{John go at } pro_7]]]]]]$
 $[\lambda 3 \text{ past } \exists_4 [pro_4^{[FUT\ pro_3]} [\lambda 5 \exists_6 [pro_6^{[PAST\ pro_5]} \lambda 7 [\text{the party be a fun at } pro_7]]]]]]]]$
- (24) a. Antecedent clause: $\lambda i_3. \exists e_4 \exists e_6 [i_3 < i_4 \wedge i_6 < i_4 \wedge \text{John go at } i_6]$
b. Consequent clause: $\lambda i_3. \exists e_4 \exists e_6 [i_3 < i_4 \wedge i_6 < i_4 \wedge \text{the party be fun at } i_6]$
c. Sentence: $\lambda i_0: i_1 < i_0. \forall i_2 \in \text{Dox}_{\text{Ana}}(i_1) \forall i_3 \in \text{Metaph}^L(i_2):$
 $\exists e_4 \exists e_6 [i_3 < i_4 \wedge i_6 < i_4 \wedge \text{John go at } i_6] \rightarrow$
 $\exists e_4 \exists e_6 [i_3 < i_4 \wedge i_6 < i_4 \wedge \text{party be fun at } i_6]$

²If we wanted to leave pro_4 free, with Ana having a *de re* thought about its referent i_4 , we would need to include the acquaintance relation under which Ana accesses this *res*. This could be achieved by extending concept generators (CG) on *res* of e-type and more complex types ([PS03]) to *res* of $s \times t$ -type. The CG needed here would have to be as indicated in (i), where $w(i)$ is the world-member of index i , $t(i)$ is the time-member of i and α stands for the identifying property under which Ana is acquainted with i_4 . We leave for future research a detailed exploration of how to combine temporal *de re*, indices and concept generators.

(1) $[\text{CG}_{\text{Ana}, i_3} [pro_4]]^g(i_3) =$ the index $\langle w', t' \rangle$ such that: $w' = w(i_3)$, $t(i_3) < t'$ and t' has property α at i_3

3 Subjunctive mood

■ Mood in complement clauses in Spanish and other Romance languages:

- Representational verbs like *creer* ‘believe’ and *decir* ‘say’ select INDICATIVE: (25).
- Non-representational verbs like *lamentar* ‘regret’ and *hacer* ‘to make (somebody do something)’ select SUBJUNCTIVE: (26).

(25) Bea cree [que Juan enseña / *enseñe semántica]
 Bea believes [that Juan teaches.IND / *teaches.SUBJ semantics]
 ‘Bea believes that Juan teaches semantics.’

(26) Bea lamenta [que Juan *enseña / enseñe semántica]
 Bea regrets [that Juan *teaches.IND / teaches.SUBJ semantics]
 ‘Bea regrets that Juan teaches semantics.’

■ [Sch05]’s analysis of mood morphology, adapted here:

- Mood morphology introduces a mood feature on world pronouns: $pro_i^{[IND\ pro_k]}$
- The features IND(icative) and SUBJ(unctive) are relative to an anchor attitude holder pro_k and call up the so-called “local context” (in the sense of [Sta75]) pertaining to that attitude holder, that is, the set of doxastic alternatives $Dox_{g(k)}$ of pro_k at the relevant evaluation world.
- The feature IND imposes a presupposition on the value of the world pronoun whereas the feature SUBJ imposes no presupposition: (28)-(29).

(27) LF of the indicative morphology in a verbal form: $pro_i^{[IND\ pro_k]}$

(28) $\llbracket pro_i^{[IND\ pro_k]} \rrbracket$ is defined only if $g(i) \in Dox_{g(k)}$;
 if defined, $\llbracket pro_i^{[IND\ pro_k]} \rrbracket = g(pro_i)$

(29) $\llbracket pro_i^{[SUBJ\ pro_k]} \rrbracket = g(pro_i)$

■ Indicative vs. subjunctive proposition:

(30) $\llbracket Juan\ teach\ semantics\ at\ pro_i^{[IND\ pro_k]} \rrbracket = \lambda w':w' \in Dox_{g(k)}(w_0).J\ teaches\ sem\ in\ w'$
 = the function f such that, for any w in W :
 $f(w)=1$ if $w \in Dox_{g(k)}(w_0)$ and John teaches semantics in w
 $f(w)=0$ if $w \in Dox_{g(k)}(w_0)$ and John does not teach semantics in w and
 $f(w)=\#$ if $w \notin Dox_{g(k)}(w_0)$

(31) $\llbracket Juan\ teach\ semantics\ at\ pro_i^{[SUBJ\ pro_k]} \rrbracket = \lambda w':w' \in Dox_{g(k)}(w_0).J\ teaches\ sem\ in\ w'$

■ *Believe* plus a complement clause: \checkmark IND-proposition, * SUBJ-proposition.

- Lexical entry for *believe*: (32).
- This lexical entry simply asks us to check the value of our proposition at the worlds $w \in Dox_x(w_0)$. For that, the partial IND-proposition (30) suffices. Hence, \checkmark IND-proposition.
- By Maximize Presupposition in (33) [Hei91], the maximally presuppositional IND-proposition has to be used. Thus, *SUBJ-proposition.

$$(32) \llbracket \textit{believe} \rrbracket(p)(x) = \lambda w_0. \forall w \cap \text{Dox}_x(w_0): p(w)$$

(33) Maximize Presupposition: Make your contribution presuppose as much as possible!

■ *Regret* plus a complement clause: * IND-proposition, ✓ SUBJ-proposition.

- Lexical entry (34) for *regret* (slightly modified from [Hei92]’s *be glad*), where:
 - i. it is presupposed that the subject x believes the proposition p ,
 - ii. $\text{Dox}_x(w_0)$ is temporarily revised with respect to p , as defined in (35),
 - iii. the result of this revision is updated with $\neg p$, and
 - iv. $\text{Sim}_w(\psi)$ ask us to find the most similar world w' to w for which $\psi(w')$ yields TRUE/1.

$$(34) \llbracket \textit{regret} \rrbracket(p)(x) = \lambda w_0: \forall w \cap \text{Dox}_x(w_0) [p(w)]. \\ \forall w \cap \text{Dox}_x(w_0) [\text{Sim}_w(\text{rev}_p(\text{Dox}_x(w_0)) + \neg p) >_{\text{Bou}_x(w_0)} w]$$

(35) For any context c and proposition p :

$$\text{rev}_p(c) = \cup \{X \subseteq W: c \subseteq X \text{ and } X+p \text{ is defined}\}$$

- If we take p to be the total SUBJ-proposition (31), task (iv) can be carried out.
 - ii. The (temporarily) revised $\text{rev}_p(\text{Dox}_x(w_0))$ contains worlds w' for which $p(w')$ yields TRUE/1 and worlds w' for which $p(w')$ yields FALSE/0
 - iii. This revised doxastic state is updated with $\neg p$, so that the result contains only worlds w' for which $\neg p(w')$ yields TRUE/1
 - iv. Sim_w ask us to find the most similar world w' to w for which the updated revised doxastic state yields TRUE/1.
- If we use the partial IND-proposition (30), task (iv) cannot be carried out.
 - ii. The (temporarily) revised $\text{rev}_p(\text{Dox}_x(w_0)) = \text{Dox}_x(w_0)$
 - iii. This revised doxastic state is updated with $\neg p$ in (36), which results in an empty doxastic state (contradiction).
 - iv. Sim_w ask us to find the most similar world w' to w for which the updated revised doxastic state yields TRUE/1. But there is no such world!

(36) The function f such that, for any w in W :

$$f(w)=0 \text{ if } w \in \text{Dox}_x(w_0) \text{ and John teaches semantics in } w \\ f(w)=1 \text{ if } w \in \text{Dox}_x(w_0) \text{ and John does not teach semantics in } w \text{ and} \\ f(w)=\# \text{ if } w \notin \text{Dox}_x(w_0)$$

4 Proposal

■ [Dud83]’s original idea:

(37) A counterfactual with ‘fake’ tense involves a back shift in time with a future (metaphysical) conditional interpreted under that back shift.

■ Translating [Dud83]’s idea into an LF structure gives us an interpretable past tense scoping over an entire future metaphysical conditional ([GvS09], cf. [Ipp03]; as in *free* indirect speech). Adding the analyses of tense and mood in the preceding sections, we obtain the following preliminary LFs for our Spanish CCs:

- (38) Si Juan tuviese resaca (ahora/hoy), (pro) estaría en la cama. PRESENT
 If Juan **had.SUBJ** hang-over (now/today), (he) **would-be** in the bed
 ‘If John had a hang-over (now/today), he would be in bed.’ (= (3))

- (39) Preliminary LF for present CC (38):
 $\lambda 0 [\text{pro}_1^{\text{PAST } \text{pro}_0}] \lambda 2 \text{MODAL}_{\text{METAPHY}}^{\text{L}} \text{pro}_2$
 $[\lambda 8 [\text{pro}_8^{\text{SUBJ } \text{pro}_{Sp}}] \lambda 3 [\text{past } \exists_4 [\text{pro}_4^{\text{FUT } \text{pro}_3}] \lambda 7 [\text{John have hang-over at } \text{pro}_7]]]]]$
 $[\lambda 8 [\text{pro}_8] \lambda 3 [\text{past } \exists_4 [\text{pro}_4^{\text{FUT } \text{pro}_3}] \lambda 7 [\text{John be in bed at } \text{pro}_7]]]]]$

- (40) Si Juan hubiese ido a la fiesta (ayer), la fiesta habría sido
 If Juan **had.SUBJ** **gone** to the party (yesterday), the party **would.have been**
 divertida. PAST
 amusing.
 ‘If John had gone to the party (yesterday), the party would have been fun.’ (= (4))

- (41) Preliminary LF for past CC (40):
 $\lambda 0 [\text{pro}_1^{\text{PAST } \text{pro}_0}] \lambda 2 \text{MODAL}_{\text{METAPHY}}^{\text{L}} \text{pro}_2$
 $[\lambda 8 [\text{pro}_8^{\text{SUBJ } \text{pro}_{Sp}}] \lambda 3 [\text{past } \exists_4 [\text{pro}_4^{\text{FUT } \text{pro}_3}] \lambda 5 \exists_6 [\text{pro}_6^{\text{PAST } \text{pro}_5}] \lambda 7 [\text{John go at } \text{pro}_7]]]]]$
 $[\lambda 8 [\text{pro}_8] \lambda 3 [\text{past } \exists_4 [\text{pro}_4^{\text{FUT } \text{pro}_3}] \lambda 5 \exists_6 [\text{pro}_6^{\text{PAST } \text{pro}_5}] \lambda 7 [\text{it be fun at } \text{pro}_7]]]]]$

- Two adjustments are still needed to derive appropriate truth conditions for CCs.
- First, [Dud83]’s original idea needs to be refined in order to guarantee the correct temporal alignment of the hypothetical events with respect to the utterance index i_0 .
 - In the indirect speech examples (12)-(15), the attitude holder Ana was thinking about how things would be on a particular date, represented in our LFs as a pronoun pro_4 whose temporal coordinate happens to be –but did not need to be– today’s date in our scenarios.
 - In our CCs, pronoun pro_4 must be temporally co-valued with the utterance index pro_0 . This co-valuation is needed in order to secure that:
 - in the LF (39), the index $[\text{pro}_7]/[\text{pro}_4]$ at which John has a hang-over and John is in bed temporally overlaps with the utterance index $[\text{pro}_0]$ and,
 - in the LF (41), the index $[\text{pro}_7]/[\text{pro}_6^{\text{PAST } \text{pro}_5/\text{pro}_4}]$ at which John goes to the party and the party is fun temporally precedes the utterance index $[\text{pro}_0]$.
 - This means that Dudman’s original idea should be refined in (42):

- (42) Refinement of [Dud83]’s idea:
 A counterfactual with ‘fake’ tense uttered at index i_0 involves a back shift in time with a future metaphysical conditional *about* i_0 under that back shift.
- For concreteness, this is implemented with the feature [T-IDENT pro_0] on pro_4 : (43).

- (43) $[\text{pro}_i^{\text{T-IDENT } \text{pro}_j}]$ is defined only if $\text{time}(g(i)) = \text{time}(g(j))$;
 if defined, $[\text{pro}_i^{\text{T-IDENT } \text{pro}_j}] = g(i)$

- Second, CCs do not quantify over all future metaphysical possibilities branching out from a given past time t' . “Intermediate” facts that took place between t' and t_0 sometimes restrict the metaphysical possibilities quantified over:

o Morgenbesser cases:

- (44) I am driving to the airport to catch a 9 o'clock flight to Paris. The car breaks down in the motorway. I sit there waiting for the breakdown service. 9 o'clock passes: I've missed my flight. More time passes. 'If I had caught the plane, I would have been half way to Paris by now', I say to the repairman who eventually shows up. 'Which flight were you on?', he asks. I tell him. 'Well you're wrong', he says. 'I was listening to the radio. It crashed. If you had caught that plane, you would be dead by now.' [Edg04]

o Our modest goal here is to have a place holder for that information in our LFs. For concreteness, we implement this by adding a situation argument pro_{sit} to the modal cluster (46), whose denotation should be a modal part (\subseteq_m) of w' , as defined in (45):

- (45) For any situation s and world w : [Arr09]
 $s \subseteq_m w$ iff there is a situation s' such that s' is a counterpart of s and s' is part of w .
- (46) $\llbracket \text{MODAL}_{\text{METAPHY}}^L pro_{sit} pro_2 \rrbracket(p)(q) =$
 $\lambda i. \forall i' \in (\text{Metaph}^L(i) \cap \{ \langle w', t' \rangle : \llbracket pro_{sit} \rrbracket \subseteq_m w' \}) [p(i') \rightarrow q(i')]$

■ Let us add these two adjustments to our preliminary LF and do the semantic derivation.

■ Present CC (38):

- o Tense and temporal alignment: In the truth conditions (48c), we quantify over law-like metaphysical alternatives i_3 to an index i_1 preceding the utterance index i_0 (alternatives at which, additionally, certain "intermediate" facts hold). For each of these i_3 , we check whether the index i_4 that has the same world-member as i_3 and the same time-member as i_0 is such that John has a hang-over at i_4 . If so, then the sentence commits us to i_4 being such that John is in bed at i_4 . This delivers the correct temporal alignment of the hypothetical events.
- o Mood: The use of subjunctive in the *if*-clause makes the antecedent proposition total, as in (48a). If, instead, indicative mood were used, the antecedent proposition would be defined only for the doxastic alternatives of the attitude holder, here the speaker. Since the speaker believes that the antecedent is false, this would lead to vacuous quantification: For any index i_3 that we would apply the indicative version of (48a) to, we would obtain # (if $i_3 \notin \text{Dox}_{\text{Speaker}}(i_0)$) or FALSE/0 (if $i_3 \in \text{Dox}_{\text{Speaker}}(i_0)$). Hence, indicative mood cannot be used and subjunctive mood must.

- (47) LF for present CC (38):
 $\lambda 0 [\text{pro}_1^{\text{PAST } pro_0}] \lambda 2 \text{MODAL}_{\text{METAPHY}}^L (pro_{sit}) pro_2$
 $[\lambda 8 [\text{pro}_8^{\text{SUBJ } pro_{Sp}}] \lambda 3 [\text{past} \exists_4 [\text{pro}_4^{\text{FUT } pro_3}][\text{T-IDENT } pro_0] \lambda 7 [\text{John have hang-over at } pro_7]]]]$
 $[\lambda 8 [\text{pro}_8 \lambda 3 [\text{past} \exists_4 [\text{pro}_4^{\text{FUT } pro_3}][\text{T-IDENT } pro_0] \lambda 7 [\text{John be in bed at } pro_7]]]]]$
- (48) a. Antecedent clause:
 $\lambda i_3: i_3 \in \text{Dox}_{Sp}(i_0). \exists e_4 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge \text{John have hang-over at } i_4]$
- b. Consequent clause:
 $\lambda i_3. \exists e_4 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge \text{John be in bed at } i_4]$
- c. Sentence:
 $\lambda i_0: i_1 < i_0. \forall i_3 \in (\text{Metaph}^L(i_1) \cap \{ \langle w', t' \rangle : \llbracket pro_{sit} \rrbracket \subseteq_m w' \}):$
 $i_3 \in \text{Dox}_{Sp}(i_0) \wedge \exists e_4 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge \text{J have hang-over at } i_4] \rightarrow$
 $\exists e_4 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge \text{John be in bed at } i_4]$

■ Past CC (40):

- Tense and temporal alignment: Now the index i_6 at which the hypothetical events of the antecedent and consequent clauses hold has to temporally precede i_4 . Again, i_4 has the same time-member as i_0 (and the same world-member as i_3). This leads to the correct temporal ordering.
- Mood: same considerations apply as above.

(49) LF for past CC (40):

$$\lambda 0 [\text{pro}_1^{\text{PAST PRO}_0} \lambda 2 \text{MODAL}_{\text{METAPHY}}^L (\text{pro}_{\text{sit}}) \text{pro}_2 \\ [\lambda 8 [\text{pro}_8^{\text{SUBJ PRO}_{SP}}] \lambda 3 [\text{past} \exists_4 [\text{pro}_4^{\text{FUT PRO}_3} [\text{T-IDENT PRO}_0] \lambda 5 \exists_6 [\text{pro}_6^{\text{PAST PRO}_5} \lambda 7 [\text{J go at pro}_7]]]]]] \\ [\lambda 8 [\text{pro}_8 \lambda 3 [\text{past} \exists_4 [\text{pro}_4^{\text{FUT PRO}_3} [\text{T-IDENT PRO}_0] \lambda 5 \exists_6 [\text{pro}_6^{\text{PAST PRO}_5} \lambda 7 [\text{it be fun at pro}_7]]]]]]]]]$$

(50) a. Antecedent clause:

$$\lambda i_3: i_3 \in \text{Dox}_{SP}(i_0). \exists e_4 \exists e_6 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge i_6 < i_4 \wedge \text{John go at } i_6]$$

b. Consequent clause:

$$\lambda i_3. \exists e_4 \exists e_6 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge i_6 < i_4 \wedge \text{the party be fun at } i_6]$$

c. Sentence:

$$\lambda i_0: i_1 < i_0. \forall i_3 \in (\text{Metaph}^L(i_1) \cap \{ \langle w', t' \rangle : [\text{pro}_{\text{sit}}] \subseteq_m w' \}) : \\ i_3 \in \text{Dox}_{SP}(i_0) \wedge \exists e_4 \exists e_6 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge i_6 < i_4 \wedge \text{J go at } i_6] \rightarrow \\ \exists e_4 \exists e_6 [i_3 < i_4 \wedge \text{time}(i_4) = \text{time}(i_0) \wedge i_6 < i_4 \wedge \text{the party be fun at } i_6]$$

- In sum, the correct truth conditions have been derived for our CC using the analysis of tense and mood morphology independently motivated in sections 2 and 3.

5 Conclusions and further issues

- The truth conditions of CCs in Spanish have been derived within the temporal remoteness line while keeping a uniform analysis of temporal and mood morphology across the grammar.
- I would like to make two further points about the temporal remoteness approach.
- First, relating CC structures to the description of future events under a back shift cannot only account for ‘fake’ tense, as we saw, but also for ‘fake’ aspect. It has been noted that, even when the event described in the antecedent clause of a CC is punctual, an **imperfective** past form has to be used. We note that the same is true for indirect speech reporting a past utterance of an indicative future conditional:

(51) Scenario: Ana was wondering in summer 2017 how things would be today, Dec 20, 2017. She thought: “If Juan reaches the summit (that day), he will call his mother on the phone”.

(52) Ella pensó que, si Juan alcanzaba la cima (ese día), (pro) She thought that, if Juan **reached.Impf.Ind** the summit (that day), he llamaría for teléfono a su madre. **would.call** by telephone to his mother ‘She thought that, if Juan reached the summit (that day), he would call his mother on the phone.’

- (53) # Ella pensó que, si Juan alcanzó la cima (ese día), (pro)
 # She thought that, if Juan **reached.Pft.Ind** the summit (that day), he
 llamaría for teléfono a su madre
would.call by telephone to his mother

- Second, counterpossibles like *[If 2 plus 2 were 5, ...]* have always been an important problem for the temporal remoteness line. While I have no real solution to offer, one possible avenue to explore is to relativize indicative and counterfactual conditionals to a given epistemic state (cf. [Sta14, Lea17]). In that case, Dudman’s back shift may be understood not as taking us back to a time point t' at which the metaphysical future conditional is true, but to a time point t' at which the some agent’s epistemic state deems the metaphysical future conditional true.

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