EPISTEMIC MODALITY AND TEMPORAL ANCHORING

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ABSTRACT : In this paper, we explore the constraints on temporal configurations in epistemic readings in French and Spanish, two languages in which modals can be fully inflected for temporal-aspectual categories. Epistemic readings are associated with a simultaneous (deictic or anaphoric) TEMPORAL PERSPECTIVE and a past or simultaneous TEMPORAL ORIENTATION, but there are important syntax-semantic mismatches involving the site of realization and the site of interpretation of tense-aspect morphology. We show that there are important differences between the case of perfect morphology on epistemic modals (OVERT PERFECT RAISING) and the case of simple past tenses on epistemic modals. In the former case, cross-linguistic variation seems to correlate with the status of present perfects and their possibility to function as past tenses. We further argue that syntax-semantic mismatches are to be expected in this domain, because these configurations have only one syntactic Tense projection, but their interpretation requires two "semantic tenses", one for TEMPORAL PERSPECTIVE and another for TEMPORAL ORIENTATION. Necessarily, one of these semantic tenses will be calculated by a default mechanism, and linearisation does not entirely determine which one will be so interpreted.
KEYWORDS: Modal verbs; epistemic readings; temporal construals; tense; scope reversal.

1. INTRODUCTION

The syntactic and semantic literature on modals traditionally distinguishes epistemic from root interpretations (Ross 1969, Huddleston 1974, Zubizarreta 1982, Picallo 1990, Brennan 1993, Cinque 1999, Butler 2003, Hacquard 2006, a.o.). The split between epistemic and root modals is commonly attributed to a scope distinction, the pervasive intuition being that epistemic modals scope high (IP-level) and root modals scope low (VP-level). As far as temporal anchoring is concerned, it is well known that, cross-linguistically, some tense-aspect configurations impose epistemic readings for modals, while others categorically exclude them. Thus (1a) only gets an epistemic reading, whereas (1b) cannot be interpreted epistemically:

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(1)   a. He must have left early.

       'I suppose/ infer /conclude that he left early'.

       #'He is under the obligation/necessity of having left early'.

       b. He'll have to leave early.

       #'I suppose/ infer / conclude that he will leave early'.

       'He will be under the obligation/necessity to leave early'.

In order to arrive at the correct generalizations concerning the temporal anchoring of epistemic modality, we need to first state some key assumptions as explicitly and precisely as possible, since both the notion itself of epistemic modality and the understanding of the temporal configurations involved are fraught with complexities which have considerably increased with the wealth of research on the topic in recent years.

1.1. EPISTEMIC READINGS

Epistemic readings of modals express something about the information state and the beliefs of an epistemic agent -typically the Speaker. They operate on ignorance alternatives about what is or was the case, and not on the ways eventualities may comply or not with what is necessary or possible in view of a body of social norms, or preferences, or laws of nature. Given the fundamental link they entertain with the beliefs of an individual, they would be more appropriately called doxastic rather than epistemic, but the latter term is by now too well established to be changed. Even if this is rarely made explicit (for an exception, see Condoravdi 2001), in actual practice most linguists restrict the term to situations in which there is only subjective uncertainty about the truth value of the prejacent proposition[2] at the time of evaluation. The prejacent makes thus reference to decided or settled issues, i.e. to past, present or pre-determined eventualities. In the case of contingent future propositions, subjective uncertainty goes hand in hand with objective uncertainty (the truth value of the prejacent proposition is not decided at the time of evaluation), so that more is involved than the ignorance of an epistemic agent about what is the case.

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[2] We follow von Fintel (2005) in calling 'prejacent proposition' what constitutes the complement of the modal verb, i.e. the modalized proposition minus the modal.

Since epistemic readings operate on ignorance alternatives, they are incompatible with total subjective certainty as to the truth or falsity of the prejacent. This provides the foundation for the most common operational test applied to identify them, namely the naturalness of tags such as *for all I know, let's check* targeting directly the content of the prejacent. As shown below, in the case of non-epistemic readings, these tags target the whole modalized proposition , whereas they target exclusively the prejacent in the case of the epistemic reading:

(2)   a. He must have left early. Let's check.
      a'. Let's check if it is the case that he left early.
      b. He'll have to leave early. Let's check.
      b'. Let's check if it is the case that he will have to leave early.

In epistemic readings, possibility modals express that the truth of the prejacent is compatible with the beliefs of the relevant epistemic agent, whereas necessity modals express that its truth is inferrable from those beliefs. In quantificational terms, possibility modals indicate that there is at least one world among the doxastic alternatives which verifies the prejacent, and necessity modals indicate that all the worlds among the doxastic alternatives verify the prejacent. This is shown by the near paraphrases in (3) and (4):

(3)   a. He must have left early.
      b. From what I know/believe, I conclude that he left early.

(4)   a. He may have left early.
      b. From what I know/believe, I cannot exclude that he left early.

1.2. TEMPORAL CONFIGURATIONS IN MODAL ENVIRONMENTS

As for temporal configurations, they are more complex in modalized environments than in non-modalized environments, because over and above the time of the eventuality described in the prejacent, they involve the location of the time of modal evaluation. The time of modal evaluation is the time from which the relevant alternatives (sets of possible worlds, modal bases, ordering sources) are accessed. In the case of ignorance alternatives, the flow of time/of events ideally reduces the set of relevant alternatives: with increasing knowledge, the

domain of possibilities decreases (see Ippolito 2004). In the case of metaphysical alternatives (which capture the way the actual world is), the flow of time/of events factually reduces this set: each new event that happens eliminates the possibility of this event not happening at all and all the consequences of this possibility. For this reason, the relative location of the time of modal evaluation is crucial in determining the set of relevant alternatives.

Condoravdi (2001) proposes a way of analysing temporal configurations in modalized environments which has greatly contributed to clarify this issue. She distinguishes the **temporal perspective** (**TPERSP**) of a modalized sentence from its **temporal orientation** (**TORIEN**). **TPERSP** is the relationship between the time of modal evaluation (**Tmod**) and the contextual temporal anchor. In main sentences , this contextual temporal anchor is normally the time of utterance (**UTT-T**); in the case of the argument clauses of verbs of propositional attitude (including verbs of saying), the contextual temporal anchor is the time of the matrix clause (**Tmatrix**).[3] Thus, the temporal anchor for the modal in (5a) is **UTT-T**, whereas it is the time of thinking -which is past wrt. **UTT-T**- in (5b):

(5)   a. He must have left early.

    b. Mary thought that he must have left early.

TORIEN is the relationship between the time of the prejacent (**Tprej**) and **Tmod**. For instance, both (5a) and (5b) illustrate an anterior (past) **TORIEN**: the time of his leaving precedes in both cases the time of modal evaluation.

Slightly diverging from Condoravdi (2001), and following the tradition inaugurated by Reichenbach (1947/1966), we distinguish three possible temporal relations, anteriority, posteriority and simultaneity. When working with intervals, and not with points in time, further distinctions turn out to be necessary.

	TPERSP	**TORIEN**
anteriority (past)	**UTT-T/Tmatrix > Tmod**	**Tmod > Tprej**
posteriority (future)	**UTT-T/Tmatrix <Tmod**	**Tmod < Tprej**
simultaneity (present)	**UTT-T/Tmatrix ⊗ Tmod**	**Tmod ⊗ Tprej**

Table 1: The ingredients of temporal configurations in modal environments

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[3] This holds also in the case of so-called *double access readings* (for instance, a present tense embedded under an attitude verb in the past, as in *Peter said that Mary is pregnant*), which are "double access" because they are anchored both to **Tmatrix** and to **UTT-T**. This double anchoring explains the oddness of #*Ten months ago Peter said that Mary is pregnant.*

1.3. ACCOUNTING FOR THE DISTRIBUTION OF EPISTEMIC READINGS

Having clarified these notions , we can now turn back to the examples introduced at the beginning, repeated here for convenience, in order to provide an answer to the question as to the influence of temporal configurations on epistemic readings.

(1)   a. He must have left early.

b. He'll have to leave early.

The first question is why (1a) can only have an epistemic reading. Recall that **T**ORIEN in (1a) is past. This means that at **Tmod** the issue whether he left early or not is already decided. All worlds contained in a circumstantial or metaphysical modal base are therefore either uniformly *p* or uniformly *non-p*. Now, modal bases are subject to a pragmatic diversity constraint which requires them to include both *p-* and *non-p*-worlds (see Condoravdi 2001, Werner 2003, Laca 2012). But even when the facts of the matter are decided, it is perfectly possible for an epistemic agent not to know in which way they are decided. Thus, the ignorance alternatives constituting an epistemic modal base are apt to fulfill the diversity constraint in such a temporal configuration.

The second question is why an epistemic reading is excluded in (1b). There are actually two closely related, but nonetheless distinct types of answer to this question in the literature. In syntactic approaches, it is assumed that either tense in general or certain tense categories cannot scope above epistemic modals. In particular, future tense, as expressed in (1b), could not have an epistemic modal in its scope, and neither could past tense (see, for instance, Cinque 1999, Hacquard 2006). In semantic-pragmatic approaches, it is assumed that modals in epistemic readings can only be dominated by present or zero tenses (Condoravdi 2001), i.e. that they require a simultaneous **T**PERSP. The rationale for this constraint has been attributed to the indexical nature of epistemic readings (Papafragou 2006), i.e. to the fact that in epistemic readings, **Tmod** must be simultaneous to the *now* of the relevant epistemic agent (Boogaart 2005). Future tense in (1b) would impose a non-simultaneous **T**PERSP, thus precluding the epistemic reading.

However, languages with a rich tense-aspect morphology which allow this morphology to be realised on modal verbs pose a number of problems for both syntactic and semantic-pragmatic approaches, which either constrain the relationship between tense and epistemic modality or the **T**PERSP of epistemic readings.

Thus, in view of examples such as (6a-b) below, syntactic approaches have to admit that the postulated scopal constraints hold at the interpretive level, and not at the overt morpho-syntactic level:

(6)   a. *Rosenthal **deberá** estar jugando rugby ahora en Escocia.* [SPAIN.]
           Rosenthal   MUST.FUT   be   playing   rugby   now   in Scotland
               'Rosenthal must probably be playing rugby in Scotland by now'.
       b. *Il **a dû** beaucoup pleuvoir .*   [FRENCH]
           it has MUST.PART a-lot   rain
               'It must have rained a lot'.

In spite of the future morphology on the modal, (6a) has an epistemic reading. Future morphology, however, does not affect **TPERSP** in this case, but has a modal interpretation (as a 'future of probability', see Falaus & Laca 2014). In a similar vein, as suggested by the translation, the present perfect/ past morphology in (6b) does not seem to affect **TPERSP,** but to determine a past **TORIEN**: it is the latter that is past, whereas the former remains present.

2. THE EPISTEMIC READINGS OF PAST MODALS

In fact, epistemic readings for modal verbs bearing past temporal morphology, or perfect aspect, or both, abound in languages such as French and Spanish, and are not unattested in English (see Stowell 2004). Their very existence poses obvious problems for the structural assumption that epistemic modals cannot be in the scope of tense or aspect, and for the semantic assumption that epistemic readings necessarily have a simultaneous **TPERSP.**

2.1. PAST/ IMPF AS A REALIZATION OF ZERO TENSE

At this stage, it is useful to discuss first the case of zero tenses, which can be accommodated rather straightforwardly in semantic approaches, but still pose a problem for syntactic approaches.

Zero tenses are primarily the expression of simultaneity in embedded contexts. In languages exhibiting Sequence of Tense, simultaneous construals under a matrix past require past morphology on the embedded verb (cf. Kratzer, 1998, Lungu, 2012). This past morphology does not express anteriority, but simultaneity with regard to a past **Tmatrix**.

(7) a. John said that Mary was pregnant.

    b. *Jean m'a   dit   que Marie le détestait.*   [FRENCH]

       Jean me+has said that Marie him hate.IMPF.

       'Jean told me that Marie hated him.'

    c. *Juan pensó   que María sabía   nadar.*   [SPAN.]

       Juan thought that María know.IMPF swim.

       'Juan thought that Maria could swim.'

Note that in the Romance languages, only imperfective past morphology (IMPF) can realize a zero tense. If the verb in the embedded clause is a modal, epistemic interpretations are possible: **TPERSP** is simultaneous to the past **Tmatrix,** and the relevant epistemic agent is the subject of the attitude predicate in the matrix sentence:

(8) a. John said that Mary could be pregnant.

    b. *Jean m'a   dit que Marie devait   le détester.*   [FRENCH]

       Jean me+has said that Marie MUST.IMPF him hate.

       'Jean told me that Marie must hate him.'

    c. *Juan pensó   que María debía   saber nadar.*   [SPAN.]

       Juan thought that María MUST.IMPF know swim.

       'Juan thought that Maria must be able to swim'

In as far as **TPERSP** is simultaneous in such cases, they do not violate the constraint postulated in semantic-pragmatic approaches. By contrast, syntactic approaches assuming that modal verbs in epistemic readings structurally outscope Tense are confronted with the fact that the semantic and morphological contrast between two possible realizations of a Tense head, a deictic (Present) and an anaphorically bound one (Past, IMPF) clearly shows the modal heads to be in the scope of Tense.

Moreover, zero-tense morphology (Past, IMPF) appears frequently in texts in free indirect speech contexts. Although lacking overt embedding under a past attitude verb, free indirect speech sentences reproduce the thoughts or the words of an epistemic agent at a past time. For epistemic modals in such interpretations, **TPERSP** is -again- simultaneous with the *now* of the relevant epistemic agent whose thoughts or words are being reproduced. Thus, in (9a), it is the thoughts of the police at the time of the search that are being reported, in (9b),

the thoughts of Marie when she sees the time it is, and in (9c) the thoughts of the parents when learning about the facts:

(9)   a. The police conducted a thorough search of the premises. The murder weapon
                had to be inside. It **could** not have evaporated.
      b. *Marie regarda sa montre. Il était très tard.*   [FRENCH]
         *Pierre **devait**   s'inquièter   de son absence.*
           Pierre MUST.IMPF REFL-worry of her absence
      'Marie looked at her watch. It was very late. Pierre must be worrying that she was not
           there'
      c. *Cuando los padres se enteraron, montaron en furia, la golpearon sin piedad*
[SPAIN.]
         y no le permitieron explicar los reales hechos.
         *Decididamente, la cosa   **tenía**   que haber sucedido tal como la gente decía.*
           decidedly   the thing HAVE.IMPF that have happened such as   the people said.IMPF
         *La culpa de todo **debía**   tenerla ella.*
         the guilt of all   MUST.IMPF have+it she.
      'When the parents learned about it, they became furious, they beat her remorselessly and didn't let her explain the real facts. Decidedly, the whole thing had to have happened as people were saying. Everything must have been her fault'

    Although the technical problem posed by free indirect speech contexts can be solved by positing a covert attitude verb in the past, acting as a binder for the zero tense, these uses of past and IMPF morphology pose an important analytical problem, since they have to be distinguished from other uses of this morphology in which it does express genuine anteriority.

2.2. 'REAL PASTS' ABOVE EPISTEMIC MODALS

    In fact, past tenses realized on epistemically interpreted modal verbs may have genuine anteriority interpretations. As suggested for example (6b) above, repeated below as (10a), the anteriority relationship seems to hold for **TORIEN** and not for **TPERSP.** The same applies to the IMPF in (10b), which does not function as a zero tense in this case:

(10) a. *Il **a** **dû*** *beaucoup pleuvoir* . [FRENCH]

         it has MUST.PART a-lot   rain

         'It must have rained a lot'.

    b. *À cette époque-là, la rivière **devait*** *être moins contaminée qu'aujourd'hui*. [FRENCH]

     to this time+there the river   MUST.IMPF be less contaminated than today

       'In those times, the river must have been less polluted than nowadays'

In such configurations, there appears to be a mismatch between syntactic (11a) and semantic (11b) scope. Although it is realized on the modal, tense-aspect morphology determines the location of **Tprej**:

(11)   a. [$_{TP}$ [$_T$ PRES+PERF / IMPF[Modal Verb [vP...]]]]

       b. Modal Verb [PRES+PERF / IMPF[[vP...]]]

There is widespread consensus in the literature that this mismatch between syntactic and semantic scope involves a scope reversal mechanism. Thus, for instance, Stowell (2004) suggests that the epistemic modal originates above tense and that tense morphology moves upwards to combine with the higher epistemic modal head. This means that the interpretation of these structures involves reconstruction. According to this suggestion, the base structure, which is the structure determining the interpretation, corresponds to (11b), from which the surface structure (11a) is derived by a semantically vacuous mechanism of tense-aspect raising.

The existence of this mechanism finds some support in the distribution of past tenses. It has been observed that mandatory choices for tense-aspect categories in a non-modalized sentence apparently resurface as necessary conditions for the epistemic reading of the correspondingly tensed modal sentence (Tasmowski 1980, Laca 2012). Thus, in the following examples the distribution of different past tenses on the modal can be shown to replicate the distribution which is required by the the prejacent in the absence of the modal:

(12)   a. *Marie a   écrit/ *écrivait   ce roman en moins d'un an.*

     [FRENCH]

     Marie has written/ wrote.IMPF this novel in less of a month

    'Marie wrote this novel in less than a month'

b. *Marie a   dû   écrire ce roman en moins d'un an.* [√EPISTEMIC]

Marie has MUST.PART write this novel in less of a month

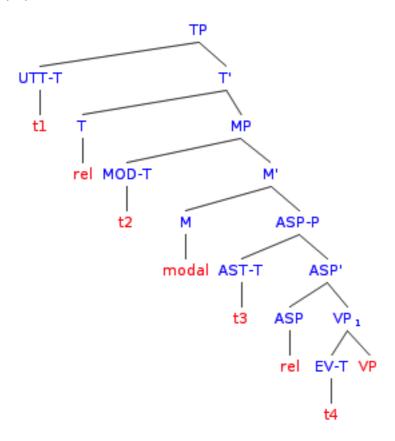'Marie must have written this novel in less than a month'

c. *Marie devait   écrire ce roman en moins d'un an*. [*EPISTEMIC]

Marie MUST.IMPF write this novel in less of a month

'Marie had to write this novel in less than a month'

(13)   a. *En aquella época, el correo   quedaba   / *quedó   lejos.*   [SPAIN]

in that   time   the post office remain.IMPF / remain.SP far away

'In those times, the post office was far away'

b. *En aquella época, el correo   debía   quedar lejos.*

in that   time   the post office MUST.IMPF remain far away

'In those times, the post office must have been far away'

c. **En aquella época, el correo   debió   quedar lejos.*

in that   time   the post office MUST.SP remain far away

However, there are two important problems with this sort of approach: firstly, it resorts to unmotivated and semantically vacuous movement, secondly, it predicts semantic equivalences among different linearisations which, as we will see below, do not necessarily hold.

In a series of papers devoted to the interaction between temporality and modality, Demirdache & Uribe-Etxebarria (2006 *et seq*) have worked out a solution that relies on a uniform cross-linguistic phrase-structure for modals in all of their interpretations, and provides a motivation for movement, which in their analysis takes place in order to rescue an otherwise illicit temporal configuration. The phrase structure they assume is given in (14).

(14)

The syntactic heads, Tense (T°), Modal (M°), Aspect (ASP°) and V°, each contribute a time argument to the temporal calculus of the clause in which they occur, which appears in the specifier position of the respective head. Demirdache & Uribe-Etxebarria follow Condoravdi (2001) in assuming that **MOD-T** is an interval [t, ∝] stretching infinitely into the future. Since past tenses introduce a relation **AFTER**, which orders **UTT-T** after its second argument, and in this case the second argument is **MOD-T,** the resulting configurations are nonsensical: no time can ever be after infinite. It is at this point that movement intervenes in order to rescue the structure: lowering of the past tense to the next available head, M°, results in an interpretable structure. As we will see, this approach, although giving a specific motivation for movement that depends on the assumption that **MOD-T** has a particular interval structure, also faces the problem of the equivalences it predicts.

There is a third possible account for the mismatch between syntactic and semantic scope evidenced by examples such as (10b) and (13b). Notice that lowering of the relationship expressed by the past tense head onto M° in structure (14) makes the tense land in the same position as the modal verb itself. The resulting structure -which for Demirdache & Uribe-Etxeberria is the LF structure relevant for interpretation- is reminiscent of Picallo's (1990) original proposal for the syntax of epistemic modals. According to Picallo, epistemic

modals are base-generated in the same position (head of the I-phrase) as Tense and Agreement. Morphologically, the exponents of Tense are linked to the exponents of Agreement. On the other hand, modal verbs take infinitival clauses as complements, and infinitives do not bear agreement morphology. As a result, the only possible realization site for tense morphology is the modal head, even when Tense semantically affects the complement of the modal verb and not the modal verb itself:

(15) a. [IP [I°Modal - Tense+Agr] [VP Marie DÉTESTER Jean depuis longtemps]] [FRENCH]

　　　b. [IP Marie **devait** [VP détester Jean depuis longtemps]]

　　　　　　　Marie MUST.IMPF hate　　Jean since long+time

(16) a. [IP [I°Modal - Tense+Agr] [VP el ladrón ENTRAR por la ventana]]　　　[SPAN.]

　　　b. [IP El ladrón **pudo**　[VP entrar por la ventana]]

　　　　　　　the thief CAN.SP　　enter by　the window

It follows from the above considerations that morphological realization of a simple tense on a modal cannot discriminate between an operator that is scoping above the modal, and thus affecting **TPERSP**, and an operator that is scoping below the modal and affects **TORIEN.** According to what we have seen in section 2 above, (15b) is actually ambiguous, as shown by the contrast between (17a) and (17b):

(17) a. *J'ai　　pensé que　Marie devait　　détester Pierre depuis longtemps.*　[FRENCH]

　　　　　I have thought that Marie MUST.IMPF hate　　Pierre since long+time

　　　　　　　'I thought that Marie must have hated Pierre for a longtime'

　　　b. *Je pense que Marie devait　　　détester Pierre depuis longtemps.*

　　　　　I think　that Marie MUST.IMPF hate　　Pierre since long+time

　　　　　　　'I think that Marie must have hated Pierre for a longtime'

In (17a), under a past attitude, tense morphology affects **TPERSP**: as a zero tense, IMPF indicates precisely simultaneity to the past attitude, and not to **UTT-T**. **TORIEN** is itself simultaneous. By contrast, in (17b), the absence of a licensing past attitude determines a non-anaphoric interpretation of IMPF. In this environment, IMPF expresses anteriority wrt. **UTT-T**, an anteriority affecting **TORIEN. TORIEN** is thus anterior, while **TPERSP** is simultaneous to a present attitude and, therefore, to **UTT-T**.

Things are different in the case of perfect morphology, whose exponents are not linked to the exponents of agreement morphology. Perfect morphology is therefore free to occur inside the infinitival complement of the modal. The question that arises here concerns the reasons for the existence and putative equivalence of the two alternative linearisations (18a) and (18b):

(18) a. *Il a dû*   *beaucoup pleuvoir* .   [FRENCH]
        it has MUST.PART a-lot   rain
           'It must have rained a lot'.

   b. *Il doit*   *avoir beaucoup plu.*   [FRENCH]
      it MUST.PRES have a-lot   rained.
          'It must have rained a lot'.

Both scope-reversal approaches -Stowell's reconstruction approach and Demirdache & Uribe-Etxebarria's lowering approach for anteriority relationships base-generated above ModP- predict an equivalence between these two linearisations. For the former, (18a) originates from the same base structure as (18b) by a semantically vacuous mechanism which we will dub OVERT PERFECT RAISING. For the latter, (18a) ends up having the same LF as (18b) by a semantically driven rescue mechanism of 'anteriority lowering'. The third possible account we sketched, building on Picallo's original suggestion as to modals being generated with Tense and Agreement under I°, does not predict such an equivalence, but is at a loss to explain why perfect morphology in (18a) should affect **TORIEN** and not **TPERSP**, as it is generally assumed in the interpretation of such examples.

2.3. HIGHER PERFECTS AND EPISTEMIC READINGS

From the previous discussion, it emerges that the case of morphologically simple past tenses realized on modals differs from the case of perfect morphology realized on modals. Simple past tenses have simply no alternative realization sites, whereas it is entirely possible for perfect morphology to be hosted by the infinitival complement of the modal. Interestingly enough, languages differ in the possibilities they exhibit for obtaining epistemic readings in the presence of what we will call HIGHER PERFECTS, and this variation also holds among different varieties of the same language.

Thus, contemporary French freely admits epistemic readings for HIGHER PERFECTS, both when the auxiliary is in the present tense (*PASSÉ COMPOSÉ*) and when it is in the IMPF (PLUPERFECT). Next to examples like (18a), one finds quite often examples like (19a-b).

(19) a. *Quelqu'un* avait   dû   *le   jeter dehors, mais qui ? Qui ?*
        somebody have.IMPF MUST.PART him throw outside, but who who

        Qui avait pu ?   *Il ne se souvenait pas*   \<googlesearch\>
        who have.IMPF CAN.PART

        'Somebody must have thrown him outside, but who? Who? Who could have? He didn't
               remember'

    b. *Ces pièces, il* avait   dû   *les garder*   \<googlesearch\>
        these coins he have.IMPF MUST.PART them keep

        en se disant qu'elles prendraient de la valeur un jour. Il ne s'était pas trompé.
        'Those coins, he must have saved them, supposing that their value would eventually
               increase. He had not been proven wrong'.

In epistemic readings, the sequence PLUPERFECT + MODAL corresponds to one of two different temporal configurations. In the most plausible interpretation of (19a), which instantiates an inner monologue in free indirect speech, **TPERSP** is simultaneous to a past attitude (made explicit in the last sentence, 'He didn't remember') and **TORIEN** is anterior. In (19b), **TPERSP** is possibly present, and **TORIEN** exhibits a two-step anteriority.

Spanish clearly differs from French, since epistemic readings for the sequence PLUPERFECT + MODAL are very rarely attested. In fact, a search through Davis's *Corpus del español* returns only a couple of clear examples:[4]

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[4] This frequency is as low as that of progressive aspect on a modal with an epistemic reading, for which there are very rare examples such as:
(i) *ya había puesto en conocimiento del Ministerio Fiscal las situaciones que se* **estaban pudiendo producir** *a tenor de las denuncias que había hecho la OCU* (Cortes CL-M54)
'I had already informed the Attorney General of the situations that might have been happening according to the complaints filed by the OCU'.

(20) *El instrumento emitió un quejido desagradable. El resto de sus compañeros pareció no*

　notarlo, pero a Joe Hortiz le pareció que

　el chirrido se　　había　　tenido　　que oír en las plateas más lejanas

　the squeak REFL have.IMPF HAVE.PART that hear in the seats more distant

'The instrument let out an unpleasant moan. The rest of his partners seemed not to notice,

but

　Joe Ortiz had the impression that the squeak must have been audible even from the most

distant

　seats.' [Lamberto García del Cid, El violinista en el estrado, <www. corpusdes

espanol.org>]

　As for the sequences PRESENT PERFECT + MODAL, they exhibit considerable variation

accross Spanish dialects, and this variation correlates with variation in the semantics and

distribution of the PRESENT PERFECT (see Laca 2009a, 2009b). Thus, Vázquez Laslop (2004)

shows that examples like (21), in which the sequence has an epistemic reading, are quite

frequent in European Spanish, but very rare in Mexican Spanish:

(21) *Me he　　　debido　　　quedar dormida.*　　　　　[SPAN.]

　me have.1SG MUST.PART remain asleep

　'I must have fallen asleep'

　This finding correlates with the fact that the PRESENT PERFECT in European Spanish may

function as a past tense (with some restrictions requiring recently happened or particularly

noteworthy events), whereas in Mexican Spanish -as in other American varieties- it has a

predominantly aspectual value as a perfect and exhibits particular restrictions concerning the

makeup of the extended-now interval it introduces.[5]

　　Epistemic readings for HIGHER PERFECTS are also sporadically attested in Dutch

(Boorgaart 2005) and in Western and Northern Norwegian dialects (Eide 2001). In both

languages, the PRESENT PERFECT may function as a past tense -as is the case in French and in

European Spanish.　Interestingly　enough,　in　the　Norwegian　dialects　the　verb　of　the

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[5] In American Spanish varieties in which PRESENT PERFECTS have evidential uses as inferences from results (particularly, but not exclusively, Andean varieties), examples like (21) above are particularly frequent. This is not at all surprising, since it instantiates a sort of "evidential concord": the modal expresses an inference, the tense specifies it as an inference from results.

prejacent must be a perfect participle if the intended reading of the modal is the epistemic reading:

(22) a. *Han har måtta arbeidd med det i heile natt.*   [NORWEGIAN]

  he has mustPERF workPERF on it in all night

  'He must have worked on it all night through.' (Eide 2001, 233-4)

  b. *Hu   har   kunna   vorre   her   og   forre   igjen.*

  she has canPERF bePERF here and leavePERF again

  'She may have been here and left again.'

This sort of 'perfect doubling' has a slightly different counterpart in Spanish, in which a modal in the simple (perfective) past cooccurs with a perfect infinitive. The anteriority relation seems to be interpreted only once -in fact, the perfect infinitive is often assumed to be redundant in such cases, cf. Bosque (1999)-, and the sequences can only have an epistemic or a counterfactual reading. They differ in this respect from the sequences lacking perfect morphology on the infinitive, which are three-way ambiguous among an epistemic, a counterfactual and a root (implicative) reading:

(23) a. *El ladrón pudo   haber entrado por la ventana.*   [SPAN.]

  the thief   CAN.SP have entered   by the window

   (i) 'The thief may have come in through the window'.

   (ii) 'The thief might have come in through the window'.

  b. *El ladrón pudo   entrar por la ventana.*

   the thief CAN.SP enter by   the window

   (i) 'The thief may have come in through the window'.

   (ii) 'The thief might have come in through the window'.

     (iii) 'The thief managed to come in through the window'.

The correlation between the occurrence of HIGHER PERFECTS in epistemic readings and the existence of past interpretations for a   PRESENT PERFECT, on the one hand, and the phenomenon of 'perfect doubling', on the other, suggest a possible explanation for HIGHER PERFECTS by analogy to a rather well attested phenomenon, the externalization of inflection. The externalization of inflection is a morphological phenomenon by which inflectional material that gets trapped between a stem and other morphological material -for instance

enclitics- inside a word, diachronically tends to migrate towards the edge of the word. In intermediate stages, this migration may take the form of a doubling of inflection, which appears both at its original site and at the edge of the word (cf. Haspelmath 1993). The phenomenon can be illustrated by the substandard Spanish forms (24b-c), which are variants for the standard sequence (24a):

(24) a. den+le

        give.IMPERATIVE.3PL+Clitic.3SG.DATIVE

    b. denlen

   give.IMPERATIVE.3PL+Clitic.3SG.DATIVE+3PL

    c. delen

  give.IMPERATIVE+Clitic.3SG.DATIVE+3PL

The analogy I would like to suggest is that perfects that have become more tense-like, such as the French, European Spanish, Dutch or Norwegian ones, may be realized at the site where simple tense morphology must necessarily be realized, i.e. on the modal verb itself. Of course, much more work is needed, particularly of the diachronic kind, in order to see if this speculative suggestion is on the right track. What is undeniably the case is that, when comparing contemporary French and Spanish, one observes a clear preference for HIGHER PERFECTS in French. Whereas HIGHER PERFECTS are for all practical purposes restricted to root readings in most Spanish varieties[6], in French they are more frequent and exhibit more latitude of interpretation (see Laca 2012).

3. AMBIGUITIES AND EQUIVALENCES IN TEMPORAL CONFIGURATIONS

3.1. THE SOURCES OF AMBIGUITY AND EQUIVALENCE

The apparent mismatches between syntactic and semantic scope in epistemic readings of modals are none too surprising in view of the conjunction of two facts. Firstly, the structures we are discussing are monoclausal, and have therefore only one T projection, but the temporal configuration in modal sentences requires at least two temporal relations to be specified, namely **TPERSP** and **TORIEN**, which constrain, respectively, the time of modal

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[6] Recall, however, that PRESENT PERFECTS may appear on epistemic modals in European Spanish and in the varieties mentioned in footnote 3.

evaluation and the time of the prejacent. Secondly, modals in epistemic readings take propositions as arguments. We follow some recent approaches in assuming that propositions are functions from worlds (and not from world-time pairs) into truth values (see e.g. Kush 2011). This means that propositions are not properties of times, but quantified or referential statements about a given time span. In order to identify the relevant time span, the argument of epistemic modals has to be semantically "tensed".

The conjunction of these facts has led researchers to postulate at least three possible structures (25a-c) for the interaction of epistemic modality with tense:

(25)   a. [T [Modal [vP…..   (Condoravdi 2001, Demirdache & Uribe Etxeberria 2006)

        b. [Modal [T [vP…..   (Steedman 1997, Stowell 2004, Hacquard 2006)
        c. [T [Modal [T [vP…..   (Reed 2005)

The structure (25c), with its two Tense projections, provides a syntactic space for the expression of the semantically necessary relationships (**TPERSP** and **TORIEN**). Nonetheless, it goes against the manyfold syntactic indications for the monoclausality of modalized sentences (see for instance Picallo 1990). In fact, it is rarely defended, and the arguments advanced in its defense (mainly, the fact that both negation and aspect may figure on the modal or on its complement) are not compelling. Moreover, the hypothesis that there are two Tense projections does not account for the intriguing fact that only one of the two temporal relations is fully specified, whereas the other is calculated by default mechanisms. This is precisely what is predicted by the clearly monoclausal structures (25a) and (25b).

In (25a), it is **TPERSP** that is specified by Tense. **TORIEN** is calculated by a default mechanism which roughly stipulates that states will be simultaneous or forward shifted wrt. the time of modal evaluation, events will be always forward-shifted, and the event giving rise to the 'perfect state' denoted by perfect infinitives will precede the time of modal evaluation (see Condoravdi 2001, Laca 2012, Falaus & Laca 2014).

In (25b), it is **TORIEN** that is specified by Tense. **TPERSP** is calculated by a default mechanism that stipulates that the time of modal evaluation in the case of epistemic readings is always simultaneous to the (relevant) *now* of the relevant epistemic agent.

Disregarding the question of the comparative merits of these two solutions, I'd like to stress the fact that both of them predict a number of ambiguities and equivalences. They are a source of ambiguities, because two relations have to be semantically specified, but only one

of them can be overtly specified. They are a source of equivalences because, for both approaches, the site of realization of the temporal information turns out to be irrelevant in some crucial cases. In fact, both approaches have to contemplate movement for cases such as (15b) and (16b) above, repeated below for convenience:

(26) a. [IP Marie **devait** [VP détester Jean depuis longtemps]]

        Marie MUST.IMPF hate   Jean since long+time

    b. [IP El ladrón **pudo** [VP entrar por la ventana]]

        The thief CAN.SP   enter   by the window

In order to arrive at the most salient interpretation for (26a-b) from a structure like (25a), some sort of lowering of the anteriority relation expressed by the past tense is required, as proposed by Demirdache & Uribe Etxeberria (2006, 2008) (cf. above section 2.2). In order to arrive at the overt structure from a structure like (25b), raising of the past tense is required, as suggested by Stowell (2004). Thus, movement is necessary in both cases, and movement implies that linearisation is not a safe guide to the structure that underlies the interpretation.

3. 2. EXPECTED AMBIGUITIES AND EQUIVALENCES.

Now, the expected ambiguities and equivalences do indeed exist to a large extent[7], and they are compounded by the ambiguities in the interpretation of the tenses themselves. Let us illustrate this firstly with modals bearing PLUPERFECT morphology in French. As discussed above, French freely resorts to HIGHER PERFECTS in epistemic readings, contributing an anteriority relation that affects the prejacent, i.e. is interpreted at the level of **TORIEN.** Besides, the IMPF on the auxiliary is ambiguous between an interpretation as a zero tense, in which it contributes a simultaneity relation interpreted at the level of **TPERSP**, and an interpretation as a 'real past', in which it contributes an anteriority relation that has to be interpreted at the level of **TORIEN**. As a consequence, a modal bearing PLUPERFECT morphology in an epistemic reading can be associated to two distinct temporal configurations:

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[7] We are restricting our attention to ambiguities in the temporal configurations of epistemic readings, thus ignoring further ambiguities which involve other "flavors" of modality, such as the ambiguities among implicative, counterfactual and epistemic readings mentioned for example (23b) above.

(27) a. **PLUPERFECT + MODAL + V.INF**

  b. **TPersp: simultaneous, anaphoric; TOrien: anterior**

  c. **TPersp: simultaneous, deictic; TOrien: two-step anterior**

The attested examples below (in which the tense of the matrix verb clearly determines whether **TPERSP** may be anaphoric or must necessarily be deictic) show that both possibilites are realized, with (28a) corresponding to the configuration (27b), and (28b) to the configuration (27c):

(28) a. *elle a eu tout lieu de penser [...] qu'il était quasi certain*

  que M. de Nemours avait   dû   comprendre qu'elle   l'avait vu.

  that M. de Nemours have.IMPF MUST.PART understand that she him had seen.

  'She had all reason to suppose that it was almost certain that M. de Nemours must have

  understood that she had seen him'

  b. *Je n'ajoutai rien mais je pense*

  qu 'elle avait   dû   comprendre mes intentions

  that she have.IMPF MUST.PART understand my intentions.

    'I did not add anything, but I believe she must have understood what I intended'

Now, the same ambiguity in temporal configuration resurfaces for modals bearing IMPF morphology which embed a perfect infinitive:

(29) a. **IMPF + MODAL + V.PERF.INF**

  b. **TPersp: simultaneous, anaphoric; TOrien: anterior**

  c. **TPersp: simultaneous, deictic; TOrien: two-step anterior**

 In the attested examples below, (30a) exhibits the same temporal configuration as (28a), and (30b) corresponds to (28b):

(30) a. *Il essaya d'en expliquer le mécanisme et décrivit l'appareil dans tous ses détails ;*

    quand il crut   que l'on devait   avoir compris,

  when he think.SP that ON MUST.IMPF have understood

    il ouvrit la porte.

'He tried to explain the mechanism and he described the machine in all detail; when he thought we must have understood, he opened the door'

b. *Je pense que chacun d'eux* devait   avoir compris *mon besoin de solitude.*

I think that   each of+them MUST.IMPF have understood my need of solitude

'I think everyone of them must have understood that I needed to be alone'

In this case, the ambiguities arise because of the ambiguity of IMPF, while the equivalences arise because of the apparent semantic vacuousness of the mechanism by which HIGHER PERFECTS are generated or interpreted. Recently, however, Mari (2011: 134) has questioned this semantic vacuousness by arguing that examples (31a) and (31b) are not strictly equivalent:

(31) a. *Pierre a   pu être   recompensé par la médaille Fields lorsqu'il est entré au CNRS.*

Pierre has CAN.PART be awarded by the medal Fields when he is entered to+the CNRS

b. *Pierre peut avoir été recompensé de la médaille Fields   lorsqu'il est entré au CNRS.*

Pierre CAN.PRES have been   awarded by the medalFields when he is entered to+the CNRS

'Pierre may have been awarded the Fields medal when he entered the CNRS'

According to Mari (2011), only (31b) admits an interpretation in which Pierre's getting the Fields medal precedes his being hired at the CNRS. This argument against the equivalence does not seem compelling. It simply shows that a result-state interpretation for perfect morphology is only possible when perfect morphology appears on the infinitive. In result-state interpretations, perfect infinitives can be anchored to temporal adverbials or temporal clauses (the state of having being awarded the Fields medal holds at the time given by the temporal clause), and not to the reference time of the sentence.[8] The crucial fact pointing to the semantic vacuousness of OVERT PERFECT RAISING is that (31b) also has a reading which is equivalent to the only reading of (31a), namely that it is compatible with

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[8] See Demirdache & Uribe Etxeberria (2006) on the analysis of the future perfect configurations in modal environments exemplified in (i) as instances of result-state interpretations for perfect infinitives:
(i) Mary must have completed her dissertation by October.
In such configurations, the modal has a root interpretation, **TPERSP** is present and **TORIEN** is future, despite the perfect infinitive, which denotes a result-state which is said to obtain at a future time.

what is known/believed by the Speaker now that Pierre got the Fields medal at the time he entered CNRS.

3.3. PAST TENSES AND ASPECT

Romance past tense morphology not only specifies anteriority wrt. **UTT-T/T-matrix**, but it also carries aspectual information. The simple past is a perfective tense, whereas non-anaphoric (real-past) IMPF morphology is at least non-perfective. Following Smith (1991) and much work thereafter, we assume that perfective aspect provides an interval which includes the temporal trace of the event, most importantly its initial and final boundaries. As for IMPF, I have argued elsewhere (see Laca 2003) that its aspectual profile is underspecified, although usually interpreted imperfectivily, i.e. as providing an interval which is included in the temporal trace of the event and excludes its final boundaries. There is widespread consensus (see Borgonovo & Cummins 20007, Demirdache & Uribe-Etxeberria 2008 among others) that in cases such as (26a-b) above, not only the anteriority relation, but also the aspectual information is interpreted at the level of the prejacent. Recall that it is precisely the correspondance between the mandatory aspectual choice in the non-modalized prejacent and the aspectual choice required for the past tense appearing above the modal that has furnished an important argument for scope-reversal approaches (see above, section 2.2.). The question that arises here concerns the possible equivalences between linearisations with modals bearing past morphology and linearisations in which modals bearing present morphology dominate a perfect infinitive, as illustrated for French in (32a-b)[9] and for Spanish in (33a-b) and (34a-b):

(32) a. *Lou devait connaître la cause de la tension de Nietzsche.*

   Lou MUST.IMPF know the cause of the tension of Nietzsche

  b. *Lou doit avoir connu la cause de la tension de Nietzsche.*

    Lou MUST.PRES have known the cause of the tension of Nietzsche

    'Lou must have known the cause for Nietzsche's tension'

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[9] All through this paper, we ignore (perfective) simple past morphology in French (PASSÉ SIMPLE), because the analysis of this tense, which is confined to a special style (roughly, literary narrative) in the contemporary language, is particularly problematic.

(33) a. *Seguramente, ella debía   saber quién estaría en la fiesta.*

    surely   she MUST.IMPF know who would+be in the party

  b. *Seguramente, elle debe   haber sabido quién estaría en la fiesta.*

    surely   she MUST.PRES have known who would+be in the party

   'Surely, she must have known who would be at the party'

(34) a. *Además de misioneros, también debieron   llegar a China otros mercaderes europeos.*

      besides of missionaries also   MUST.SP arrive to China other merchants european

  b. *Además de misioneros, también deben haber llegado a China otros mercaderes europeos.*

      besides of missionaries also MUST.PRES have arrived to China other merchants european

      'Besides missionaires, other European merchants must have also reached China'

These examples are apparently equivalent. Note, however, that in the case of French, the equivalence (32a-b) leads to a clear paradox in the light of what we have seen in sections 2.2., 2.3 and 3.2. above. Since we have assumed in section 3.2. that OVERT PERFECT RAISING is vacuous in French, (32b) is predicted to be equivalent to (32c) below, and thus, by transitivity, (32c) should be also be equivalent to (32a):

(32) c. *Lou a   dû   connaître la cause de la tension de Nietzsche.*

     Lou has MUST.PART know   the cause of the tension of Nietzsche

     'Lou must have known the cause for Nietzsche's tension'

But this conclusion clearly contradicts the observation made in section 2.2., namely that there is a clear contrast between IMPF and PASSE COMPOSE morphology on an epistemic modal, a contrast reproducing the aspectual choice for the prejacent in the absence of the modal. At first sight, however, the conclusion holds: both (32a) and (32c) may be paraphrased as:

(35) 'According to the evidence we have now, at that time in the past Lou had knowledge of the causes for Nietzsche's tension'

This suggests some degree of neutralisation between two past tenses with contrasting aspectual profiles when they appear on an epistemic modal. This suggestion is reinforced by an observation due to Mari (2011), namely that the choice of PASSE COMPOSE morphology on an epistemic modal sometimes does not reflect what would be the mandatory or natural aspectual choice for the prejacent. This is the case, for instance, when the prejacent contains an individual level state, which requires IMPF morphology:

(36) a. *Hélène a   dû   avoir les yeux bleus.*

   Hélène has MUST.PART have the eyes blue

  'Helen must have been blue-eyed'

 b. #*Hélène a eu les yeux bleus.*

   Hélène has had the eyes blue

  #'Helen used to be blue-eyed'

 c. *Hélène avait les yeux bleus.*

  Hélène have.IMPF the eyes blue

  'Helen was blue-eyed'

An analogous phenomenon can sporadically be observed in Spanish: there are cases in which (perfective) simple past morphology on an epistemic modal cannot possibly reflect (perfective) simple past morphology in the prejacent:

(37) a. *Albéniz murió a los 48 años, edad que está usted a punto de cumplir. ¿Se considera usted ahora*

 con   la   mentalidad   que   pudo   tener   Albéniz   en   ese   momento ? [*www.**corpusdelespanol**.org*]

 with the mentality that CAN.SP have Albéniz in that moment

 'Albéniz died at the age of 48, the age you are about to have. Do you believe you have now the same mindset that Albéniz might have had at the time?'

 b. …*con la mentalidad que *tuvo   / tenía Albéniz en ese momento*

  with the mentality that have.SP / have.IMPF Albéniz in that moment

  'the same mindset that Albéniz had at the time'

The paradox we have uncovered consists in the fact that sometimes there is a correlation between the unacceptability of a sentence containing an epistemic modal in the

PASSÉ COMPOSÉ in French or in the (perfective) simple past in Spanish and the mandatory or natural aspectual choice for the prejacent -which excludes a PASSÉ COMPOSÉ or a simple past-, but sometimes the modalized sentences are acceptable, while not conforming to the mandatory or natural aspectual choice for the prejacent. The latter situation, illustrated in (36a-b) and (37a-b), contrasts with the correlation observed in (38a-b) and (39a-b):

(38)   a. *Marie a dû détester Pierre depuis longtemps.

Marie has MUST.PART hate Pierre since long+time

Intended reading: 'Marie must have hated Pierre for a long time'

b. *Marie a détesté Pierre depuis longtemps.

Marie has hated Pierre since long+time

(39)   a. *En aquella época, el correo   debió   quedar lejos. [SPAN.]

in that   time   the post office MUST.SP remain far away

Intended reading: 'In those times, the post office must have been far away'

b. *En aquella época, el correo   quedó   lejos.

in that   time   the post office remain.SP far away

Much further work is required before we can propose a solution for this paradox. We surmise, firstly, that it will require in-depth examination of the respective aspectual profiles for the PASSÉ COMPOSÉ, the perfective simple past, and, last but not least, perfect infinitives, and, secondly, that it involves a complex interplay among these aspectual profiles, the Aktionsart of the prejacent, and temporal adverbials.

The same holds for the apparent equivalences illustrated in (32)-(34) above. These equivalences exhibit at least one important limitation: a modal in the present tense, as in the sentences repeated below for convenience, necessarily renders **Tmod** simultaneous to **UTT-T,** i.e. **TPERSP** is necessarily both simultaneous and deictic:

(40) a. *Lou doit avoir connu la cause de la tension de Nietzsche*.

Lou MUST.PRES have known the cause of the tension of Nietzsche

'Lou must have known the cause for Nietzsche's tension'

b. *Seguramente, elle debe   haber sabido quién estaría en la fiesta*.

surely   she MUST.PRES have known who would+be in the party

'Surely, she must have known who would be at the party'

c. *Además de misioneros, también deben haber llegado a China otros mercaderes europeos.*

besides of missionaries also MUST.PRES have arrived to China other merchants european

'Besides missionaires, other European merchants must have also reached China'

As a consequence, and by contrast with the corresponding sentences bearing past morphology on the modal, such sentences cannot be embedded under past attitudes. Double access (DAR)-configurations seem to be impossible for epistemic modals (contra Stowell 2004):

(41) a. **J'ai   cru   que Lou doit avoir connu la cause de la tension de Nietzsche.*

I have believed that Lou MUST.PRES have known the cause of the tension of Nietzsche

Intended reading: 'I thought that Lou must have known the cause for Nietzsche's tension'

b. **Pedro pensó que   ella debe   haber sabido quién estaría en la fiesta.*

Pedro thought that she MUST.PRES have known who would+be in the party

Intended reading: 'Pedro thought that she must have known who would be at the party'

To summarize, the distribution of aspectualized past tenses and the interpretation of the present tense show that   there are limits to the predicted equivalences and ambiguities, which still require to be explored in detail.

4. CONCLUDING REMARKS

In this paper, we have explored temporal configurations in epistemic readings. The semantics of these temporal configurations seems to be quite straightforward and constrained: epistemic readings are associated with a simultaneous (deictic or anaphoric) TPERSP and a past or simultaneous TORIENT. However, particularly in languages in which modals can be fully inflected for temporal-aspectual categories, there are various syntax-semantic mismatches involving the site of realization and the site of interpretation of tense-aspect

morphology, which give rise to far-reaching compositionality issues. After presenting the main solutions that have been proposed for such syntax-semantic mismatches, we have shown that there are important differences between the case of perfect morphology on epistemic modals (OVERT PERFECT RAISING) and the case of simple past tenses on epistemic modals. In the former case, cross-linguistic variation seems to correlate with the status of present perfects and their possibility to function as past tenses.

We have also shown that the ambiguities and equivalences among temporal configurations which are predicted by scope reversal solutions are to be expected, since these configurations have only one syntactic Tense projection, but their interpretation requires two "semantic tenses", one for TPERSP and another for TORIENT. Necessarily, one of these semantic tenses will be calculated by a default mechanism, and linearisation does not entirely determine which one will be so interpreted.

The expected ambiguities and equivalences hold to a large extent, but closer examination of the distribution of aspectual past tenses reveals a possible neutralization between aspectual profiles in some contexts. This neutralization is predicted by OVERT PERFECT RAISING and scope-reversal approaches, but is paradoxical in view of the correlations between the mandatory aspectual choice in the prejacent and the aspect on the modal observed elsewhere. Much further research is needed in order to determine the exact perimeter of the equivalences and thus the adequacy of scope-reversal approaches.

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RESUMO: Neste artigo, exploramos as restrições nas configurações de tempo dentro de leituras epistemológicas em francês e em espanhol, duas línguas em que os modais podem ser totalmente flexionadas para as categorias modo-temporais. As leituras epistemológicas são associadas a uma PERSPECTIVA TEMPORAL simultânea (dêitica ou anafórica) e também a um passado, ou ORIENTAÇÃO TEMPORAL, simultâneo, mas existem incompatibilidades sintático-semânticas importantes que envolvem tanto o local de realização quanto o local da interpretação de tempo-modo na morfologia. Mostramos que há diferenças importantes entre o caso da morfologia perfeita em modais epistêmicos (OVERT PERFECT RAISING) e o caso do tempo passado simples em modais epistêmicos. No primeiro caso, a variação entre línguas parece correlacionar-se com o presente perfeito e suas possibilidades de funcionar como tempos passados. Argumentamos, sobretudo, que as inadequações de sintático-semânticas são esperadas nesse domínio, porque essas configurações têm apenas uma projeção sintática de Tempo, mas sua interpretação requer dois "tempos semânticos" – um para a PERSPECTIVA TERMPORAL e outro para ORIENTAÇÃO TEMPORAL. Necessariamente, um desses tempos semânticos será calculado por um mecanismo-padrão, sendo que a linearização não determina inteiramente qual deles será de determinada maneira interpretado.

PALAVRAS-CHAVE: Verbos modais; leituras epistemológicas; interpretações temporais; tempo; escopo reverso.