

Epistemic Modals and Past Tenses

1. Introduction. It is generally assumed that on the epistemic reading of modal verbs, the evaluation time of the modal (MOD-T) is the utterance time (U-T), cf. e.g. Stowell 2004. In languages like French, where, contrary to English, modals can be fully inflected and bear tense/aspect morphology, it is often assumed that the past or perfect(ive) morphology on the epistemic modal originates between the modal and the verbal projection, raises to combine with the modal, but is interpreted in its original position (PAST/PERF>MOD>P is interpreted as MOD>PAST/PERF>P ; cf. a.o. Stowell 2004, Hacquard 2006, Laca 2008). Thus, the French translations (3)-(4) of (1) below are supposed to be equivalent.

- (1) There might have been ice cream in the freezer. (von Fintel & Gillies 2008, (21))
- (2) *Il pouvait y avoir de la glace au frigo.* OK C1, OK C2, OK C3
It-IMPERS. can-PAST.IMP. PRN have of the ice-cream in-the freezer.
'There might have been ice cream in the freezer.'
- (3) *Il a pu y avoir de la glace au frigo.* #C1, #C2, OK C3
It-IMPERS. can-PRST.PERF. PRN have of the ice-cream in-the freezer.
'There might have been ice cream in the freezer.'
- (4) *Il peut y avoir eu de la glace au frigo.* #C1, OK C2, OK C3
It-IMPERS. can-PRES. PRN have had of the ice-cream in-the freezer.
'There might have been ice cream in the freezer.'

2. Against Synonymy. We present several new pieces of data challenging the claim that HAVE MOD epistemic sentences (henceforth ESs), cf. (3), are equivalent to MOD HAVE ones, cf. (4). Firstly, while MOD HAVE-ESs can have a generic reading, HAVE MOD ones cannot, cf. (5)-(6) :

- (5) On *peut*_{PRES.} (*/pouvait*_{PAST.IMP.}) très bien *avoir été*_{PERF.} membre d'un parti communiste sans avoir été véritablement communiste. (Internet)
One might very well have been a member of the communist party without having really been a communist.
- (6) #On a très bien *pu*_{PRES.PERF.} *être membre*_{IMP.} d'un parti communiste sans être véritablement communiste. (generic reading)

The contrast is easy to explain if one assumes that tense/aspect morphology is interpreted *in situ* : (5) is blocked because a perfective sentence cannot have a generic interpretation (cf. Carlson 1980, Dahl 1985). Secondly, while ESs are incompatible with future adverbials when PERF is on the modal, it is not the case when it is on the infinitive, cf. (7)-(8). Again, this contrast remains unexplained if the perfect is interpreted below the modal in (8). Note that (8) is acceptable if the present perfect on the modal is replaced by a past imperfective (the *imparfait* form 'pouvait').

- (7) Votre voiture *peut*_{PRES.IMP.} très bien *avoir été*_{PERF.} détruite demain.
Your car might very well be destroyed tomorrow
- (8) *Votre voiture a très bien *pu*_{PRES.PERF.} (OK *pouvait*_{PAST.IMP.}) *être*_{IMP.} détruite demain.

Thirdly, different epistemic contexts are allowed by each translation of (1). In the original context of von Fintel & Gillies (2008), Sophie is looking for some ice cream, and checks the freezer in *t*. There is none in there. She is then asked why she opened the freezer in *t*, and replies (1) (**Context 1**, or C1). In C1, (2) is acceptable, but (3) and (4) are not. In our variant **Context 2**, Sophie wants to check the freezer in *t*, but Paul stands in her way, and asks why Sophie wanted to open it. In C2, (3) is still unacceptable, but (4) is perfect. In a variant **Context 3** of Context 2, Paul takes something from the freezer that Sophie cannot see before asking his question. This time, (3) is as acceptable as (4). The facts are summarized at the right of examples (2)-(4).

Proposal (0). Scope and temporal intervals. In view of these facts and in line with Eide 2003, Boogaart 2007 and von Fintel & Gillies 2008, we admit that epistemic modals can be in the scope of Tense/Aspect, which is thus interpreted *in situ* in (2)-(4). Besides, with Boogaart 2007, we admit that the evaluation point of epistemic modals is provided by the aspectual point of view. In the scope of Tense/Aspect is thus not the evaluation point (*contra* von Fintel & Gillies), but only the alethic/metaphysical possibility contributed by the 'epistemic' modal (cf. Cantwell 2009), cf our paraphrases of (3) in (10) compared to the one one can attribute to von Fintel & Gillies in (9).

- (9) 'Based on the evidence I had in the past, it was possible that there was some ice cream in the freezer.'
PAST>EPIST. EVAL. +POSS von Fintel & Gillies
- (10) 'Based on the evidence I have now [cf. present view point provided by Present perfect, cf. below], it was possible that there was some ice cream in the freezer.'
PAST>POSS
EPIST. EVAL. = PRST VIEW POINT ASPECT

To explain the facts just described, we propose to differentiate three temporal intervals instead of two : MOD-T (the interval during which the possibility takes place), ADJ-T (the interval during which the adjacent *P* takes place in the world where *might P* is true) and EVAL-T (the time of the modal evaluation). Thus, epistemic modals describe a possibility in MOD-T, evaluated in EVAL-T, that the adjacent *P* is verified in ADJ-T. MOD-T and EVAL-T are both given by aspect/tense on the modal and are most of the time simultaneous, but interestingly disjoint with the present perfect, because of its concomitant present and perfect values. ADJ-T is determined by adverbials or temporal clauses in the adjacent if some are present (like in 7), or, if there is none, by an interaction between tense/aspect on the infinitive and tense/aspect on the modal, too complex to be fully modelised here, but see below for some insights.

3. Proposal (I). Why not a perfective? It has been largely ignored that replacing the *passé composé* by a *passé*

simple (a perfective tense) in (3) blocks the epistemic reading of *pouvoir*. Thus, the fact that the *passé composé* has a present perfect reading (besides its derived perfective reading, cf. e.g. de Swart 2007) is crucial to generate the epistemic reading of the modal, and the claim often made that the aspect on the modal in sentences like (3) is a perfective is an oversimplification. We claim that the present perfect and the past imperfective (cf. (2) and the *pouvait*-version of (8)) are compatible with ESS because they introduce a point of view which can serve as the evaluation point EVAL-P required by the modal, and the perfective incompatible with ESS because it cannot do so. **A. The imperfective.** Boogaart 2005 convincingly argued that the (past) point of view introduced by the imperfective, which conveys simultaneity with a past act of perceiving or thinking, may function as the EVAL-T required by epistemic modal (a past possibility taking place in MOD-T is thus evaluated from the 'present of the past' EVAL-T). **B. The present perfect vs the perfective.** According to its classical analysis, the *passé composé* differ from the *passé simple* in that it presents the past fact as viewed from the present. The U-T can thus function as the EVAL-P required by the modal. On the other hand, the *passé simple* is an 'objective past tense' (Imbs 1960, Wagner & Pinchon 1960), i.e. does not relate the past eventuality to a past or present point of view, and is thus unable to provide the EVAL-T required by the modal.

4. Proposal (II). Imperfect vs present perfect on epistemic modals (ex. (2) vs (3)). We claim that the differences in the epistemic contexts allowed in (2) and (3) come from the following semantic differences. (3) describes a past possibility in MOD-T ('pu'), contemplated from U-T ('a'), that P is verified in ADJ-T. The infelicity of (3) in C1 has two grounds :

- i. Since the *passé composé* describes bounded events (cf. e.g. de Swart *id.*), the possibility denoted in (3) has gone out of existence in U-T (it is *non persistent*). This is unpalatable in C1, since the state of the freezer has not changed between Sophie's attempt and Paul's question (why would it be possible that some ice-cream is on the freezer before Paul's question and not possible after it if the freezer's state didn't change in the meantime?). C3 (contrary to C2) solves this problem : since Paul took something out of the freezer after Sophie's attempt, the possibility to find some ice-cream might be over in U-T.
- ii. Given the conditions of assertability of epistemic sentences, the Assessor of epistemic modals cannot be sure that $\diamond P$ is false at EVAL-T – one does not say 'it might rain' if one is sure it doesn't rain, cf. e.g. von Stechow 2005. With the *passé composé*, EVAL-T=U-T. This is problematic, since in C1, Sophie knows that P is false in U-T (she knows there is no ice cream in U-T). C2 and C3 solve this problem : in these contexts, Sophie has not checked the freezer in U-T, and is thus still ignorant about the truth of P at that time.

(2) does not raise problem [ii.] in C1, since with the *imparfait* on MOD, EVAL-T>U-T (Sophie only has to be 'ignorant in the present of the past'). Besides, the past possibility described by *imparfait* being unbounded, it may very well persist until and after U-T ; (2) is thus acceptable even the state of the freezer has not changed (problem [i.] is not raised either).

5. Proposal (III). Present perfect vs present on epistemic modals (7) vs (8) and (2) vs (4)). The contrast between (7) and (8) can be explained as follows. In (8), given the present perfect, the possibility that P is verified is presented as over at U-T (i.e. MOD-T totally precedes U-T) ; it is thus contradictory to locate ADJ-T after U-T by the adverbial *demain*. Indeed, locating the possibility that P in the past, but P in the future generates a contradiction : at any interval P is true, $\diamond P$ should be true too. On the other hand, the present and the *imparfait* describing unbounded events, (8) describes an unbounded possibility, either located in the present, or in the past (with the *pouvait*-version). In both cases, the unbounded possibility can perpetuate after U-T, and consequently, the aforementioned contradiction vanishes. Besides, we can explain the (in)felicity of (4) in our 3 contexts. (4) is unfelicitous in C1 for the same reason [i] above than (3) (in (4) as in (3), EVAL-T=U-T). However, contrary to (4), (3) is acceptable in C2 . If the 'perfect infinitival' was always a perfect, this should be problematic : (4) would then mean 'from what I [=Sophie] knows now, it is now possible that there has been (perfect) in the past some ice cream in the freezer'. But then, Sophie would justify her attempt to open the freezer by (4) expressing the belief that the freezer might contain no ice-cream anymore, which is not rational. If (4) is a rational answer in C2, it is because the 'infinitival perfect' being the only way to express a past under a (present) modal (cf. Hofmann 1976, Eide 2003, Zwarts 2007), it does *not* systematically have a perfect value. Thus, (4) rather means 'from what I [=Sophie] knows now, it is now possible that there was (imperfect) [and still is] some ice cream in the freezer'.

To conclude, the subtle distribution of tense/aspect morphology on French modals suggests that the reason that past modals resist an epistemic reading is not so much that epistemic modality cannot be in the scope of the past, but rather that epistemic modality is incompatible with perfective aspect (Boogaart 2007), and present perfect forms are in principle compatible with this modality because they have non perfective readings.

Selected references. Boogaart, R. 2005, 'The past and perfect of epistemic modals', *Cahiers Chronos* 5 • Carlson, G. 1980, *Reference to Kinds in English*, Garland Publishing • Condoravdi, C. 2001, 'Temporal interpretations of modals. Modals for the present and for the past', in Beaver, D. & al. *Stanford Papers on Semantics*, CSLI Publications • Dahl, O. 1985, *Tense and Aspect Systems*, Oxford • de Swart, H. 2007, 'A cross-linguistic discourse analysis of the perfect', *Journal of Pragmatics*, 39/12 • Eide, K. 'Modals and Tense', Proceedings of SuB7, Konstanz. • Hacquard, G. 2006, *Aspect of Modality*, MIT Diss. • Hofmann, T. 1976. 'Past Tense Replacement and the Modal System', in *Syntax and Semantics* 7, Academic Press • Imbs ; P. 1960, *L'emploi des temps verbaux en français moderne*, Klincksieck • Laca, B. 2008, 'On modal tenses and tensed modals', ms • von Stechow, K. and T. Gillies 2008, 'CIA Leaks', *Philosophical Review* • Zwart, J. 2007, *On the Tense of Infinitives in Dutch*, Ms, Groningen.