

Epistemic Modals Can Scope Under Past Tense

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Texas Linguistics Society
Austin, June 24, 2012

Main goal of the talk

- **A common claim:** Epistemic modals cannot occur in the scope of (past) tense.
- We argue **against** this claim, based on data from English and Dutch (and a little bit from Gitksan and St'át'imcets).

Overview

1. The ambiguity of *might have*
2. Epistemic modals with past temporal perspective
3. Previous accounts of epistemic modals with past TP
4. Analysis
5. Conclusion

1. The ambiguity of *might have*

Condoravdi (2002): *might have* is ambiguous between two readings.

(see also Huddleston & Pullum 2002:203-204)

Reading A (“epistemic”):

(1) *John might have won the game (but I’m not sure if he did).*

Reading B (“counterfactual”):

(2) *John might have won the game (if he hadn’t been feeling sick that day).*

Temporal Perspective (TP): time at which the modal base is calculated

Temporal Orientation (TO): relation between TP and time of the event

Reading A: Epistemic Modality with Present TP

(1) *John might have won the game (but I'm not sure if he did).*

*'In some worlds compatible with my **present** knowledge, he won in the **past**.'*

➤ Present TP & Past TO

Reading B: "Metaphysical" Modality with Past TP

(2) *John might have won the game (if he hadn't been feeling sick that day).*

*'In some worlds compatible with the facts at a **past time t**, he won at a time **after t**.'*

➤ Past TP & Future TO

- Abusch (2008) has argued that metaphysical modality is actually a subtype of circumstantial modality.

- According to Condoravdi (2002), this ambiguity is due to *have* scoping either over or under the modal:

Reading A: PRES(MIGHT(HAVE(*he win*)))
Present TP & Past TO

Reading B: PRES(HAVE(MIGHT(*he win*)))
Past TP & Future TO

A Third Reading

Our claim: there is an additional reading for *might have*:

Reading C: Epistemic Modality with Past TP

- Condoravdi (2002) claimed that this reading is not attested.
(but she has since changed her mind; cf. Condoravdi 2007, ESSLLI handout)
- According to Condoravdi (2002), metaphysical modals can scope under *have*, giving a past TP. But epistemic modals do not allow this.
- But there actually isn't anything in her 2002 analysis that prevents this.

2. Epistemic Modals with Past TP

The issue: Can English sentences like (3a-c) make an assertion about what was epistemically possible or necessary at some past time?

- (3) a. Jack's wife **couldn't** be rich. (Stowell 2004:625)
b. There **had to** be a hundred people there. (Stowell 2004:626)
c. There **might have** been ice cream in the freezer.(von Fintel & Gillies 2007:87)

No: Groenendijk and Stokhof (1975), Cinque (1999), Drubig (2001), Condoravdi (2002), Stowell (2004), Hacquard (2006), Borgonovo & Cummins (2007), Demirdache & Uribe-Etxebarria (2008), Laca (2008).

Yes: von Fintel & Gillies (2007) (see also Iatridou 1990).

%: Portner (2009:227)

2.1 Evidence from English

There *might have* been ice cream in the freezer. (= 3c)

- von Stechow & Gillies (2007:87): 'It is possible for [the speaker] to have said something true, even though at the time of utterance she knows ... there is no ice cream in the freezer.'

Corpus evidence: *might have*

From the Corpus of Contemporary American English (COCA):

- (4) I wasn't worried about the guards. They knew we were neighbors. I mean, we **might have** been borrowing a cup of sugar, right?
- (5) It was dark. He did not know he was in a new land. Through the window he could see stars trembling in the clear black night. It **might have** been the sky over Valparaso.
- (6) ... suddenly the two of them were riding inside a taxi, in downtown Turin, alive and in broad daylight. They **might have** been two businessmen in bad new suits who'd spent their night carousing.
- (7) J.R., Pete and another Ranger found two dead insurgents and another crawling away, pulling on a pin. It **might have** been a suicide vest or another grenade, Pete said.

Corpus evidence: *had to*

- (8) And here in the bathroom off the hall they found Clorox bottles. Looked like someone tried to wash away evidence. This **had to** be more than just an injured dog.
- (9) Almost unconsciously he kept paddling backward, keeping a wary eye on where the flames were headed, aware now that his life jacket was getting heavier as it inevitably began to soak up water.... Where was everybody? There **had to** be more survivors -- he had seen dozens of men abandoning the ship just before she rolled over.
- (10) Petra went to the left through the crowd, her eyes searching for any signs of trouble. They were so close. This **had to** be it. Here they would uncover the information they needed. She was sure of it.
- (11) A dim chemical light flickered on as we entered, revealing metal boxes of C-6 stacked to the ceiling. There **had to** be over a tonne of the stuff.

Elicited evidence: *might have*

(12) Context: Mary is a school principal and at her school there is a (rather unfair) policy that if there is even a possibility that a teacher has abused a student, the teacher will be fired. Five years ago, Mary fired one of her teachers because he was accused of abusing a student. This morning, the accuser recanted the accusation and conclusive proof was brought forward that the accuser had lied and the teacher was innocent. Mary is now being interviewed by a reporter.

Reporter: How do you feel about the news today that the teacher you fired was in fact innocent?

Mary: Very upset. It is most unfortunate.

Reporter: So why did you fire him at the time, when you did not have conclusive proof that he was guilty?

Mary: Because he *might have* been guilty.

judged perfect by 9/12 participants; marginal by 3/12

Elicited evidence: *had to*

- (13) This morning I opened my phone bill and was shocked when I saw that I owed \$10,000. This **had to** be a mistake! Unfortunately, it turned out to be correct. My husband had used my phone on his latest trip to Papua New Guinea, forgetting about the roaming charges.

judged perfect by 11/12 participants; marginal by 1/12

2.2 Evidence from other languages

Dutch

- Modals are regular verbs, and inflect for tense.
- The tense determines TP.
- We are only considering epistemic readings.

Simple present

(14) *De sleutels kunnen in de la liggen*
the keys can in the drawer lie
'The keys may/might be in the drawer'

Simple past

(15) *De sleutels konden in de la liggen*
The keys could in the drawer lie
'The keys might have been in the drawer.' / 'It was possible that the keys were in the drawer.'

Past perfect

(16) *The sleutels hadden in de la kunnen liggen*

The keys had in the drawer can lie

‘The keys might have been in the drawer’

Subtle difference between the simple past and the past perfect:

- Past perfect: “hindsight” perspective (at the utterance time, the speaker knows the keys were **not** in the drawer).
- Simple past: the protagonist’s perspective at past reference time.
→ more natural in a narrative

- Past TO is expressed by means of a perfect in the scope of the modal:

Present TP, Past TO:

(17) *Hij kan gewonnen hebben*

He can won have

'He may have won'

Past TP, Past TO:

(18) *Hij kon gewonnen hebben* (modal in simple past)

He could won have

'He might have won' / 'It was possible that he had won'

(19) *Hij had gewonnen kunnen hebben* (modal in past perfect)

He had won can have

'He might have won' / 'It was possible that he had won'

Gitksan (Tsimshianic)

- Lexically distinguishes epistemic from circumstantial modals.
(Peterson 2010, Matthewson 2011)
- Past tense is not overtly marked.
- The epistemic modal *imaa* can freely be interpreted with a past TP:

(20) *Context: Stacey bought food to feed Pat's pet, but she didn't know what kind of pet he had, so she bought all the wrong kinds of food. Later she finds out Pat's pet is a snake. Pat asks 'Why did you buy a carrot?' Stacey replies:*

yugw=**imaa**=hl

gax-t

IMPF=**EPIS**=CN

rabbit-3SG.II

'He might have been a rabbit.'

('Feeding Fluffy', www.totemfieldstoryboards.org)

St'át'imcets (Lillooet Salish)

- Lexically distinguishes epistemic from circumstantial modality. (Rullmann et al. 2008)
- Does not obligatorily encode past tense. (Davis 2006, Matthewson 2006)
- The epistemic modal *k'a* allows a past TP interpretation.

(21) *Context: the Canucks were playing last night. you weren't watching the game, but you heard your son sounding excited from the other room, where he was watching. You thought the Canucks were winning, and you called up your friend and said: 'Good sports news!' But after the game, you found out that the Canucks had actually lost, and your son was excited about something his friend was telling him on his cellphone. The next day, you see your friend and he asked you why you had told him there was good sports news when the Canucks had actually lost. You say:*

wá7=k'a t'cum i=Canucks=a
impf=EPIS win PL.DET=Canucks=EXIS

'The Canucks might have been winning.'

3. Previous accounts

- A minority of authors acknowledge the existence of epistemic modals with a past TP in various languages (almost never for English).
Fagan (2001), Boogaart (2007), Eide (2003, 2005), Hacquard (2006), Homer (2010), Martin (2011) (and see Portner (2009:222-236) for discussion).
- Attempts to explain past TP epistemic modality away:
 1. Elision of a matrix clause (Hacquard 2006, 2010)
e.g., I thought that ...
 2. Free Indirect Discourse (Fagan 2001, Boogaart 2007)
- We argue against both these responses.

Elision

- Hacquard (2006, 2010): epistemic modals with past TP result from deletion of a matrix clause.
- The past tense on the modal is due to Sequence of Tense.

(22) A: Why did you look in the drawer?

B: My keys **might have** been in there.

B': ~~I thought that~~ my keys **might have** been in there.

B'': ~~Looked in the drawer because~~ my keys **might have** been in there.

An argument against the elision approach:

(23) a. I thought that my keys **might** be in there.

PAST TP

b. ~~I thought that~~ my keys **might** be in there.

c. My keys **might** be in there.

#PAST TP

- The elision account incorrectly predicts that (23c) should allow a past-TP reading.
(See Homer (2010) for similar arguments against Hacquard's elision account for French.)

Free Indirect Discourse

- Boogaart (2007): past TP epistemic modals are restricted to Free Indirect Discourse (FID) (see also Fagan (2001) for German).

Arguments against the FID approach

- Past TP epistemic modals also occur in non-narrative contexts:
The ice-cream might have been in the freezer.
- Past TP epistemic modals do not support shifting of indexicals (Homer 2010):

(24) Betty woke up feeling nervous. **Today** was going to be awful. (FID)

(25) A (talking about what B did yesterday): Why did you look in the freezer?
B: # The ice-cream might have been in there **today**.

4. Analysis

Main claims:

- Modals in the scope of (past) tense can be epistemic.
- More generally, we want to argue that there are no **general grammatical** constraints on the modal base due to tense
- although there may be certain pragmatic preferences, and individual modals may have lexical idiosyncrasies.

- We adopt Condoravdi's (2002) basic framework, but we make some changes to her formal analysis.

4.1 Building blocks

1: The judge argument

- variable j representing the ‘judge’ (Stephenson 2007, Lasersohn 2005)
- Modal bases are functions from **world-time-judge triples** to sets of worlds:
 $MB(w,t,j)$ = the set of worlds that are compatible with the epistemic state of the judge j at time t in world w .
- In declarative present tense matrix sentences, an epistemic modal usually represents the epistemic state of the speaker at the utterance time.
- In sentences with past TP, the relevant epistemic state can be that of the speaker or of some other person at a past time.

2: Viewpoint aspect

- **Perfective** and **imperfective** are functions from properties of events to properties of times:

$$(26) \quad [[\text{PFV}]] = \lambda P_{\langle l, st \rangle} \lambda t \lambda w . \exists e [P(e)(w) \ \& \ \tau(e) \subseteq t] \quad (\text{Kratzer 1998})$$

$$(27) \quad [[\text{IMPF}]] = \lambda P_{\langle l, st \rangle} \lambda t \lambda w . \exists e [P(e)(w) \ \& \ t \subseteq \tau(e)] \quad (\text{Kratzer 1998})$$

- The **perfect** needs to stack on top of PFV or IMPF, so it is a function from properties of times to properties of times:

$$(28) \quad [[\text{PERFECT}]] = \lambda P_{\langle i, st \rangle} \lambda t \lambda w . \exists t' [t' < t \ \& \ P(t')(w)] \quad (\text{cf. Matthewson 2012})$$

3: The prospective operator

- How to account for the future TO in sentences like *She might win*?
- Future TO comes from a separate **prospective** aspect operator, which existentially quantifies over a future time. (Kratzer 2011, Matthewson in press a,b)
- PROSP is null in English but phonologically overt in some languages.

(29) $[[\text{PROSP}]] = \lambda P_{\langle i, st \rangle} \lambda t \lambda w . \exists t' [t \leq t' \ \& \ P(t')(w)]$

- We assume that PROSP and PERFECT are in complementary distribution.

4. Sample lexical entry for a modal

$$(30) \quad [[\text{MAY/MIGHT}_{\text{MB}}]] = \lambda P_{\langle i, \text{st} \rangle} \lambda t \lambda w \exists w' [w' \in \text{MB}(w, t, j) \ \& \ P(t)(w')]$$

4.2 Applying the analysis

Eventive perfectives

(31) *John may/might leave*

PRES(MIGHT(PROSP(PFV(John leave))))

- Present TP
- Future TO

(32) $[[\text{PRES}(\text{MIGHT}_{\text{MB}}(\text{PROSP}(\text{PFV}(\text{John leave}))))]]^{w,t} =$
 $\exists w' [w' \in \text{MB}(w,t,j) \ \& \ \exists t' [t \leq t' \ \& \ \exists e [\text{John-leave}(e)(w') \ \& \ \tau(e) \subseteq t']]]$

There is a world w' which is epistemically accessible from $\langle w,t,j \rangle$, and there is an event e of John leaving in w' , whose run-time is contained within some interval t' which starts no earlier than t .

- This correctly predicts that John's potential leaving must be in the future.
- **Statives and imperfectives** allow future or present TO, due to the subinterval property.

Adding *have*

(33) *John may/might have left* (“reading A”)

PRES(MIGHT(PERFECT(PFV(John leave))))

- Present TP
- Past TO

(34) $[[\text{PRES}(\text{MIGHT}_{\text{MB}}(\text{PERFECT}(\text{PFV}(\text{John leave}))))]]^{w,t} =$

$\exists w' [w' \in \text{MB}(w,t,j) \ \& \ \exists t' [t' < t \ \& \ \exists e [\text{John-leave}(e)(w') \ \& \ \tau(e) \subseteq t']]]$

There is a world w' which is epistemically accessible from $\langle w,t,j \rangle$, and there is an event e of John leaving in w' , whose run-time is contained within some interval t' which precedes t .

- Statives and imperfectives work similarly; they all derive present TP and past TO.

4.3 The past TP reading of *might have*

- Condoravdi (2002) achieves past TP via *have*-raising.

(35) John may/might have left

PRES(PERFECT(MIGHT(PFV(John leave))))

- Past TP
 - Future TO
- We could adopt the *have*-raising analysis, and simply say that epistemics allow it too.
 - However ...

Arguments against *have*-raising

[see also Arregui 2005]

- *Have*-raising would violate the head movement constraint.
- The *have*-raising analysis can't explain why the past-TP readings are possible with *might*, but not with *must* or *may* (at least for most speakers).

(36) *At that time, they **must/may have** won the game (but in the end they didn't).

(37) A: Why did you look in the drawer?
B: # My keys **must/may have** been in there.

The morphological problem of English modal auxiliaries

- How to express modality with past temporal perspective, given that English modals cannot inflect for tense?
- Two “patches” in the grammar:
 - Periphrastic verbs and constructions (“semi-modals”) can be used instead of real modals: *have to*, *be able to*, *be allowed to*, etc.
 - *Have* in the complement of a modal can encode past TP for a subclass of modals (by activating their **defective past tense**).

Solution: defective past tense

- English modals divide into two groups with respect to the presence of remnant past morphology: (Stowell 2004, Portner 2009:223)
- Modals that **historically contained past morphology**: *might, could, would, ...*
These modals **allow past temporal perspective**.
- Modals that **don't contain past morphology**: *may, must, can, will, ...*
These modals **don't allow past temporal perspective**.
- But there is some dialect variation (e.g., Denison 1992 and Huddleston & Pullum 2002)

Evidence for defective past tense on *might, could, would*

- The defective past behaves like ordinary past morphology in that it participates in Sequence of Tense: (Stowell 2004, Portner 2009)

(38) John said “I **may** leave early.”
John said he **might** leave early.

(39) John said “I **can** solve the problem.”
John said he **could** solve the problem.

(40) John said “I **will** leave early.”
John said he **would** leave early.

- **Our claim:** the defective past tense can also be semantically activated by an immediately following *have*.

Three options for *might have*

- i. *have* contributes perfect semantics (giving past temporal orientation)

MIGHT(PERFECT(P))

present TP, past TO

- ii. *have* licenses the defective past tense of *might* (giving past temporal perspective)

PAST(MIGHT(P))

past TP, present or future TO

- iii. *have* does **both** of those things

PAST(MIGHT(PERFECT(P)))

past TP, past TO

See also Portner (2009:229)

Evidence for the past TP, past TO reading

(41) Context: A and B support the same sports team, which lost yesterday. A and B were busy during the game and only found the results out afterwards. Between the game and finding out the results, B bought champagne, thinking that the team might have won.

A: Why did you buy champagne yesterday?

B: The team **might have** won.

- The *have*-raising analysis cannot account for this reading.

Evidence for “vacuous” *have*

(42) In 1941 it was still possible for Germany to *have* won the war.

- *Have* here is not imparting past orientation.
- *Have*-raising cannot be happening here. So the failure of *have* to impart past TO is not due to it having scoped over a modal.
- *Have* might be participating in Sequence of Tense, i.e., agreeing with the past tense in the higher clause.
- *Have* is optional here:

(43) In 1941 it was still possible for Germany to win the war.

5. Conclusion

Our two main claims:

- Epistemic modals can have past temporal perspective in at least English, Dutch, Gitksan and St'át'imcets.
- There are no general grammatical restrictions on the modal base arising from its relation to tense.

Open question:

- We have argued that in past TP readings of epistemic modals the judge parameter can be shifted to someone other than the speaker.
- Strong contextual support is needed for this; in particular, this is facilitated by a narrative context.
- What exactly are the factors influencing judge shifting?

Many thanks to

- The participants in the UBC LING 530 modality seminar: Sihwei Chen, James Crippen, Jennifer Glougie, Vera Hohaus, Becky Laturus, Patrick Littell, Tianhan Liu, Meagan Louie, Stacey Menzies, Ori Simchen, Amélia Reis Silva, and Carmela Toews.
- Pranav Anand, Cleo Condoravdi, Henry Davis, Valentine Hacquard, Angelika Kratzer, Tyler Peterson, and Ryan Waldie.
- Audience members at the Ottawa modality workshop (April 2012), in particular Bronwyn Bjorkman, Remus Gergel, Marleen van der Vate, and Igor Yanovich.
- Audience members at UC Santa Cruz, in particular Adrian Brasoveanu, Amy-Rose Deal, Bill Ladusaw, Jaye Padgett.
- Gitksan consultants and teachers Barbara Sennott, Vincent Gogag and Hector Hill. *Ha'miyaa!*
- St'át'imcets consultants Carl Alexander, Gertrude Ned, Laura Thevarge, the late Beverley Frank and the late Rose Agnes Whitley. *Kukwstumúlhkacw!*
- The UBC Gitksan Research Lab: Andrei Anghelescu, Henry Davis, Clarissa Forbes, Jesse Lawrence, Alyssa Satterwhite, Michael Schwan, and Savanna van der Zwan.
- A Jacobs Research Fund grant and SSHRC grant #410-2011-0431.