

Beyond the Common Ground





The Semantics and Pragmatics of Epistemic Modals

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Main ideas

- Sentences with epistemic modals affect the context in multiple ways.
- The common ground (CG) is a subset of a broader construct, the **common propositional space (CPS)**.
- As assertion of $M(\varphi)$ performs two speech acts:
 - **Truth conditional effect:** it adds the modal proposition “ $M(\varphi)$ ” to the common ground;
 - **Prejacent relevance effect:** it adds the prejacent proposition “ φ ” to the common propositional space.

Outline of presentation

1. Background on possible worlds semantics for modals 
2. Problems 
3. New ideas about modals 
4. The CPS 

Background on possible worlds semantics for modals

Modal logic

- Modals quantify over possible worlds
 - Necessity: universal quantification
 - Possibility: existential quantification
- Domain of quantification is given by an “accessibility relation”

Adaptation for linguists

- Each modal expression is compatible with a variety of accessibility relations.
- Accessibility relations be better modeled as “conversational backgrounds” (Kratzer 1977):

A conversational background is a function from worlds to sets of propositions.

Example: *must*

(1) *The butler must be the murderer.*

- Conversational background f assigns to each world a set of propositions
- (1) is true in w iff $f(w)$ entails that he is the murderer.

- Formal version

- $\llbracket \textit{must } \phi \rrbracket^{c,f} = \{w : \cap f(w) \subseteq \llbracket \phi \rrbracket^{c,f}\}$

- $\llbracket \textit{must } \phi \rrbracket^{c,f} = \{w : \forall v[v \in \cap f(w) \rightarrow v \in \llbracket \phi \rrbracket^{c,f}]\}$

- If $f(w)$ is a set of facts known by the speaker in w , as in (1), the sentence has an epistemic reading.
- If $f(w)$ is a set of rules, the sentence has a deontic reading.

Not good enough

- Conditionals
- Samaritan paradox
- Graded modality

Ordering semantics

- $f(w)$ gives a set of relevant worlds, but not all relevant worlds are equally relevant.
- We measure the relevant worlds according to some ideal (Stalnaker, Lewis, Kratzer).
- Kratzer's (1981) theory reviewed below

Deontic example

(2) *Mary must go to jail.*

Two kinds of information = two conversational backgrounds:

- Circumstantial: $f(w) = \{\text{Mary robbed John, Mary is an adult, Mary is mentally competent, ...}\}$
- Deontic: $g(w) = \{\text{Robbery by competent adults is to be punished by time in jail, ...}\}$

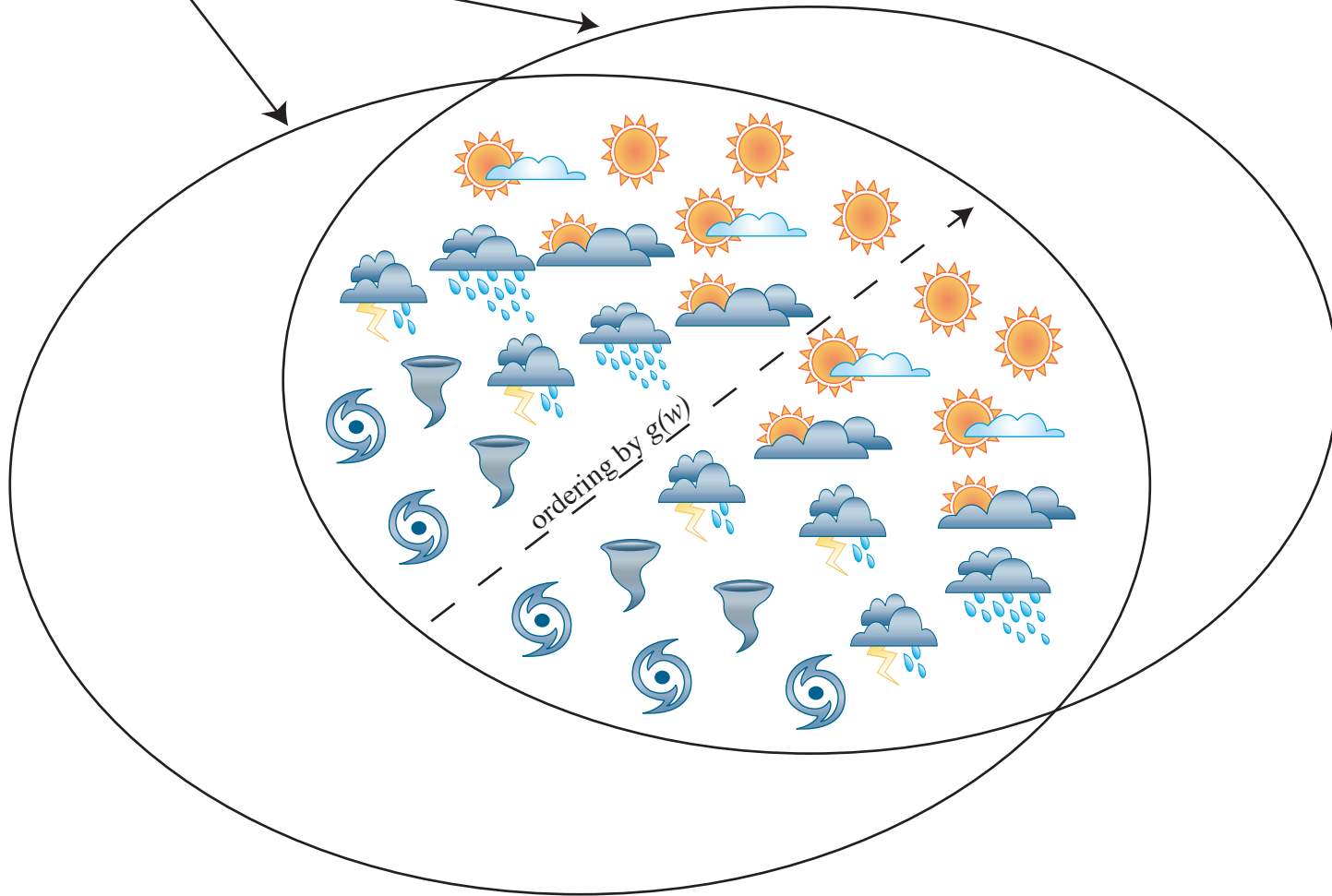
Epistemic example

(3) *It must be sunny outside.*

Two conversational backgrounds:

- Epistemic: $f(w) = \{\text{Many people are wearing sunglasses, nobody is carrying an umbrella, nobody is wearing rain boots, ...}\}$
- Doxastic (stereotypical): $g(w) = \{\text{People wear sunglasses when it's sunny, People don't carry an umbrella when it's not raining, ...}\}$

members of $f(w)$



It must be sunny outside.

- $f(w)$ is the **modal base**: $\cap f(w)$ is the set of relevant worlds.
- $g(w)$ is the **ordering source**: $\leq g(w)$ orders worlds.
- *It is sunny outside* is true in the most highly ranked relevant worlds.

- Official version (Kratzer 1981):

$\llbracket \textit{must } \phi \rrbracket^{c,f,g} = \{w : \text{for all } u \in \cap f(w), \text{ there is a } v \in \cap f(w) \text{ such that}$

(i) $v \leq_{g(w)} u$, and

(ii) for all $z \in \cap f(w) : \text{if } z \leq_{g(w)} v, \text{ then } z \in \phi\}$

- Simpler and good enough for our purposes (the ‘limit assumption’):

$\llbracket \textit{must } \phi \rrbracket^{c,f,g} = \{w : \{v : v \in \cap f(w) \text{ and there is no } u \in \cap f(w) \text{ such that } u \leq_{g(w)} v\} \subseteq \llbracket \phi \rrbracket^{c,f,g}\}$

- Shorthand:

$\llbracket \textit{must } \phi \rrbracket^{c,f,g} = \{w : \text{Best}(f, g, w) \subseteq \llbracket \phi \rrbracket^{c,f,g}\}$

Possibility modals

Simplified, but good enough for our purposes:

$$\llbracket \textit{may } \phi \rrbracket^{c,f,g} = \{w : \text{Best}(f, g, w) \cap \llbracket \phi \rrbracket^{c,f,g} \neq \emptyset\}$$

Problems

- This story of the problems has become a standard tale among semanticists working on epistemic modals.
- See von Stechow & Gillies (2006) and Papafragou (to appear) for more extensive discussions.

Traditional descriptions of epistemic modality

- Epistemic modal indicate the speaker's **degree of commitment** to the truth of a proposition.

For example: Halliday (1970), Palmer (1986), Bybee & Fleischman (1995)

- They do not contribute to truth conditions
- Drubig (2001) compares epistemic modals to evidentials.
- Papafragou (to appear) gives an overview.



What facts argue for this view?

Some examples from Papafragou:

- **Lack of embeddability** of epistemic modals

(4) *?It is surprising the superman must be jealous of Lois.*



- Epistemic modals' status in **assent and dissent**.

(5) *A: The professor must be smart.*

B: That's not true.

≠ It's not true that it follows from the speaker's knowledge that the professor is smart.

= It's not true that the professor is smart.



How the traditional view explains these facts

- Epistemic modals do not make a contribution to truth conditions.

That's not true relates to truth conditions only, so it can't target a meaning involving the modal

- Epistemic modals only relate to the speaker's evaluation.

The speaker's evaluation can't be directed at an embedded sentence. [Why not?] Therefore the modal cannot be embedded.

But epistemic modals often do contribute to truth conditions

- Lots of arguments for this (see literature cited above).
- For example, counter-examples to the “no embedding” and “assent/dissent” properties (examples from Papafragou):

(6) *It is surprising that it may rain tomorrow, since there was no sign of a cloud all day today*

(7) *A: The weather forecast told viewers that it may rain tomorrow.*

B: That's not true.

(= ‘It is not true that it may rain tomorrow.’)



(8) *John can't be the prime suspect.*

Possibility modals are generally easier to embed,
but:

(9) *I am not really surprised that there must be a lot of resistance towards the acceptance of my claim that Sumerian is Archaic Tamil. (from Faller 2002)*



- Conclusion: Epistemic modals do contribute to truth conditions.
- So their special properties must be explained in some other way.

New ideas about epistemic modals

A closely related set of proposals:

Faller (2002, 2006), von Stechow (2003),
Papadimitriou (to appear), von Stechow & Gillies
(2006), Swanson (2006)

Papafragou

Initial observation: Epistemic modals have both an **objective** and a **subjective** use (Lyons 1977, Nuyts 1993).

- Objective:

(10) *We've all seen the evidence. John must be the murderer.*

And if John must be the murderer, you have no choice but to vote to convict.

- Subjective:

(11) *There must have been a mistake. I was clearly the best candidate for that job.*

??And if there must have been a mistake, you should change your decision and hire me.



- When used subjectively, epistemic modals can't be embedded under *if*, *surprising*, and verbs of telling.
- Embedded subjective modal is sometimes ok:
(12) *John thinks that it may rain.* (John's beliefs)
- On the subjective use, the conversational background is:
 - **indexical** (aims to explain embedding facts 👉, but not quite clear how), and
 - **externally inscrutable** (explains assent/dissent facts 👉).

Explaining the intuition behind the traditional view

- Relevance Theory.
- The modal proposition $M(\varphi)$ represents the truth conditions.
- But in many cases the prejacent φ is the “main locus of cognitive effects.”
- The traditional view 👉 is focused on the main locus of cognitive effects, not the truth conditions.

von Fintel & Gillies

(13) *There might have been a mistake in the calculation.*

“Our suggestion is that a sentence like [(12)] is used to make two speech acts: an assertion (?) that it is compatible with the evidence that there has been a mistake, and proffering (with an explicit lack of conviction) that there has been a mistake or giving advice not to overlook the possibility that there has been a mistake.”

- But it's not clear what the status of the second speech act is.
- See von Stechow (2003) and von Stechow and Gillies (2006) for discussion, but neither of these gives a concrete theory.

Summary of the new ideas

- $M(\varphi)$ and φ make independent contributions to the interpretation:
 - $M(\varphi)$ represents the truth conditions/ assertion;
 - φ does something important too.
- The proposal should be more precise and should be integrated with a general theory of discourse meaning.

The CPS

(Common Propositional Space)

The Standard Theory

- Stalnaker (1974, 1978, 1987)
- The **Common Ground** is the set of propositions which the participants in the conversation mutually agree to treat as true for purposes of the exchange.
- They are the **pragmatically presupposed** propositions.
- **Assertion** is the addition of a proposition to the Common Ground.

The CPS

- The Common Ground is the set of propositions that the a participants treat as **true**.
- But a proposition can be shared without being treated as true.

Evidentials

- Faller (e.g., 2002, 2006) on Cusco Quechua:

(14) *Para-sha-n-si.*

rain-PROG-3-REP

φ = ‘It is raining.’

Ev: ‘Speaker was told φ .’ (Faller 2006)

- Indirect representation of φ : Speaker asserts Ev (‘I was told that it is raining’).
- Faller shows that this is wrong.

- Hypothesis about evidentials: φ is added to the CPS, but not to the Common Ground.
- Hypothesis about epistemic modals:
 - Assertion: $M(\varphi)$ is added to Common Ground, and
 - Evidential-like function: φ is added to CPS (but not to CG).

- **Definition:** The CPS is the set of propositions of which the participants in the conversation are mutually aware.

Mutually aware: A is aware of φ , B is aware of φ , A is aware that B is aware of φ , B is aware that A is aware of φ , etc.

- The CG is a subset of the CPS. We have a selection function cg which selects those members of the CPS which are mutually presupposed.

Non-modal case

$\langle \text{CPS}, cg \rangle + \phi = \langle \text{CPS}', cg' \rangle$, where

- $\text{CPS}' = \text{CPS} \cup \{ \llbracket \phi \rrbracket^{c,f,g} \}$
- $cg' = \{ \langle \text{CPS}', cg(\text{CPS}) \cup \{ \llbracket \phi \rrbracket^{c,f,g} \} \rangle \}$

[An alternative to ponder some other time:]

- $cg' = cg \cup \{ \langle \text{CPS}', cg(\text{CPS}) \cup \{ \llbracket \phi \rrbracket^{c,f,g} \} \rangle \}$



Modal case

$\langle \text{CPS}, cg \rangle + \text{must } \phi = \langle \text{CPS}', cg' \rangle$, where

- $\text{CPS}' = \text{CPS} \cup \{ \llbracket \phi \rrbracket^{c,f,g} \} \cup \{ \{ w : \text{Best}(f, g, w) \subseteq \llbracket \phi \rrbracket^{c,f,g} \} \}$
- $cg' = \{ \langle \text{CPS}', cg(\text{CPS}) \cup \{ \{ w : \text{Best}(f, g, w) \subseteq \llbracket \phi \rrbracket^{c,f,g} \} \} \rangle \}$



Other selection functions besides *cg*:

- for evidentials (Portner 2006);
- for root modals (Portner to appear).

The assent/dissent facts

- As two propositions are added to the CPS, one can in principle assent to or dissent from either of them.
- This is why in some cases assent targets the prejacent 👉, while in others it targets the modal proposition 👉.
- But what explains which one it targets in a particular case?

Relevance

- Papafragou employs Relevance Theory.
- I will explore Roberts' (1996) notion of relevance. One subcase, simplified:

An assertion is **RELEVANT** if the proposition asserted is a complete or partial answer to a question under discussion.

- What is a question under discussion? Ginzburg (1995a,b) and Roberts (1996) have a detailed proposal.
- What is a complete or partial answer? Depends on your theory of questions.
- Relevance condition: Every utterance must be RELEVANT.

- How does this play out in the case of sentences with epistemic modals? Two propositions are added to CPS. One possibility for a revised condition:

An utterance which adds one or more propositions to the CPS is felicitous only if *at least one* of these propositions is a complete or partial answer to a question under discussion.

Such a proposition is **RELEVANT**.

- Proposal: Assent/dissent target a **RELEVANT** proposition.

(15) *It might rain tomorrow.*


- The picnickers. QUD = Will it rain tomorrow?

You're wrong. It won't rain tomorrow.


- The meteorology school. QUD = Might it rain tomorrow?

You're wrong. It can't rain tomorrow.

The embedding facts

- Remember Papafragou's point that subjective epistemic modals cannot be embedded under *if* and certain other operators. 
- What's the difference between the objective and subjective interpretations?
- In terms of the concepts of ordering source and CPS:
 - Objective: ordering source \subseteq CPS
 - Subjective: ordering source \subseteq speaker's beliefs

Two ways of thinking about the ungrammaticality of embedded subjective modals:

- The problem is that the speaker's beliefs are not available in these contexts.
 - A version of the traditional view/Papafragou's explanation.
 - Reason for skepticism: bouletic modals can be embedded, and reflect "my/your/our desires". Why is this different from speaker's beliefs?
 - Reason for skepticism: What about others' beliefs?
cf. (12) 

- The problem is that these contexts are intimately connected with the CPS, and this forces the CPS to be chosen as the ordering source.
 - Conditionals: The hypothetical (*if* φ) should be drawn from the CPS.
 - *Surprising*: Though φ is presupposed, propositions which imply that φ is (probably) false are in CPS. (They used to be in the CG.)
 - This approach needs more work!

Explaining the intuition behind the traditional view

When the non-asserted prejacent φ is RELEVANT:

- What we care about is the status of φ (that's what RELEVANT means), and
- the assertion of $M(\varphi)$ provides additional “evaluative” information about the status of φ .

Evaluative information?

- $\text{Must}(\varphi)$: Though φ follows from shared knowledge (modal base) plus other assumptions (ordering source), it does not follow from shared knowledge alone.
- Thus I indicate a reduced “degree of commitment” to φ .

(16) *There must have been a mistake. (I was clearly the best candidate for that job.)*

- Asserted: The existence of a mistake follows from shared knowledge plus my beliefs.
- Added to CPS: φ = ‘There has been a mistake.’
 - φ , and not the asserted content, is plausibly RELEVANT.
 - Implicated QUD: ‘Has there been a mistake?’
 - Hedging: I’m not confident enough of φ ’s truth (inferential use) – or perhaps I don’t have the social standing (politeness use) – to assert its truth outright.
 - Based on our mutual awareness of φ and of the fact that my beliefs imply that it is true, I hope we will further address the implicated QUD (i.e., I hope that the implicated QUD will become the actual QUD).

Thank you

References will be posted along with the slides on my homepage:

www.georgetown.edu/faculty/portnerp

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