

Epistemic Modals: A Linguistic Perspective

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What is Epistemic Modality?

(1) There might have been a power outage overnight.

might there was a power outage overnight

Expressions of epistemic modality mark the possibility/necessity of the prejacent proposition relative to some body of evidence/knowledge.

Overview

Part 1: Some Facts

Part 2: A Standard Possible Worlds Semantics

Part 3: Epistemic Modality in the Second Dimension

Part 4: Evidential Meanings

Part 1: Some Facts

Modals are chameleon-like in their semantics. They adapt to their surroundings.

Some Expressions of Epistemic Modality

- ▶ might, may, must
- ▶ ought, should
- ▶ can, could
- ▶ have to
- ▶ needn't
- ▶ possibly, probably, certainly
- ▶ apparently, supposedly, allegedly

Modals Often Can Express Many Different Flavors of Modality – Here, the English Modal “Have to”

epistemic *Given all those wet umbrellas, it **has to** be raining.*

deontic *According to the hospital regulations, visitors **have to** leave by six pm.*

bouletic *According to my wishes as your father, you **have to** go to bed in ten minutes.*

circumstantial *Excuse me. *Given the current state of my nose, I **have to** sneeze.**

teleological *Given the choices of modes of transportation and their speeds, to get home in time, you **have to** take a taxi.*

Many Different Flavors of Epistemic Modality Can Be Expressed

- (2) *As far as Bill knows*, John **might** be the thief.
- (3) *Given what I knew at the time*, John **might** have been the thief.
- (4) *Given the results of the DNA tests*, John **might** be the thief. But *if we take the eyewitness seriously*, John **can't** have been the thief.

Summary: Multiplicity of Meaning

Simple modal expressions (like *can*, *might*, *must*, *have to*) have a multitude of uses:

- ▶ different flavors of modality (epistemic, deontic, . . .)
- ▶ different subflavors (what Bill knows, what I knew, what the DNA tests reveal)

The Task for a Semantics of Modals

A successful semantic analysis should look as follows:

- ▶ a shared semantic core
- ▶ mechanisms for modulating the core meaning in context

Contextual Indeterminacy

(5) John has to be in New York.

- ▶ Epistemic or deontic?
- ▶ If epistemic, based on speaker's evidence or all available evidence or ...?

Part 2: A Standard Possible Worlds Semantics

Kripke, Hintikka, and Kratzer show the way.

A Context-Dependent Possible Worlds Semantics

might (B) (ϕ)

B the *conversational background* (Kratzer), a function from worlds to sets of propositions, or simpler to sets of worlds (i.e. an accessibility function of sorts)

ϕ the prejacent proposition

might (B) (ϕ) is true in w iff ϕ is true in some world that is B -accessible from w

The Context Hook

might (B) (ϕ)

The conversational background B is identified in context, possibly with the aid of restricting expressions (*judging by the DNA evidence, according to your father's wishes, in view of what the eye witness told us, ...*).

“If” -Clauses as B-Restrictors

If John is not in his office, he might be in the cafe.

If-clauses are used to temporarily (hypothetically) restrict attention to a subset of the B-accessible worlds.

(“Add to the evidence in front of us, the temporary assumption that John is not in his office. Then, there are some accessible worlds where he is in the cafe.”)

Lexical Idiosyncracies

Not all modals show maximal flexibility:

- ▶ *might* doesn't have deontic uses
- ▶ German *sollen* can only be based on hearsay evidence
- ▶ etc.

These idiosyncracies can be modeled as selectional restrictions on the kind of conversational background a modal is willing to combine with.

Epistemic Idiosyncracies

Investigations are needed into what kind of conversational backgrounds a particular modal goes with. So, what bodies of evidence can epistemic *might* be sensitive to?

- ▶ Work by Hacking, Teller, DeRose, and now MacFarlane and Egan, Hawthorne & Weatherson.

Part 3: Epistemic Modality in the Second Dimension

Smart people claim that epistemic modals do not contribute to truth-conditions, or even that epistemically modalized sentence have no truth-conditions.

Double Talk

Immanuel Kant wrote in his *Critique of Pure Reason* that
the modality of judgments is a very special function thereof, which has the distinguishing feature that it does not contribute to the content of the judgment.

Gottlob Frege wrote in his *Begriffsschrift* that
by saying that a proposition is necessary I give a hint about the grounds for my judgment. But, since this does not affect the conceptual content of the judgment, the form of the apodictic judgment has no significance for us.

Prima Facie Evidence

Q: Why isn't Louise coming to our meetings these days?

A: She might/must be too busy with her dissertation.

(Experimental paradigm courtesy of Mandy Simons)

Two Implementations

1. Epistemic modals as parentheticals
 - ▶ There must be a mistake.
= There is a mistake, as follows from the evidence.
2. Epistemic modals as speech act modifiers
 - ▶ There might be a mistake.
= (I advise you not to overlook the possibility that) there is a mistake.
(cf. Eric Swanson's work in progress)

The Embedding Problem

- (6) If there might have been a mistake, the editor will have to re-read the manuscript.
- a. \neq If there is a mistake, as is possible, the editor will have to re-read the manuscript.
 - b. \neq If I advise you not to overlook the possibility that there is a mistake, the editor will have to re-read the manuscript.

Other Embeddings

- (7) There can't have been a mistake.
- (8) Bill thinks that there might have been a mistake.
- (9) Where might you have put the keys?
- (10) The editor re-read the manuscript because there might have been a mistake.

The Alternative: Two Speech Acts

Mandy Simons on parentheticals

Q: Why isn't Louise coming to our meetings these days?

A: I heard she is too busy with her dissertation.

Two speech acts:

- ▶ Assertion that I heard that she is too busy with her dissertation.
- ▶ Offering her dissertation work as an explanation of her absence.

The second speech act is the *main point*.

Two Speech Acts with Epistemic Modals

(11) There might be a mistake (in the calculation).

Two speech acts:

- ▶ Assertion (?) that it is compatible with the evidence that there is a mistake.
- ▶ Proffering (with a lack of conviction) that there is a mistake.
or
Advice not to overlook the possibility that there is a mistake.

Challenge and Response

Imagine a game of Mastermind between me and my son. After some rounds where I give him hints about the solution, he says:

(12) There might be two reds.

Possible responses:

- (13)
- a. That's right. There might be.
 - b. That's right. There are.
 - c. That's wrong. There can't be.
 - d. That's wrong. There aren't.

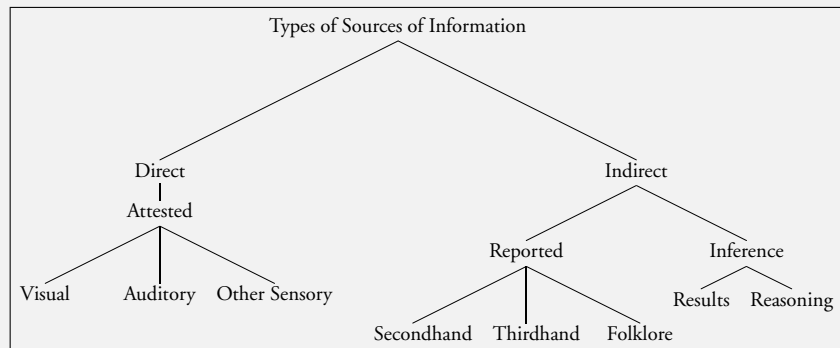
Response can target the epistemic claim or the prejacent proposition.

Part 4: Evidential Meanings

Epistemic Modals are very close to Evidential Markers. Perhaps, they in fact incorporate a particular kind of evidential meaning.

Full-Fledged Evidential Systems

Willet's taxonomy of evidentials:



The Evidential Nature of Epistemic Modals

- (14) [Seeing wet umbrellas] It must be raining.
- (15) [Seeing the pouring rain] #It must be raining.
(OK: It is raining)

Karttunen's Problem: How can a necessity modal make a weaker claim than its prejacent?

Not Really A Sign of Weakness

- (16) The ball is in A or in B or in C.
- (17) It is not in A. It is not in B.
- (18) So, it must be in C.

Inferential Evidence

Gottlob Frege in the sentence just before the ones cited earlier:

What distinguishes the apodeictic from the assertoric judgment is that it indicates the existence of general judgments from which the proposition may be inferred – an indication that is absent in the assertoric judgment.

Conclusion

Epistemic readings of modal expressions

- ▶ are instantiations of a core meaning
- ▶ that is contextually filled in;
- ▶ they serve as evidential comments on the prejacent proposition
- ▶ whose being put forward is often the *main point* of the utterance;
- ▶ they typically signal the presence of an indirect inference;
- ▶ a suitably detailed possible worlds semantics does not appear to be hopeless

Bibliography and Contact Info

There is a select bibliography on epistemic modals on my website, where you can also download this slideshow.

<http://semantics-online.org/fintel>

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