

LSA 220

Morphology, syntax, and semantics of modals

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July 27-August 12 2009

1 The plan for our six sessions

- Some Semantic Basics
- Epistemic Modality and Evidentiality
- Some Syntax/Morphology
- Anatomy of a Modal
- Ought
- Modality & Tense
- Covert Modality, Imperatives

2 First look at (epistemic) modals

What is added by the modal?

It is raining vs. It must be raining

Kant

“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.”

— Kant (1781, 74)

Frege

“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. 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 apodeictic judgment has no significance for us.”

— Frege (1879, 5)

Some Linguists

“[Epistemic modality] is the speaker’s assessment of probability and predictability. It is external to the content, being a part of the attitude taken up by the speaker: his attitude, in this case, towards his own speech role as ‘declarer’.” (Halliday, 1970, 349)

“[Epistemic modality indicates] the status of the proposition in terms of the speaker’s commitment to it.” (Palmer, 1986, 54-55)

“Epistemics are clausal-scope indicators of a speaker’s commitment to the truth of a proposition.” (Bybee & Fleischman, 6)

More Linguists

“In its most normal usage, epistemic *must* conveys the speaker’s confidence in the truth of what he is saying, based on a deduction from facts known to him (which may or may not be specified)” (Coates, 1983, 41).

“*May* and *might* are the modals of epistemic possibility, expressing the speaker’s lack of confidence in the proposition expressed” (Coates, 1983, p. 131).

Two levels

- The prejacent proposition:
 - *It's raining*
- The additional signal:

- the grounds for believing the prejacent are based on indirect information

The Frege-Geach problem

Pascal and Mordecai are playing Mastermind. After some rounds where Mordecai gives Pascal hints about the solution, Pascal asks

- (1) $\left\{ \begin{array}{l} \text{Do there have to} \\ \text{Must there} \end{array} \right\}$ be two reds?

Embedding under negation

- (2) a. There don't have to be two reds.
 b. *Der Code muss nicht zwei rote Stifte enthalten.*
 the code must not two red pins contain
 "There don't have to be two red pins in the code."

Modality in the proposition

- *It must be raining* expresses the proposition that it follows from the available information that it is raining.
- *Must it be raining?* asks the question whether it follows from the available information that it is raining.
- *It doesn't have to be raining* says that it doesn't follow from the available information that it is raining.

Must vs. Might

- *Must p*:
 - *p* follows from the available information
- *Might p*:
 - *p* is not contradicted by the available information

Factoring modality

- Modal Force
 - *must* = necessity
 - *might* = possibility
- Modal Base
 - epistemic = available information
 - deontic = relevant law/principles
 - goal-oriented/teleological = salient goal(s)

Types of modality

- epistemic: *He has to be home by now*
- deontic: *You have to call your mother more often*
- goal-oriented: *To find good cheese, you have to go to Little Italy*
- **NB:** one modal (*have to*) can be used in all three meanings

Ambiguity vs. Context-Dependency

- Kratzer: the multiplicity of uses of many modals is not an accident
- Basically, they just indicate modal force (necessity, possibility)
- What particular kind of modality a particular modal expresses depends on the context

3 Possible worlds semantics for modals

Sentences express propositions = sets of possible worlds

Asserting a sentence claims that the evaluation world is in the set of worlds expressed by the sentence

Modals express a relation between the prejacent set of worlds and a modal base set of worlds

The modal base is determined by properties of the evaluation world

Classically: a modal makes a claim about a set of accessible worlds

The quantificational account of modality

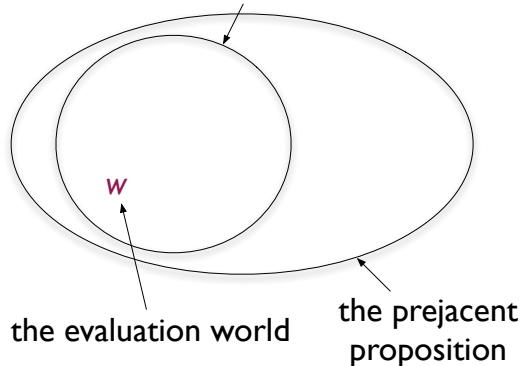
- Necessity (*must*): prejacent is true in all relevant worlds
- Possibility (*may/might*): prejacent is true in some relevant worlds

Multiplicity of meaning

- The multiplicity of meanings for modals come from the fact that what worlds are relevant for a particular occurrence of a modal is determined in context.
- ⇒ Topic for further discussion:
 - epistemic vs. deontic modals (may) differ in their syntax
 - languages often specialize their modals
 - perhaps, in fact, multiplicity of meaning is not the normal case (Nauze, 2008)

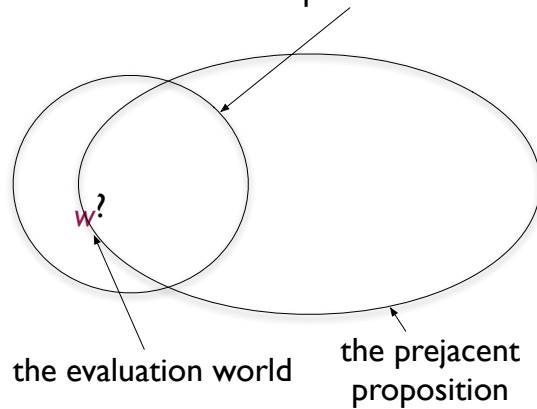
The picture for *must*

the set of worlds compatible with the information in w



The picture for *might*

the set of worlds compatible with the information in w



4 Karttunen's Problem and the mantra

A prediction

If something must be true, it is true.

Lack of confidence

Which of the following answers conveys more confidence and inspires more confidence?

- (3) Where are the keys?
 - a. They are in the kitchen drawer.
 - b. They must be in the kitchen drawer.

Karttunen's Problem

"Intuitively, (4b) makes a weaker claim than (4a)":

- (4) a. John left.
 - b. John must have left."

— Karttunen (1972)

Mantra

- (5) a. John must be at home.

- b. John is at home.

“A statement like (5a) is weaker than (5b) ... (5b) expresses more conviction on the part of the speaker than (5a) does.”

— Groenendijk & Stokhof (1975, 69)

Mantra, Mantra

- (6) a. She climbed Mount Toby.
b. She must have climbed Mount Toby.

“It has often been observed that I make a stronger claim in uttering (6a) than in uttering (6b).”

— Kratzer (1991)

Mantra, Mantra, Mantra

“Although it might appear that a statement is strengthened by putting the proposition that it expresses within the scope of the operator of epistemic necessity, this is not so, as far as the everyday use of language is concerned. It would be generally agreed that the speaker is more strongly committed to the factuality of *It be raining* by saying *It is raining* than he is by saying *It must be raining*.”

— Lyons (1977, 808)

Mantra, Mantra, Mantra, Mantra

“[E]pistemic modals are nonveridical with respect to the speaker’s epistemic model. If I know that *Frank is ill*, i.e. if he just told me so, then I cannot utter *Frank must be ill*; rather, I should say *Frank is ill*. So, if I say that *Frank must be ill*, it is implied that I don’t know for sure that Frank is ill, hence I am not committed to the truth of *Frank is ill*.”

— Giannakidou (1999)

Mantra, Mantra, Mantra, Mantra, Mantra

“there is an observation, apparently made at various times in the literature, that an epistemic modal assertion cannot be about a proposition known

by the speaker to be true, or known by the speaker to be false. By that observation, someone who asserts (7), for example, cannot know that John is actually asleep, and they cannot know that John is actually not asleep.

(7) John must be asleep.

At the very least, a speaker of (7) who knew John was asleep would be misleading the hearer as to the speaker's epistemic state"

— Werner (2006, 239)

The Mantra*

Epistemic *must* is weak

- *must p* is weaker than *p*
- A fortiori: *must p* doesn't entail *p*

Mantra Implementations

- i. Kant/Frege modernized: weak assertion of prejacent
Westmoreland (1995, 1998); Drubig (2001)
- ii. Veltman: bare prejacent asserts direct evidence
- iii. Kratzer: add ordering of worlds in modal base

Kratzer Orders the Worlds

- (6) a. She climbed Mount Toby.
b. She must have climbed Mount Toby.

"In uttering (6b) rather than (6a), I convey that I don't rely on known facts alone. I use other sources of information which are more or less reliable. ... If the ordering source for the modal in (6b) is, say, a conversational background assigning to every world the set of propositions which represent the normal course of events in that world, then the proposition expressed by (6b) will not imply the proposition expressed by (6a) anymore."

— Kratzer (1991)

Ordering semantics

Three ingredients:

- modal force (necessity, possibility)
- modal base (epistemic, circumstantial)
- ordering source (closeness to an ideal)

Epistemic vs. deontic

Epistemic modals:

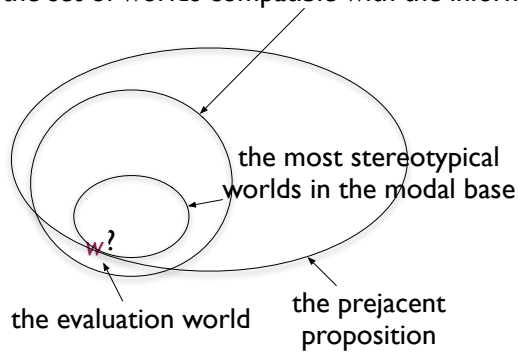
- epistemic modal base + stereotypical ordering source

Deontic modals:

- circumstantial modal base + deontic ordering source

Must à la Kratzer

the set of worlds compatible with the information in w



5 Contra mantra

Must is not always weak (1)

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

Must is not always weak (2)

- (9) A: They said it was going to rain. I wonder whether it has started.
B: I don't think so, it was still dry when I came in 5 minutes ago.
A: Look, they're coming in with wet umbrellas. There is no doubt at all. It must be raining now.

Must is never weak (1)

If *must p* \nRightarrow *p* then we'd expect sentence with the form "*must p* but perhaps not-*p*" to be perfectly happy
But they're horribly unhappy:

- (10) a. #It must be raining, but perhaps it is not.
b. #Perhaps it isn't raining but it must be.

Must is never weak (2)

You know that just outside the building there is a Hollywood shoot going on. You know that tomorrow they're going to film a scene in the rain and that they already have the necessary equipment around. Now, you see people coming in folding up their wet umbrellas. You are almost certain that rain is the only explanation since you don't think that the movie crew will use their rain equipment until tomorrow. But there's a slight twinge of doubt. What do you say?

- (11) a. It's raining.
b. It must be raining.
c. It's probably raining.

Must is never weak (3)

- (12) A: It must be raining.
B: [Opens the curtains] It's not. You were wrong.
A: #I was not! Look, I didn't say it was raining. I only said it must be raining. Stop picking on me!

Weakness means *must* isn't at the top of the strength scale - that would mean it should combine easily with *only* ... but it doesn't

Note: this is just fine with *ought*, so for *ought* we will want a weaker semantics than for *must*. More on this when we talk about *ought* later in the course.

6 Must is strong!

A strong alternative

It must be raining

The prejacent proposition:

- It follows from the available information that it is raining

The additional signal:

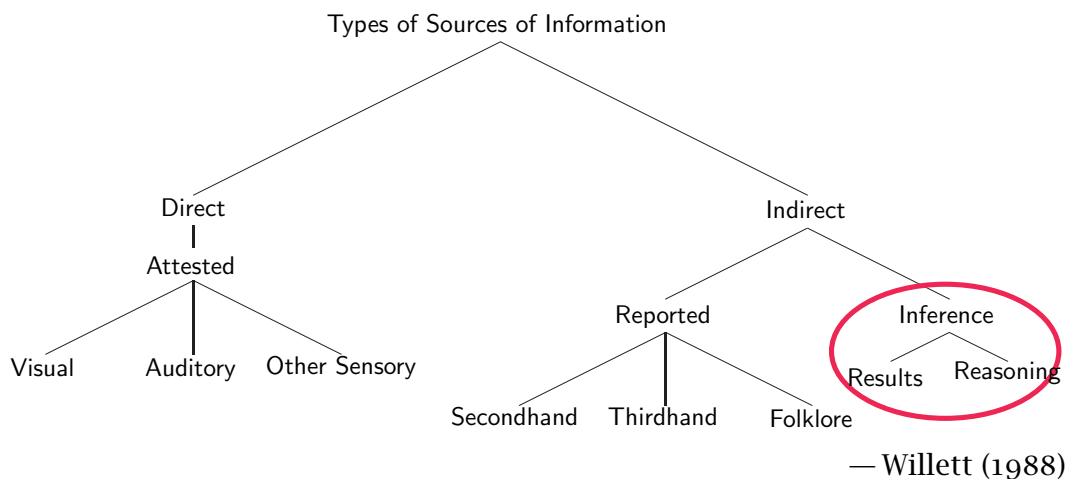
- the grounds for believing the prejacent are based on indirect information

The Idea

Epistemic modals are quantifiers but they are *also* evidential markers

They signal that as far as the *direct* information goes the prejacent isn't settled

Epistemic Modals in Willett's Taxonomy



Must

- So *must* signals that the prejacent isn't directly settled by the *c*-relevant information
- But *must* still asserts its normal strong quantificational meaning
- Putting these together gives us that *must p* is appropriate only if the direct evidence provides indirect but conclusive support for *p* - indirectness without weakness

Rain, direct and indirect

(13) Looking out the window, Billy sees pouring rain.

- ✓It's raining.
- !! It must be raining.

(14) Billy sees people coming in with wet rain gear

- ✓It's raining.
- ✓It must be raining.

must carries a signal that the evidence for ϕ is indirect, but in (1) the evidence for rain is direct, so (1b) is bad.

Two Issues

- What kind of signal?
- What does it mean for evidence to be indirect?

Cross-Linguistic Stability

Epistemic modals (especially necessity modals) carry this evidential signal reliably across languages.

⇒ The evidential signal should not be a stipulated, arbitrary part of their lexical meaning, so it shouldn't be a lexically specified presupposition or conventional implicature.

[If you have a counter-example, please tell us. You'd be making our day.]

What kind of signal?

- Conversational implicature?
 - Prejacent doesn't signal *directness* so no good competitor
- Conventional Implicature?
 - Most attractive story about CIs says no single item can contribute to both at-issue and CI-dimension of meaning
- Presupposition (?)

A Prediction ...

Our generalization is that *all* epistemic modals carry the evidential signal. We don't usually see it for possibility modals since the signal is swamped by the quantity implicature (*may* ϕ implicates *may* $\neg\phi$).

If signal = presupposition then we get a prediction:

Epistemic possibility modals pattern with *must* and it becomes visible when they occur under negation

A Prediction ...

- (15) Looking out the window, Billy sees brilliant sunshine.
- a. ✓It's not raining.
 - b. !! It can't be raining.
- (16) Billy sees people coming in putting away their sunglasses.
- a. ✓It's not raining.
 - b. ✓It can't be raining.

7 The Kernel

Izvorski etc.

The modal base for indirect evidentials:

$$f(w) = \{p : \text{speaker considers } p \text{ indirect evidence in } w\}$$

But what is indirect evidence depends on what it is evidence for!

Rain

- direct evidence for rain (no duh!)
- *indirect* evidence for the high pressure system being slower than expected

Intuition

We start from the other end. Structure the evidence that underlies epistemic modality as follows.

- The kernel is made up of those bits of information that are “directly known”.
- A proposition is directly settled by the kernel iff either it or its negation are directly known. (First approximation)
- must p presupposes that the truth/falsity p is not directly settled by the kernel

The Context-Dependency of What’s in the Kernel

When can you say *it must be raining* even when you are looking straight at the rain (or even getting wet)?

- i. Epistemologists on vacation
- ii. The Alien
- iii. Mozart

8 Conclusion & Outlook

Finally: Weakness?

- (4) a. John left.
b. John must have left.

Karttunen 1972, p.13: “The intuitive feeling that (4b) is a weaker assertion than (4a) is apparently based on some general conversational principle by which indirect knowledge — that is, knowledge based on logical inferences — is valued less highly than “direct” knowledge that involves no reasoning.”

Must Is Strong!

- Speakers who say *must p* are just as strongly committed to the prejacent as those who assert *p* by itself.
- There are prejacent for which intuitively direct evidence is more convincing evidence than indirect inferential evidence.
- So, a speaker who chooses nevertheless to use the strong *must p* incurs a higher degree of risk.
- So, we may judge that in many cases, *must p* is more likely to be false than *p* by itself would have been if there had been direct evidence for the prejacent.
- But a sentence being more likely to be false than another is far from an argument that it is weaker!

Outlook

We hope that structuring information states will also lead us to an analysis of other evidential categories. Perhaps, a simple bifurcation of the kernel into propositions supported by direct observation and propositions supported by trustworthy reports will be a good next step.

Conclusion

The mantra that epistemic *must* is a marker of weakness is an overreaction to a misdiagnosis of the much more interesting fact that epistemic *must* is an evidential marker signalling an indirect inference.

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