Slides: http://kvf.me/osu

Notes: http://kvf.me/osu-notes

Still going strong

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- Mantra

- Contra

- Razor

- Weak : Strong

- Evidentiality

Mantra

(1) a. John has left.
     b. John must have left.

Intuitively, (1b) makes a weaker claim than (1a). In general, one would use (1b) the epistemic *must* only in circumstances where it is not yet an established fact that John has left. A man who has actually seen John leave or has read about it in the newspaper would not ordinarily assert (1b), since he is in the position to make the stronger claim in (1a).

– Karttunen 1972

In stating (1b), the speaker indicates that he has no first-hand evidence about John's departure, and neither has it been reported to him by trustworthy sources. Instead, (1b) seems to say that the truth of *John has left* in some way logically follows from other facts the speaker knows and some reasonable assumptions that he is willing to entertain.

– Karttunen 1972

The intuitive feeling that (1b) is a weaker assertion than (1a) is apparently is 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.

– Karttunen 1972

(2) a. She climbed Mount Toby.
     b. She must have climbed Mount Toby.

In uttering (2b) rather than (2a), I convey that <u>I don't rely on known facts alone</u> [our emphasis – KvF & ASG]. I use other sources of information which are more or less reliable. These other sources may include facts concerning the normal course of events, a map, a tourist guide or hearsay.

– Kratzer 1991

If the ordering source for the modal in (2b) 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 (2b) will not imply the proposition expressed by (2a) anymore.

– Kratzer 1991

Contra

von Fintel, Kai & Anthony S. Gillies. 2010. *Must* ... stay ... strong! *Natural Language Semantics* 18(4). 351–383.

1. Epistemic *must* is a strong necessity modal (not a weak necessity modal like *ought*).

2. Epistemic modals are epistemic: they have a realistic modal base.

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1 + 2 = *must p* entails *p*

3. The modal base of epistemic modals is a privileged set of propositions that are treated as given (the "kernel").

4. Epistemic modals presuppose that the kernel does not *directly settle* their prejacent.

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3 + 4 = *must/can't* signal inferred necessity

Razor

The Family Business

- von Fintel, Kai. 2001. Counterfactuals in a dynamic context. In Michael Kenstowicz (ed.), *Ken Hale: A life in language*, 123–152. MIT Press.

- Gillies, Anthony S. 2007. Counterfactual scorekeeping. *Linguistics & Philosophy* 30(3), 329–260.

- von Fintel, Kai & Anthony S. Gillies. 2010. *Must* ... stay ... strong! *Natural Language Semantics* 18(4). 351–383.

- von Fintel, Kai. 2012. The best we can (expect to) get? Challenges to the classic semantics for deontic modals. Paper presented in a session on Deontic Modals at the Central APA, February 17, 2012.

Shatner's Razor

Do not weaken semantics beyond necessity!

It is worth saying that semantic non-monotonicity is likely inevitable if one works with one's hands tied behind the back, as deontic logicians typically do, since they do not even try to fully model the complexity of natural language meaning with its multiple dimensions (truth-conditional semantics, presuppositions, dynamic contexts, conventional implicatures, conversational implicatures, etc.).

– von Fintel 2012

Lassiter, Daniel. 2016. *Must*, knowledge, and (in)directness. *Natural Language Semantics.* in press.

Not always weak

The ball is in A or in B or in C.
It's not in A.
It's not in B.
So, it must be in C.

must in inferences

(3) If Carl is at the party, then Lenny must be at the party.
Carl is at the party.
So: Lenny is at the party.

(4) If Carl is at the party, then Lenny must be at the party.
Carl is at the party.
So: Lenny must be at the party.

Interaction with *only*

(5) Alex: It must be raining.
Billy: [Opens curtains] No it isn't. You were wrong.
Alex: #I was not! Look, I didn't say it was raining. *I only said it must be raining*. Stop picking on me!

(6) Alex: All/most/many/some student(s) are from abroad.
Billy: Hey, Naomi isn't. So, you're wrong.
Alex: I was not! Look, *I only said (#all, most, many, some) students are from abroad*.

(7) Alex: It's 99.9% certain that it is raining.
    Billy: [Opens curtains] No it isn't. You were wrong.
    Alex: ??I was not! Look, I didn't say it was raining. *I only said it was 99.9% certain that it was.* Stop picking on me!

(8) Alex: It's 99.9% certain that it is raining.
    Billy: [Opens curtains] No it isn't. You were wrong.
    Alex: Well, strictly speaking, I was not wrong. I was careful. *I only said it was 99% certain that it was raining.*

(9) Alex: It must be raining.
    Billy: [Opens curtains] No it isn't. You were wrong.
    Alex: Well, strictly speaking, I was not wrong. I was careful. #*I only said it must be raining*.

Problematic conjunctions

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

Our 2010 promise: find the weakest possible epistemic possibility item and it will be horrible in (10).

"This is a very early, very correct Mustang that has been in a private collection for a long time. ... The speedo[meter] shows 38,000 miles and it *must* be 138,000, but <u>I don't know for sure</u>."

"I have an injected TB42 turbo and don't like the current setup. There is an extra injected located in the piping from the throttle body.. *Must* be an old DTS desiel setup but <u>I'm not certain</u>. Why would they have added this extra injector?"
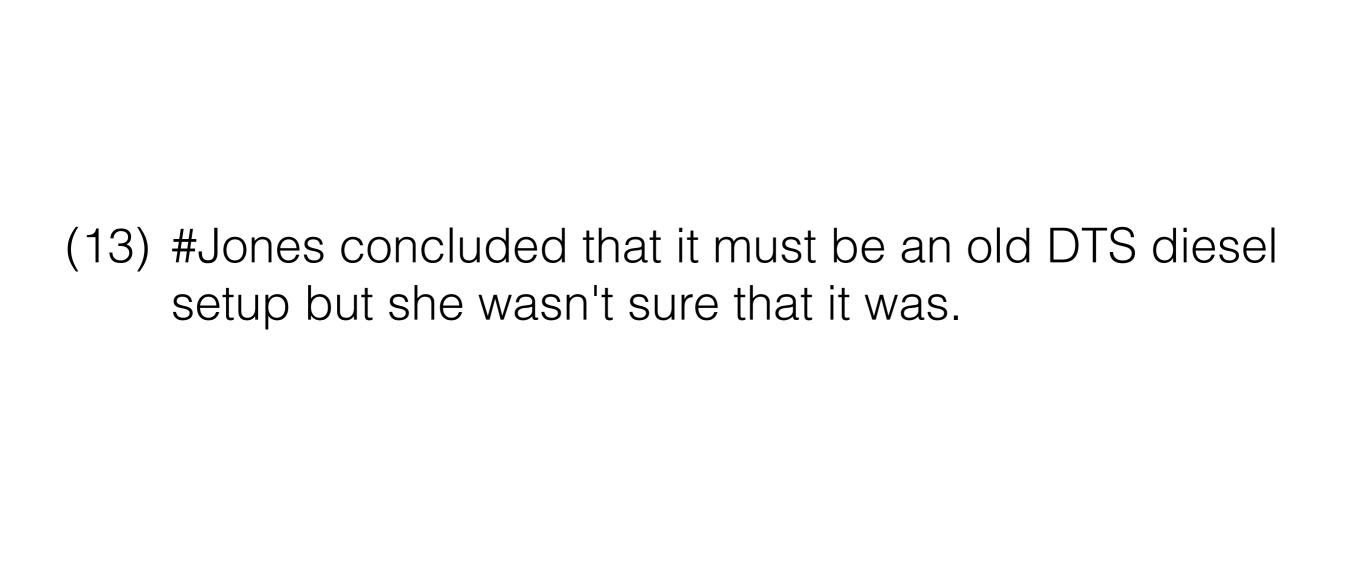
"I refuse to believe that this one game, Lost Planet 2 DX11, which was previously 100% stable remember, is crashing because my overclock is unstable . . . . It's not impossible, granted, but IMO it is highly unlikely. There must be some other cause."

Conjunction is not necessarily static.

As shown in von Fintel 2001 and Gillies 2007, there can be shifts in the modal horizon between "conjuncts".

(11) A: That must be an old DTS diesel setup but I'm not certain. Why would they have added this extra injector?

B: So, given that you're not certain, do you still think that it must be an old DTS diesel setup?

(12) a. #Although I'm not certain, it must be an old DTS diesel setup.

b. #Although I don't know for sure, it must be 138,000.

(13) #Jones concluded that it must be an old DTS diesel setup but she wasn't sure that it was.

Lassiter's Experiment

Yesterday, Bill bought a single ticket in a raffle with 1000 total tickets. There were also 999 other people who bought one ticket each. That is, the tickets were distributed like this:

People holding one ticket: Bill, Mary, Jane, ... [997 more]

The drawing was held last night, and the winner will be announced this evening.

Results

- A bare assertion "Bill did not win" is accepted by (slightly) more participants than the *must*-claim "Bill must not have won".

- Expressions of knowledge ("We know that Bill did not win") and certainty ("It is certain that Bill did not win") are accepted less frequently than the *must*-claim.

Why *must ≠ certain*

- epistemic modality can be "objective"

- *certain* may shrink the "pragmatic halo" (tolerate less slack)

(14) a. The villagers are asleep.
      b. All the villagers are asleep.

(15) #Although the villagers are asleep,
      some of them are awake.

The razor, it cuts

Lassiter's examples show that *must*

is subject to shifts in the modal horizon

and

can be more objective and allows more
pragmatic slack than expressions of certainty.

Two more comments

- Once one is a Mantrista, one doesn't need an evidential component, since *must* is weak and so shouldn't be used when there's direct evidence.

- A threshold semantics incorrectly predicts that *must* is not closed under conjunction:

must p & must q ≠ must (p&q)

(16)   a. It must be (here or there).
        b. It must not be there.
        c. So, it must be here.

Evidentiality

(1) a. John has left.
     b. John must have left.

INDIRECT

- If *must* is weak, a standard scalar implicature will derive INDIRECT.

- But since *must* is not weak, INDIRECT cannot be derived as a scalar implicature.

Lemonade

- Epistemic modals have as their modal base a set of propositions (their "kernel") that are seen as directly given (firsthand observations, trustworthy reports, commonsense knowledge, etc.).

- This set is not closed under entailment.

- Epistemic modals presuppose that their kernel does not "directly settle" their prejacent.

(1) a. John has left.
     b. John must have left.
     c. John can't have left.

Mandelkern, Matthew. 2016.
Must: A user's guide. ms, MIT.

SUPPORT

A claim of *must p* is felicitous only if there is an argument for *p* salient to the interlocutors; a non-modal claim can be felicitous whether there is a salient argument for it or not.

(17) Patch the rabbit sometimes gets into the cardboard box where her hay is stored. On his way out the door, Mark hears a snuffling from the box and thinks to himself, 'Patch must be in the hay box.' When he gets to school, Bernhard asks him how Patch is doing.

Mark: She's great. She must have gotten into the hay box this morning again.

Bernhard: Oh, funny.

SUPPORT ⤳ INDIRECT

- Asserting *must p* has the same upshot as asserting *p*, but uses a more complex expression → manner implicature.

- *must* makes reference to the collective doxastic state.

- S is trying to get H to accept *p* on the basis of a substantial salient argument for *p.*

- If S is giving an argument for *p* at all, it should be their strongest argument ("STRONGEST EVIDENCE", cf. Faller 2012).

- Explicit arguments need to be non-redundant (i.e. not mutually obvious).

- So, asserting *must p* signals a salient argument that is not redundant ⤳ INDIRECT.

Can we co-opt?

- If the derivation works, perhaps we can co-opt it.

- If *must p* means "it follows from the evidence", maybe it makes the evidence salient and also requires that the "following" be not mutually obvious/redundant.

Should we co-opt?

We're not sure SUPPORT is fully supported by the data.

(18) Holmes has a book of clues. No clue in it is misleading, but if he shares it there'd be no reason to keep him on the force. So he never shares its contents. He and his fellow detectives are trying to figure out the location of the murder and have it narrowed down to Here and There. He consults his book:

Holmes: *It must have happened Here.*

Conclusion

- *Must* is strong, we're still maximally confident.

- Whatever weakness there is is not in the denotational semantics.

- Evidentiality *may* derive as a manner implicature, but we're not sure.