Futurity, evidentiality & modality: Day 1
Introduction, class outlook, modality

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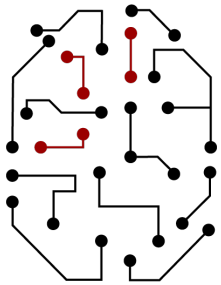

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- Questions about the role of evidence in language require the empirical coverage of linguistics and the conceptual scaffolding of philosophy.
- These questions interact in substantial ways with questions about modality and the nature of future-directed discourse.
- Our plan is to start from places that are very familiar (days 1 and 2) and then progressively approach the cutting edge.

Breakdown of days

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Expectations and lack thereof

1. We will post a daily reading, as well as several additional readings: we do not expect people to read *any* of these—especially not in the theoretical bonanza that is NASSLLI.
2. Lessons will be self-contained.
3. We do ask for your participation both with active questioning and participation in several surveys we will be running to get you involved in the main linguistic judgments.

Today's plan

1. This introduction
2. Overview on Kartunnen's Problem
3. A proposal by von Fintel & Gillies (2010)
4. ...and its formal implementation
5. Lassiter 2014 on the 'mantra'
6. Goodhue's (2017) challenge to the analysis of direct evidence
7. Matthewson's (2015) challenge to the analysis of direct evidence
8. Mandelkern (2019) on Support
9. **might**, **should** and all that

Karttunen's Problem

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- Here is epistemic *must*:

(1) Dev must be sick.

- Does epistemic **must** A entail A?
  - Yes: **must** A ≈ all worlds compatible with knowledge make A true; the actual world *w@* is compatible with knowledge; so *w@* makes A true.
  - No: strong intuition that (1) is weaker than **Dev is sick**. Karttunen (1972)

Evidential Signaling

- In the following two contexts, contrast:

(2) It's raining.

(3) It must be raining.

  - Context 1: You are staring at the pouring rain.
    Judgment: (2) is good but (3) is bad.

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    Judgment: both are good.

Evidential Signaling

- In the following two contexts, contrast:

(4) It's raining.

(5) It must be raining.

- Context 1: You are staring at the pouring rain.
  Judgment: (4) is good but (5) is bad. **Hunch:** because evidence is direct!

- Context 2: Your friend walks in soaking wet.
  Judgment: both are good. **Hunch:** because evidence is indirect!

Information sources (Willett 1988)

DIRECT	INDIRECT	
	HEARSAY	INFERENCE
•visual	•secondhand	•assumption
•auditory	•thirdhand	•observable results
•other sensory	•folklore	our modals!

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Q: how does *must* deal with direct evidence of a non-visual kind?

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Q: how does *must* deal with direct evidence of a non-visual kind?

Q: what's the difference between Secondhand and Thirdhand? What is Folklore?

Rejected options

1. the comment view : **must** contributes a "comment" that is not part of truth-conditions
2. the weakness view : **must** A does not entail A

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Any other options people want to think about?

Varieties of the weakness view

- **must** quantifies over a domain that does not have to include the actual world (Standard Kratzerian semantics).
  - Example 1: **must** A ≈ all worlds compatible with some salient *beliefs* make A true.

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  - Example 1: **must** A ≈ all worlds compatible with some salient *beliefs* make A true.
  - Example 2: **must** A ≈ all of the most typical worlds compatible with salient *knowledge* make A true.
- **must** expresses a level of subjective confidence that is compatible with less than perfect certainty.

must is sometimes not weak

1. conceptually indirectness $\neq$ weakness
2. sometimes there is no weakness:
   Chris has lost her ball, but she knows with full certainty that it is either in Box A or B or C. She says: *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.*

- These observations are true but tricky: they show that indirectness and weakness are separable, but not more than that. They are perfectly treatable by "weak" views.

must is never weak

1. musty MP: if A, **must** B; A; Therefore, B
2. abominable conjunctions (related to Yalcin (2007))

(6) # It must be raining but it's not.

(7) # It must be raining but perhaps it's not.

3. disagreement:

(8) a. A: it must be raining.
B: No it's not, you're wrong.

b. A: it should be raining.
B: # No it's not, you're wrong.

The vF&G view: preliminaries

- Encode indirectness as a presupposition.
- Projection behavior requires the presupposition to be two-sided (cf. discussion in Korotkova 2020):

(9) a. It must be raining. $\mapsto p$

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- Compare:

(10) a. Clara stopped smoking. $\mapsto$ Clara used to smoke

b. Clara has not stopped smoking. $\mapsto$ Clara used to smoke

- What can p in (9) be?

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- What can p in (9) be?
- The direct evidence doesn't settle the question *whether* p.

Quantificational modality

must A is true relative to domain δ iff for all $w \in \delta$, A is true at w

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ordering semantics: δ is generated by

(i) a background domain (a set of worlds) and

(ii) a partial order (reflexive + antisymmetric + transitive relation over worlds)

Kratzer's semantics

Two stacks of premises (mb + os) $\mapsto$ domain $\mapsto$ truth-conditions

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Under limit assumption:

Pre-domain: $PD_w = \bigcap\{A \mid A \in f_w\}$

Order $w \geq_z v$ iff $\{A \mid w \in A \ \& \ A \in g_z\} \supseteq \{A \mid v \in A \ \& \ A \in g_z\}$

Domain: $\delta(z, f, g) = \{w \in PD_z \mid \neg\exists v \in PD_z, v \geq_z w\}$

NB: in this formulation, best worlds are ranked *higher*.

Some references: Kratzer (1981), Lewis (1981), Kaufmann (2017)

Kratzer's semantics: flattened parameter simplifications

Suppose f and g are just sets of propositions (not functions from worlds to sets of propositions).

Pre-domain: $\text{PD} = \bigcap\{\text{A} \mid \text{A} \in \text{f}\}$

Order: $w \geq v$ iff $\{\text{A} \mid w \in \text{A} \ \& \ \text{A} \in \text{g}\} \supseteq \{\text{A} \mid v \in \text{A} \ \& \ \text{A} \in \text{g}\}$

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vF&G's view: core details

- let B_K be an epistemic modal domain (a set of worlds)
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  - $[\![must\ \phi]\!]^{c,w}$ is defined only if K does not directly settle $[\![\phi]\!]^c$
  - $[\![must\ \phi]\!]^{c,w} = 1$ iff $B_K \subseteq [\![\phi]\!]^c$

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- "The basic intuition is that K can fail to directly settle whether P even though K entails whether P"

first implementation of directness

- Main idea: reduce whether a kernel directly settles a proposition to individual vs. collective support.

- K directly settles whether P iff $\exists X \in K$, s.t. either $X \subseteq P$ or $X \subseteq \overline{P}$

Illustration of implementation 1

Context 1 (c_1):

- main evidence for R (rain) is S (for *I'm staring at the rain*)
- $K = \{S, ...\}$
- Verdict: evidence for R in c_1 is **direct**

Illustration of implementation 1

Context 1 (c_1):

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Context 2 (c_2):

- main evidence is W (for *I saw soaked people come inside*)
- $K = \{W, \overline{W} \cup R\}$
- Verdict: evidence for R in c_2 is **indirect**

Towards implementation 2: auxiliary definition

- A subject matter S is an equivalence relation on W (the set of worlds).
- the refinement $S[P]$ of partition S with proposition P is $S[P] = \{\langle w, v\rangle \in S : w \in P \text{ iff } v \in P\}$.
- proposition P is an issue in S iff $S[P] = S$ (informally, this means that P cuts across the borders of the partition, or otherwise said, any cell of S either entails P or $\neg P$).
- S_0 is the wholly unsettled partition; this is the **universal** relation over W (no issues are distinguished).

implementation 2

1. **kernel subject matter:**
   Let $K = \{P_1, ..., P_n\}$. Then $S_K = S_0[P_1]...[P_n]$.

2. **directness as aboutness:**
   K directly settles whether P iff P is an issue in S_K.

Illustration of implementation 2

Context 1 (c_1):

- main evidence for R (rain) is S (for *I'm staring at the rain*)
- $K = \{S, ...\}$; $S_K = S_0[S][...]$
- R is an *issue* in S_K because S_K slices cells according to S.
- Verdict: evidence for R in c_1 is **direct**.

Context 2 (c_2):

- main evidence is W for *I saw soaked people come inside*.
- $K = \{W, \overline{W} \cup R\}$; $S_K = S_0[W][\overline{W} \cup R]$
- take the partition cell in which W is false and $\overline{W} \cup R$ is true; this allows variability with respect to R. So R is not an issue in S_K.
- Verdict: evidence for R in c_2 is **indirect**.

summary of implementations

- implementation 1: K *directly settles* whether P iff $\exists X \in K$, s.t. either $X \subseteq P$ or $X \subseteq \bar{P}$
- implementation 2:
  1. **kernel subject matter:**
     Let $K = \{P_1, ..., P_n\}$. Then $S_K = S_0[P_1]...[P_n]$
  2. **directness as aboutness:**
     K directly settles whether P iff P is an issue in S_K

Lassiter's corpus data

(11) 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 diesel setup but **I'm not certain**. Why would they have added this extra injector?

(12) 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 **I don't know for sure**.

vF&G's reply

- Lassiter "has found some examples in the wild where epistemic modals undergo shifts in the possibilities deemed relevant, the modal horizon" (von Fintel & Gillies 2021: p. 99).

(13) 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?

c. I guess not./Yeah, it must be; I'm sure of it./
?*Like I said: it must be and I'm not certain.

The highlighted bit is ... controversial, let's survey it.

Goodhue on 'direct enough'

(14) *Context: Phil is cooking chicken and peas for his family. When the timer goes off, he checks the chicken's temperature and discovers it is done. He tastes the peas and they are also ready. The table is already set.*

a. Phil's daughter: Is dinner ready?

b. Phil: # Dinner must be ready.

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(15) *Context: Phil is cooking dinner for his family and his friend Meryl. He had to step out in a hurry, and instructed Meryl as he left: "Please turn the peas off when they are done, and take the chicken out of the oven when the temperature is right." When the peas are done, Meryl turns the burner off, and when the chicken is done, she removes it from the oven. She has also seen that the table is set. She wonders whether Phil was planning to make anything else, for example a salad, but Phil didn't mention anything.*

a. Phil's daughter: Is dinner ready?

b. Meryl: Dinner must be ready.

Preliminaries: testimonial chains

- Is testimony direct? how does it play with *must*?

(16) The context here is the actual context in which you probably know this by a testimonial chain.

a. Obama was born in Hawaii.

b. Obama must have been born in Hawaii.

(17) *My spouse says to me "my kids are in be". I text my own mother:*

a. The kids are in bed.

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- If anything (16b) and (17b) are a bit weird.
- Let's not blaze through this fact ... it's important.

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- One sense of 'direct' = perceptual.
- But testimonial chains aren't perceptual!
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  - those that track *directness*.
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Matthewson's (2015) Critique

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- So testimonial chains count as direct.
- One sense of 'direct' = perceptual.
- But testimonial chains aren't perceptual!
- Matthewson: two types of evidentials:
  - those that track *directness*.
  - those that track *trustworthiness*.
- Reply: it's unclear that trustworthiness is the right category unless it's imbued with directness (cf. McCready 2015).
- An alternative way of carving: **must** requires inference (Rett 2016)

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Mandelkern's Core generalization

Support : **must** A needs an argument for A that is salient to the interlocutors and endorsed by the speaker.

- **Support** is unlike **Indirectness** in part because based on **interpersonal** facts.
- Also, obviously because of the emphasis on **argument**.

The data for Support

(18) *Context: 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.*

a. (Mark:) ?? She's great. She must have gotten into the hay box this morning.

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- *Mandelkern:* something's off with Mark's comment in (18).
- *Explanation:* no argument that is salient to participants.

what are "salient arguments"?

argument

I will treat an argument for p as a set of propositions which the speaker is commonly recognized to believe provides reason to believe p—either by deductively entailing its conclusion; by inductively supporting the conclusion; or by showing how the conclusion follows from what is already accepted. (p. 229)

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2. Can be salient without being made explicit.

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salient the argument in question:

1. Need not be common ground or commonly accepted.
2. Can be salient without being made explicit.
3. Need not be salient at the time of the assertion.
4. Must be endorsed by the speaker.

Can Support explain Indirectness?

1. **must** A is a proposal to update the common ground with A.
2. By Support, this has to be based on a salient argument for A.
3. By pragmatic considerations, this argument cannot be too obvious.
4. If the argument was of the form *I see the rain, therefore it's raining*, it would be too obvious.
5. In general, if it was **direct**, it would be too obvious.

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