

# “Now that you mention it . . .”

## Dynamic attention to possibilities

Tikitu de Jager  
tikitu@logophile.org  
www.logophile.org

Institute for Logic, Language and Computation  
Universiteit van Amsterdam

LeGO 10/10/08



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These are the slides for a talk I gave at the LeGO (our internal colloquium series for the ILLC members at the philosophy department). The slides were written to be accompanied by a talk; I wrote the notes somewhat later so I could distribute the slides without worrying that people would be completely confused as to my point. (If anyone still is, at least I tried.)

## Evolution of an idea

- Dec '07 *The relevance of awareness* (Franke & de Jager)  
Amsterdam Colloquium
- May '08 *Now that you mention it: Awareness dynamics in discourse and decisions* (Franke & de Jager)  
under review
- Sep '08 *'Now that you mention it. . . ': Attending, or not, to possibilities*  
NAP-dag talk
- Today *'Now that you mention it. . . ': Dynamic attention to possibilities*
- Oct '09? Dissertation defence?



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The idea comes from "awareness models" from the economics and rational choice literature [FH88; HMS06]. Michael Franke and I applied a variant of this notion to formal pragmatics for the Amsterdam Colloquium 2007 and wrote a paper together, and I've taken it on from there.

# Abstract

It is an obvious truism that we do not, in daily life, attend to all conceivable possibilities. The truism finds its way into our semantics, in a sense, whenever we fix a set of possible worlds: those are the possibilities we attend to, and all others are inconceivable. We might think of this as nothing more than an abstraction that makes models easy to draw (in which case 'really' there is a huge, possibly infinite, set of possible worlds supporting any natural language assertion). Or we might consider it a reasonable representation of a particular instance of conversation (or belief, or reasoning), for which all *relevant* possibilities are represented. In either case, though, the picture is essentially static.

The focus of this talk, and of my dissertation, is the suggestion that we take this truism seriously. Because the set of possibilities being attended to is not, it turns out, a static background against which we can do our semantics and pragmatics. It is again intuitively a truism that we can shift our focus of attention to take in new possibilities, but this truism sits much less comfortably with a conventional semantics, when 'possibilities' are taken to be something like possible worlds. Even dynamic semantics is static in this particular sense (a more polemical title for this talk could be "Dynamic semantics made dynamic").

The immediate reaction to this suggestion might be, "Sure that's how we *should* do it, but what does all that extra work gain us?" I have three kinds of answer. The first is, it solves problems. I'll show a range of examples where this kind of analysis makes life simpler: the pragmatics of possibility statements, a proper analysis of Sobel sequences (and related phenomena), standards of precision for vague predicates, and the semantics of knowledge ascriptions (aka the sceptic's argument against the possibility of knowledge). The schema in each case is very similar: building attention to possibilities into the structures that we do semantics *with* lets us keep the semantics themselves simple, while delivering the (sometimes complex) dynamic (and, I argue, often pragmatic) effects we're looking for.

The second kind of answer is: having to do it properly forces us to do it properly. In order to represent attentiveness correctly we have to be very explicit about who is doing the attending: there are two non-equivalent ways to exclude worlds, by ruling the out or by not attending to them, and they interact in interesting ways. This means we also have to be very explicit about just what is represented by our sets of possible worlds: some particular agent's belief state, or the common ground, or someone's beliefs *about* the common ground, or what? I will argue that this clarity is beneficial, among other things in forcing us to think carefully about the status of our linguistic intuitions of acceptability.

The third kind of answer is, it's fun! This framework seems to work for some pretty wild and crazy looking dialogues. It also means we need to keep our eyes open for some pretty wild and crazy update possibilities (attending to a new possibility might in principle throw into doubt every assertion that has been accepted so far in a conversation). And secretly I suspect that that kind of fun also points at something else: it might just be correct.

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## 1 Intuitions

## 2 Details

## 3 Applications

- Sobel sequences
- Vagueness and standards of precision
- Pragmatics of possibility statements



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└ Outline

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- Connectives:  $\wedge, \vee, \neg, \rightarrow$  (standard definitions)
- Extra bits and pieces:  $\Box$
- Formal definitions, but for intuitions look at this picture:



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“Now that you mention it . . .”

└─ Intuitions

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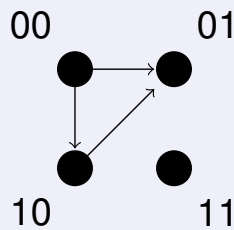
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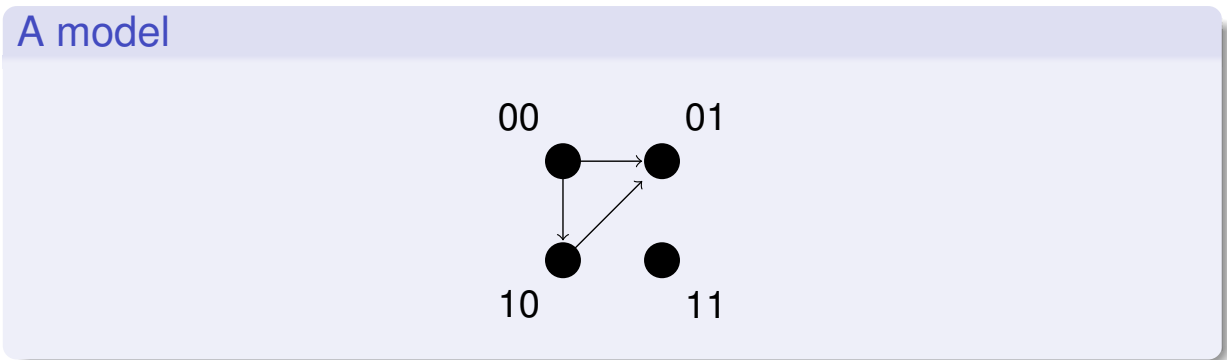
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"Now that you mention it..."

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“Now that you mention it. . .”

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Trying to motivate a distinction between conscious, considered belief (difficult to lose due to inattention) and unconscious assumption (easily lost or at least brought into question).



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- *Linguistic* presupposition: required by sentence



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- *Pragmatic* presupposition: held by speaker
- *Linguistic* presupposition: required by sentence

A brief introduction to Stalnaker’s model (it belongs of course to many others, but it’s his ideas that I’m primarily building on). I mention his unusual definition of “presupposition” because it turns up in quotes later; also because his use of the term nicely elides the difference between conscious beliefs and unconscious assumptions.

## Presuppositions that might not be beliefs

### Stalnaker

To presuppose a proposition in the pragmatic sense is to take its truth for granted, and to assume that others involved in the context do the same. This does not imply that the person need have any particular mental attitude toward the proposition, or that he need assume anything about the mental attitudes of others in the context.

Presuppositions are probably best viewed as complex dispositions which are manifested in linguistic behavior.

(*Context and Content* pg. 38)



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“Now that you mention it. . .”

└─ Intuitions

└─ Presuppositions that might not be beliefs

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Or, beliefs that need not be represented in the mind of the believer.

(NB: if you ask about them, they will *become* represented.)

The next slide gives examples of propositions taken for granted *only* because they are not noticed.

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“The Bijenkorf is larger than Frege’s left earlobe.”



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## Some riddles

Q What is brown and sticky?



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“Now that you mention it . . .”

└─ Intuitions

└─ Some riddles

Some riddles

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“Now that you mention it . . .”

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The first point is not an intuition but a technical observation about vanilla possible worlds semantics: these are the only attitudes one can hold to a proposition. The riddles seem to show that not knowing isn't always uncertainty (in the sense of not being able to distinguish the correct answer from an incorrect one).

We call unconscious beliefs “assumptions”; they're often not based on immediate evidence, and thus can easily be wrong.

Belief revision (in the technical sense) is ‘hard’, but the impression we have of overturning an assumption (technically also a species of belief revision) is that it's almost effortless (that “Aha!” moment).

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- Infallible knowledge vs. the sceptic



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He focusses on the “every” in the definition; typically natural language universals have an implicitly restricted domain. What's the right implicit restriction here?

Stupidity: if you are too dull to imagine many far-fetched possibilities, your knowledge is more stable. Doing epistemology can destroy your knowledge!

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Tikitu de Jager (ILLC)

“Now that you mention it. . .”

LeGO 10/08

12 / 36

2008-10-29

“Now that you mention it. . .”

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# Progress

1 Intuitions

2 Details

3 Applications

- Sobel sequences
- Vagueness and standards of precision
- Pragmatics of possibility statements



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“Now that you mention it. . .”

└─ Details

└─ Progress

Progress

● Intuitions

● **Details**

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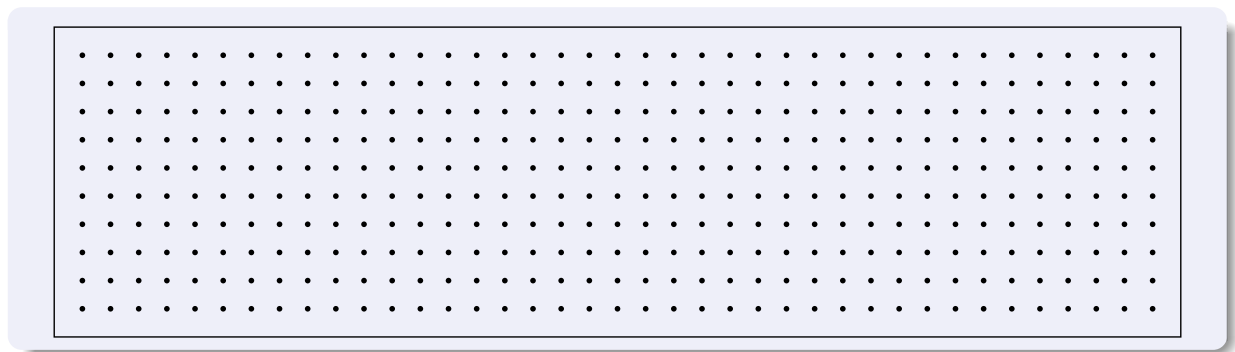
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## Formal model

- Set of worlds in principle possible (*not* represented in head)



2008-10-29

“Now that you mention it . . .”

└─ Details

└─ Formal model

Formal model

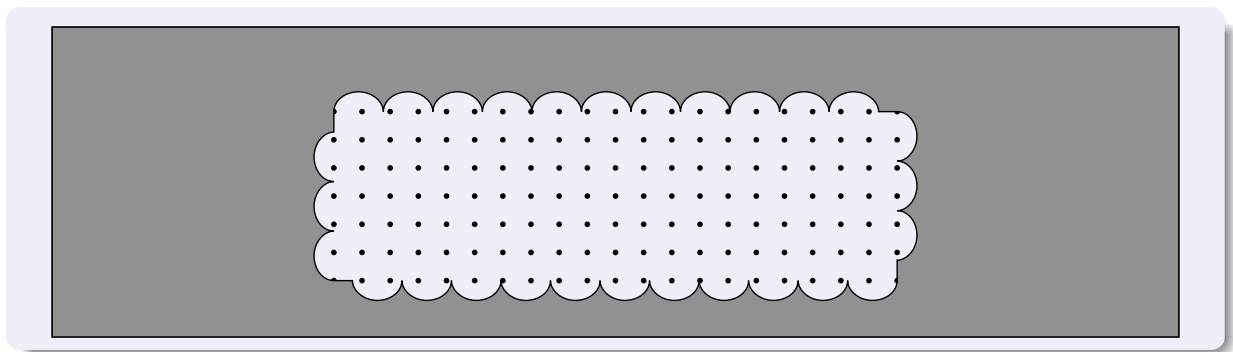
• Set of worlds in principle possible (*not* represented in head)



The distinctions are just common-or-garden finegrainedness, nothing interesting going on there. The key point is that the worlds not being entertained are invisible, even inconceivable, to the agent whose mental state we’re representing. There’s a distinction between worlds behind the gray curtain and those that have been crossed out (ruled out by evidence): both are not ‘live possibilities’ as far as the agent is concerned, but the ruled out ones can still be discussed (she can give reasons for ruling them out); the ones outside the sphere of attention are completely inaccessible except through an attention update.

## Formal model

- Set of worlds in principle possible (*not* represented in head)
- Within that, set of worlds being *entertained* (represented in head)



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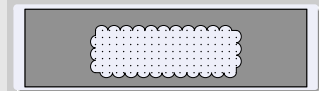
“Now that you mention it . . .”

└─ Details

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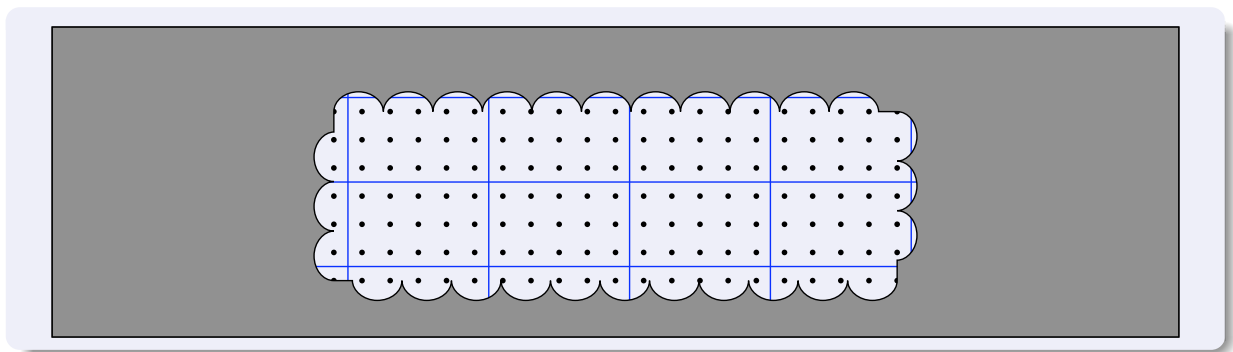


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## Formal model

- Set of worlds in principle possible (*not* represented in head)
- Within that, set of worlds being *entertained* (represented in head)
- (Distinctions made between those worlds)



2008-10-29

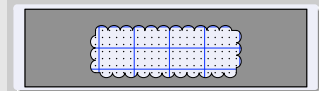
“Now that you mention it . . .”

└─ Details

└─ Formal model

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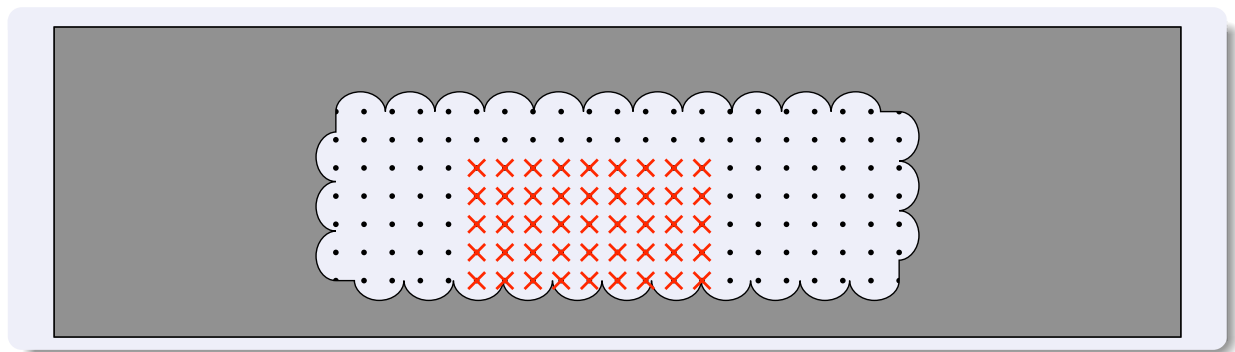
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## Formal model

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- Within that, set of worlds being *entertained* (represented in head)
- (Distinctions made between those worlds)
- Within that, set of worlds held possible (represented in head)



2008-10-29

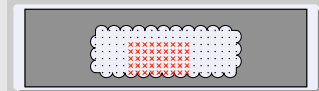
“Now that you mention it . . .”

└─ Details

└─ Formal model

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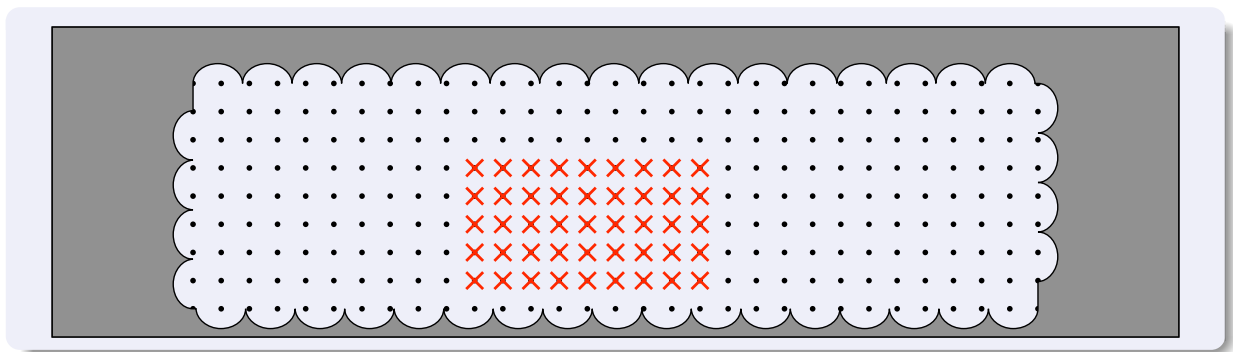
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- (Distinctions made between those worlds)
- Within that, set of worlds held possible (represented in head)
- Operation *adding* worlds by attention to a possibility



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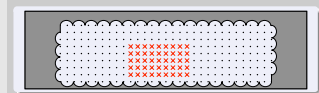
“Now that you mention it . . .”

└─ Details

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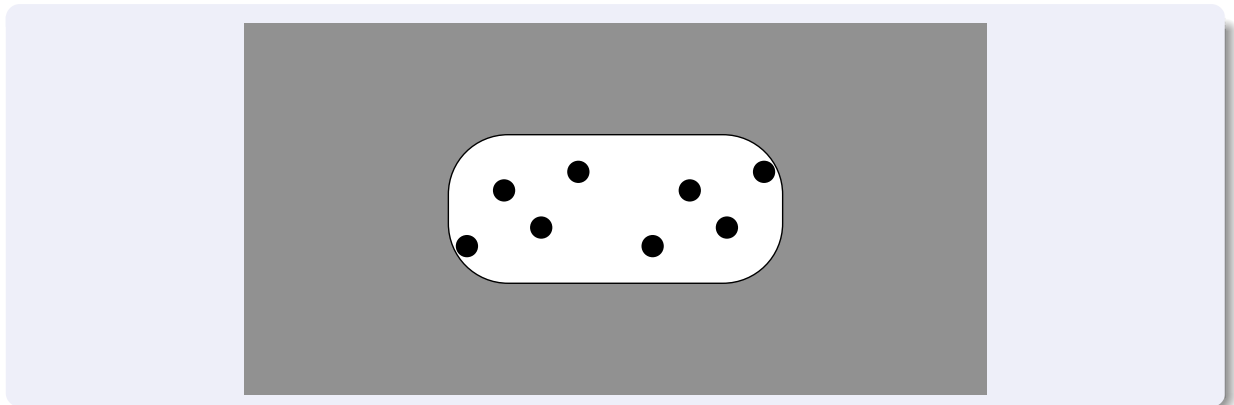
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## Updates (two-stage)

To update with  $\varphi$ :



2008-10-29

“Now that you mention it . . .”

└─ Details

└─ Updates (two-stage)

Updates (two-stage)  
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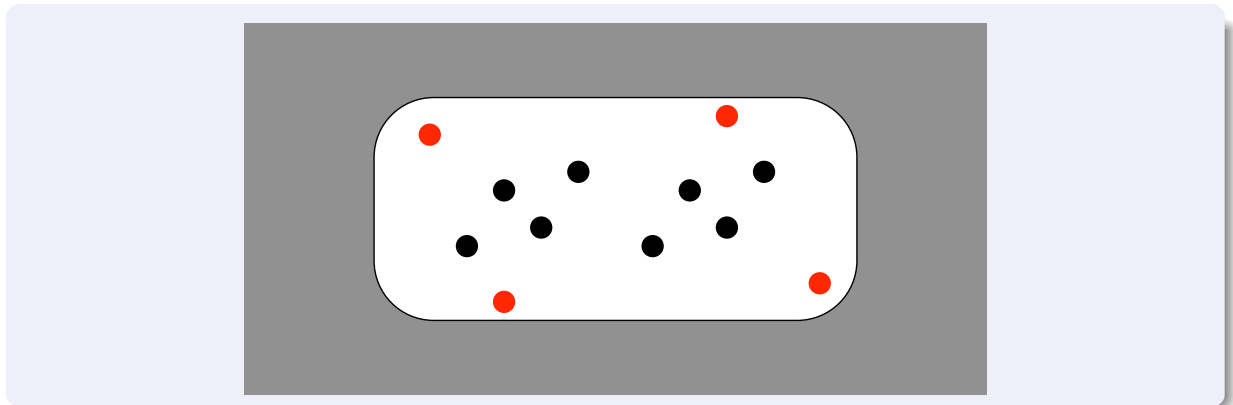


Later attention updates may invalidate previously accepted statements. Just mentioning (under negation, in questions, hedged however-you-like) introduces possibilities. It doesn't even have to be linguistic, if something happens to catch your eye you attend to it.

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“Now that you mention it . . .”

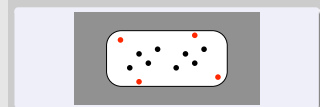
└ Details

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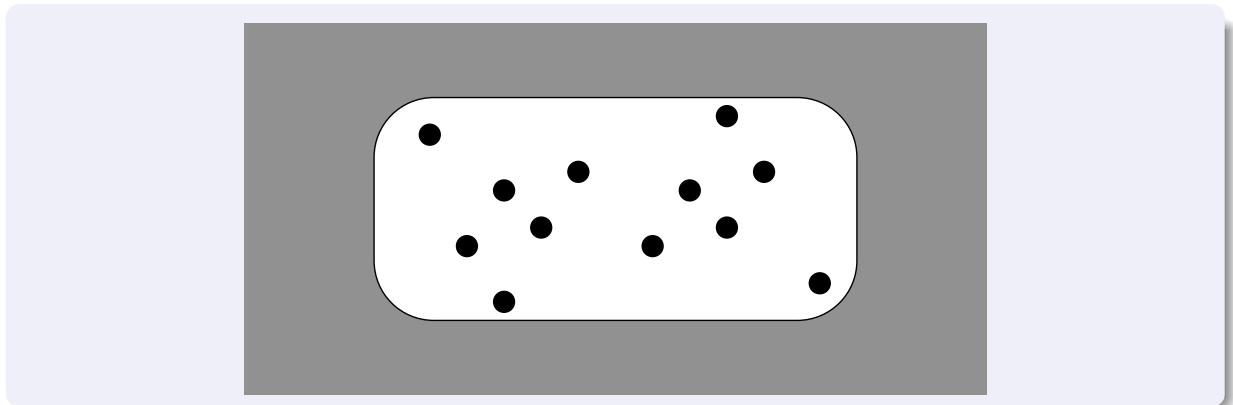


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“Now that you mention it . . .”

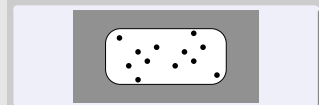
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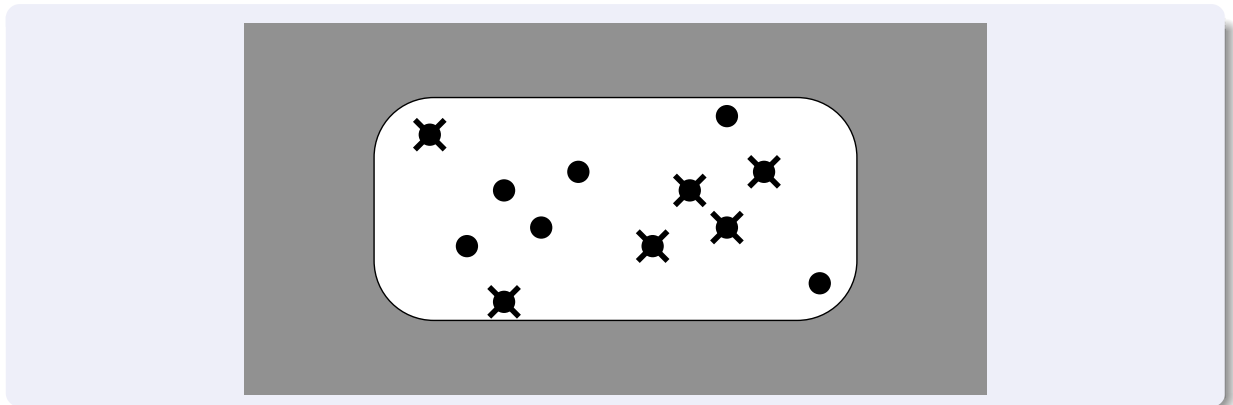


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2008-10-29

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└─ Details

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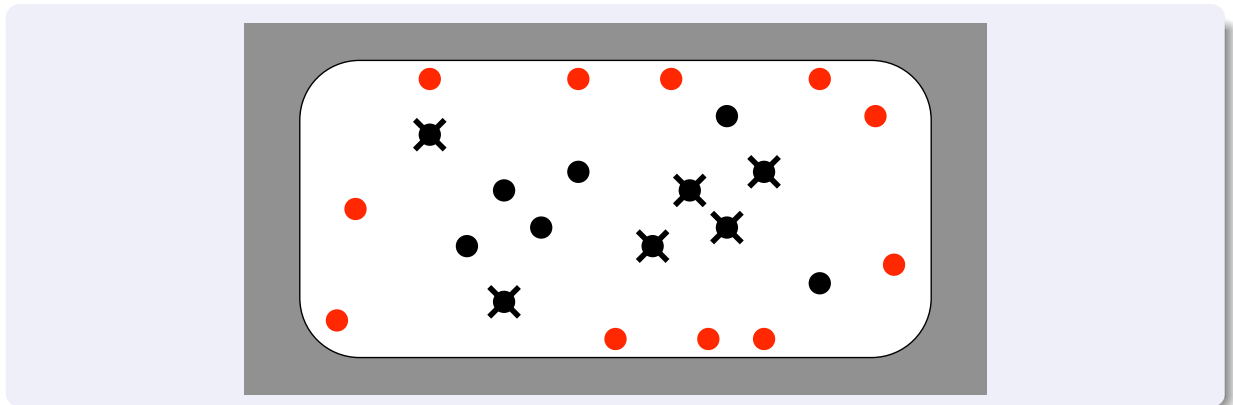


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“Now that you mention it . . .”

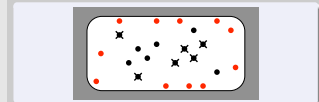
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2008-10-29

“Now that you mention it . . .”

└─ Details

└─ Updates (two-stage)

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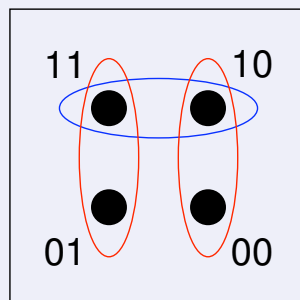
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## Whose information state?

- I believe  $P$ ; I believe that you don't believe  $P$ .



2008-10-29

“Now that you mention it. . .”

└─ Details

└─ Whose information state?

Whose information state?

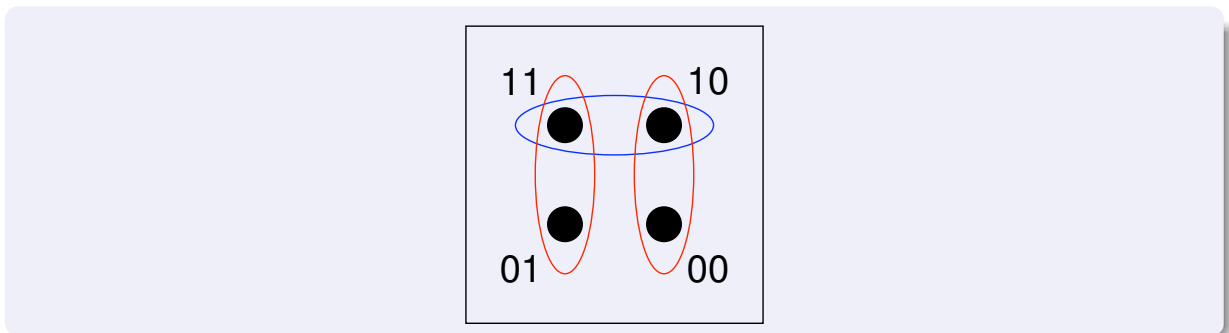
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Because you can't see outside your own attention state, not all nested combinations of epistemic/attentive operators are possible. If I assume  $\varphi$  and I'm thinking about your mental state at all, then I assume you also assume (or believe)  $\varphi$ . Typically in conversation we have a lot of mutual assumptions. If I notice you assuming something, but I think your assumption is harmless, I can leave you to assume it; but I (consciously) believe it. “Sister”: I assume I have a sister, therefore I assume you believe I have a sister, and I don't have to tell you this even if we've just met and you couldn't possibly know. (Some kinds of presupposition accommodation seem to work like this: the speaker doesn't even intend that the hearer accommodate anything.)

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2008-10-29

“Now that you mention it. . .”

└ Details

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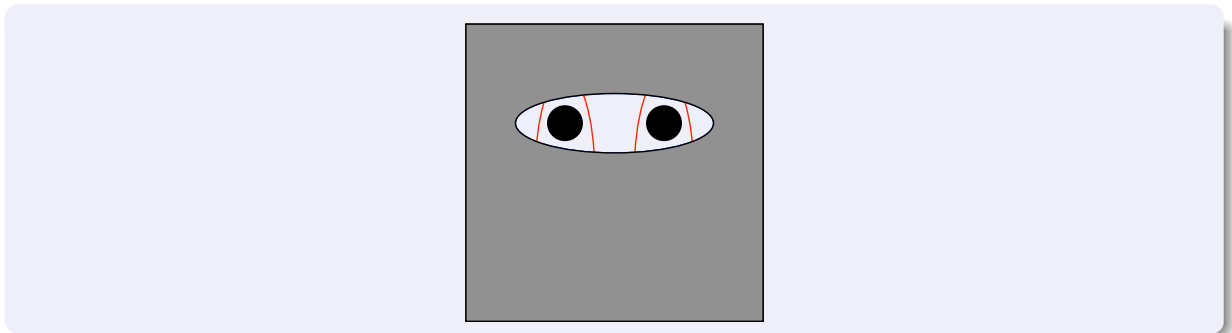
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2008-10-29

“Now that you mention it. . .”

└─ Details

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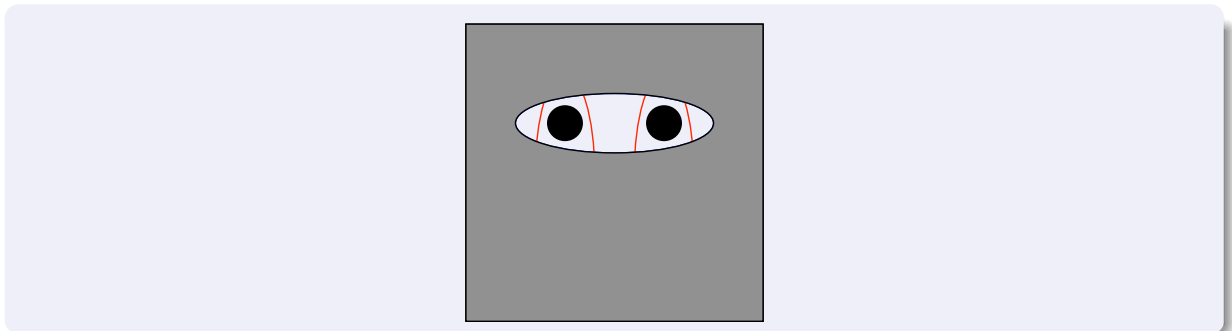
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2008-10-29

“Now that you mention it . . .”

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2008-10-29

"Now that you mention it. . ."

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2008-10-29

"Now that you mention it..."

└ Details

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- "I have to pick up my sister": I assume you agree with my assumptions



2008-10-29

"Now that you mention it. . ."

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## Splitting worlds (distinctions)

A: I was going to bake a cake, but I haven't got any eggs.

B: Did you think of making shortbread?

A: I didn't. Do you need eggs for that?

(AC paper)



2008-10-29

"Now that you mention it. . ."

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└─ Splitting worlds (distinctions)

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A lot of argument about something relatively unimportant: we need finegrainedness somewhere in there. (We don't have assumptions about every proposition we don't attend to.)

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- Shortbread recipe needs eggs
- We have no eggs
- I like cake
- It's Friday
- ...

- Shortbread recipe doesn't need eggs
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2008-10-29

"Now that you mention it..."

└─ Details

└─ Splitting worlds (distinctions)

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# Intensional (linguistic) attention

- language of self-ascription of beliefs



2008-10-29

“Now that you mention it . . .”

└─ Details

└─ Intensional (linguistic) attention

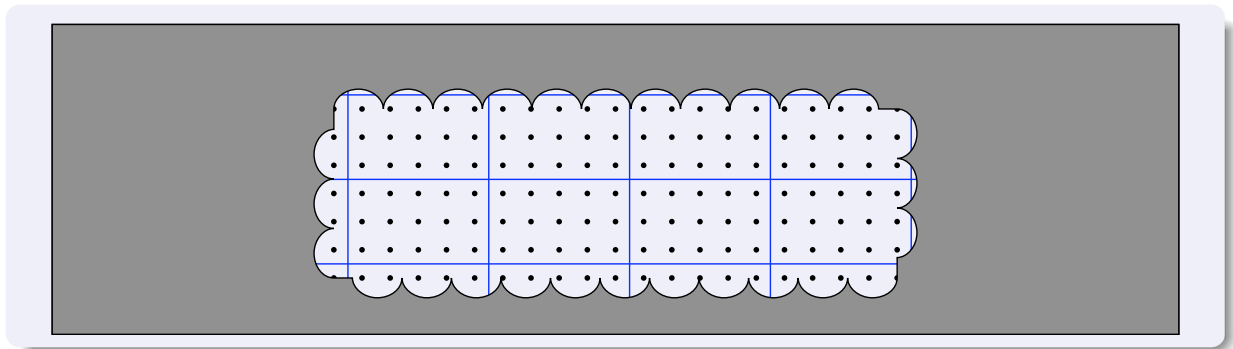
Intensional (linguistic) attention  
└─ language of self-ascription of beliefs

More on finegrainedness (nice Stalnaker quote, but the point doesn't need belabouring).

Most important, though, is the idea that attention defines the language the agent would use to report her beliefs, if asked to list 'all of them'. She doesn't *notice* that she believes she has a sister, so she doesn't list it as a belief: the term 'sister' isn't in that language of self-ascription of beliefs.

## Intensional (linguistic) attention

- language of self-ascription of beliefs
- individuates “worlds” (better maybe “states”)



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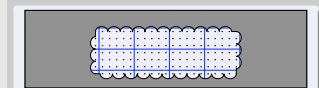
“Now that you mention it . . .”

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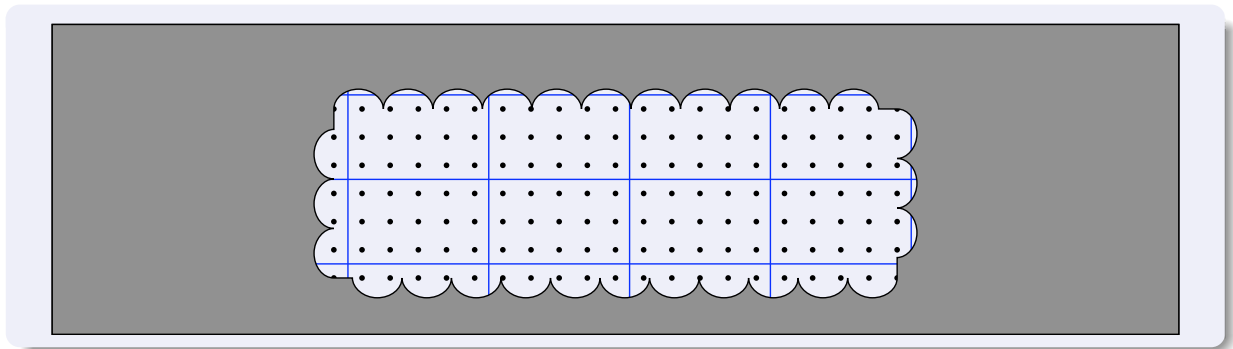


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## Intensional (linguistic) attention

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- “issues” (available/raised/settled)



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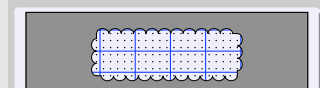
“Now that you mention it . . .”

└ Details

└ Intensional (linguistic) attention

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More on finegrainedness (nice Stalnaker quote, but the point doesn't need belabouring).

Most important, though, is the idea that attention defines the language the agent would use to report her beliefs, if asked to list ‘all of them’. She doesn't *notice* that she believes she has a sister, so she doesn't list it as a belief: the term ‘sister’ isn't in that language of self-ascription of beliefs.

## Intensional (linguistic) attention

- language of self-ascription of beliefs
- individuates “worlds” (better maybe “states”)
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### Stalnaker

[T]here are are surely an infinite number of possible worlds compatible with anyone’s belief state. But a believer’s representation of a space of possible worlds need not distinguish between them all. Just as a finite perceiver may see a space which consists of an infinite number of points, so a finite believer may represent a space of possible worlds which in fact consists of an infinite number of possible worlds.

(*Inquiry* pg. 69)



2008-10-29

“Now that you mention it . . .”

└─ Details

└─ Intensional (linguistic) attention

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# Summary

## Models:

- Set of possible worlds (“metaphysical possibilities”)
- Set of worlds ENTERTAINED (not excluded by assumptions)
- List of propositions attended to (individuates states)
- Set of states HELD POSSIBLE (not excluded by information)

## Updates:

- Attentiveness update:
  - ▶ overturn assumption (if any)
  - ▶ individuate states more finely
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“Now that you mention it . . .”

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Two kinds of updates. The attentiveness update is unavoidable; the informative update can be avoided by rejecting an assertion.

# What I'm not telling you

- How do we expand the attentiveness sphere?



2008-10-29

"Now that you mention it. . ."

└─ Details

└─ What I'm not telling you

What I'm not telling you

- How do we expand the attentiveness sphere?

One formal story can be found in the paper with Michael, which is on both our websites; I'm working on another one with Maria Aloni and Paul Egré.



# Progress

1 Intuitions

2 Details

3 Applications

- Sobel sequences
- Vagueness and standards of precision
- Pragmatics of possibility statements



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“Now that you mention it. . .”

└ Applications

└ Progress

## Progress

Intuitions

Details

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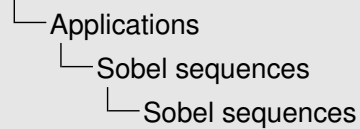
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“Now that you mention it . . .”



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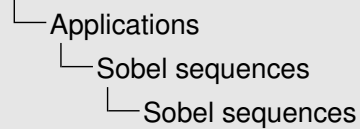
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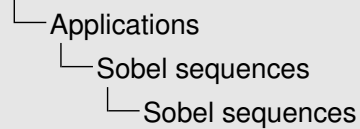
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“Now that you mention it . . .”



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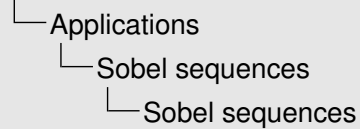


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├ Applications

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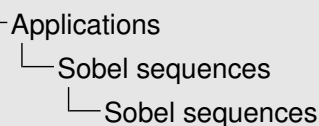
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## Some Sobel data

$$p > r \text{ vs. } p \wedge q > \neg r$$

A: If Sophie had gone to the New York Mets parade she would have seen Pedro Martínez.

B: If she had gone and got stuck behind someone tall, she wouldn't have seen him.

(Sobel, Lewis)

B: If Sophie had gone to the New York Mets parade and got stuck behind someone tall, she wouldn't have seen Pedro.

A: # If she had gone to the parade she would have seen him.

(von Fintel)



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"Now that you mention it..."

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## Some Sobel data

$$p > r \text{ vs. } p \wedge q > \neg r$$

A: If Oswald didn't shoot Kennedy then someone else did.

B: If the CIA faked his death [and Oswald didn't shoot him] then nobody did.

(Williams)

B: If the CIA faked Kennedy's death [and Oswald didn't shoot him] then nobody shot him.

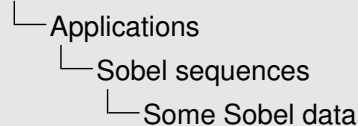
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"Now that you mention it..."



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**A:** I've been through all the CIA records. If Oswald didn't shoot him then someone else did.



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"Now that you mention it..."

- └ Applications
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A: If William has proposed to Mary, she'll be our queen.

B: She might reject him.  
(after Moss)

B: Mary might reject William [if he has proposed].

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"Now that you mention it..."

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# What a mess...

Questions:

- What does “#  $\varphi$ ” mean?

Answers?

Complications:

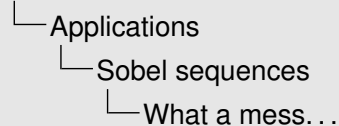


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“Now that you mention it...”



What a mess...

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Epistemic efficacy of stupidity: so long as we don't consider too many strange contexts, our theories can stay simple. Is that the kind of 'knowledge' we want?

Problem of motivation: there are at least two ways to be 'pragmatically infelicitous'. Making a statement cooperative might require a weird context; we shouldn't take 'weirdness' judgements too seriously.

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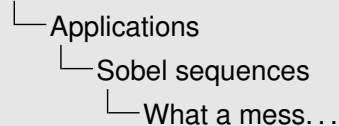
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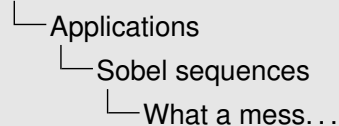


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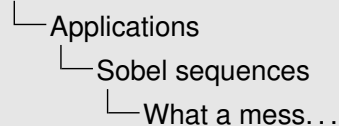
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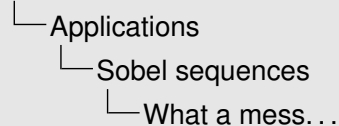
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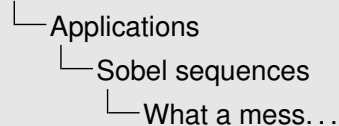
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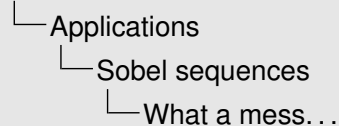
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- Epistemic efficacy of stupidity

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## What a mess...

### Questions:

- What does “#  $\varphi$ ” mean?
- **What is an acceptable dialogue?**

### Answers?

- $\neg\exists$  context s.t.  $\varphi$  is felicitous
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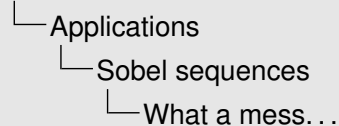
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2008-10-29

“Now that you mention it...”



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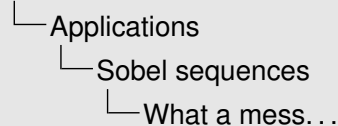
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2008-10-29

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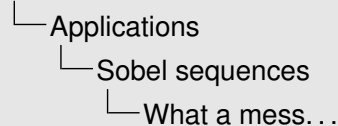
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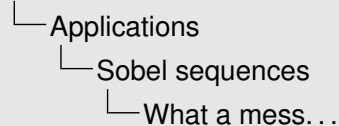
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2008-10-29

“Now that you mention it...”



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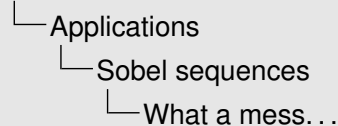
Complications:

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2008-10-29

“Now that you mention it...”



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# And my story is...

... I'm not going to tell you!



2008-10-29

"Now that you mention it..."

- └ Applications
  - └ Sobel sequences
    - └ And my story is...

And my story is...

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I hope it's fairly clear how one might start to account for this sort of data using attentiveness. The details are messy, but it seems to work pretty well.

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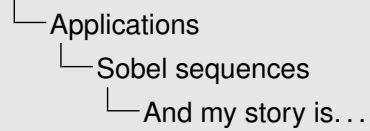
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- When you introduce possibilities matters



2008-10-29

"Now that you mention it..."



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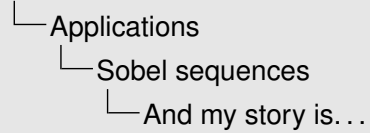
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- When you introduce possibilities matters (doing it early adds constraints)



2008-10-29

"Now that you mention it..."



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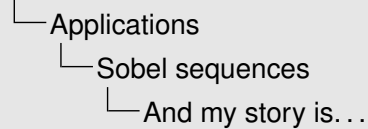
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- When you introduce possibilities matters (doing it early adds constraints)
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2008-10-29

"Now that you mention it..."



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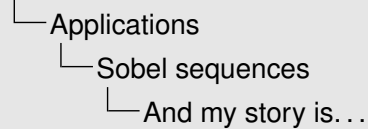
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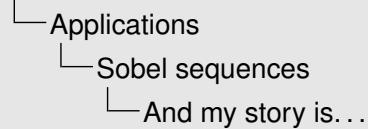
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2008-10-29

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## What does it get us?

- Uniform account (counterfactuals, indicatives, whatever)



2008-10-29

“Now that you mention it . . .”

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- Uniform account (counterfactuals, indicatives, whatever)
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2008-10-29

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2008-10-29

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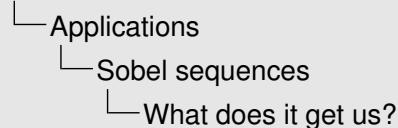
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2008-10-29

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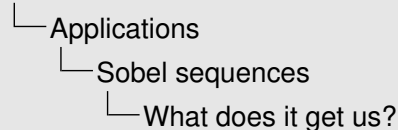
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2008-10-29

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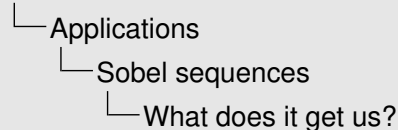
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2008-10-29

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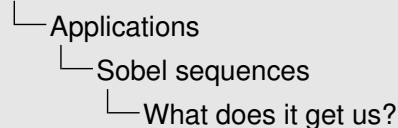
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2008-10-29

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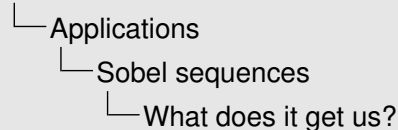
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2008-10-29

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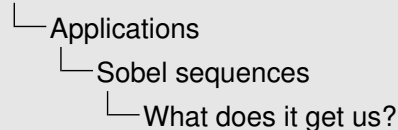
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  - B: You mean she won't.



2008-10-29

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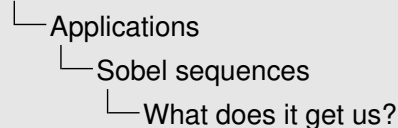
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2008-10-29

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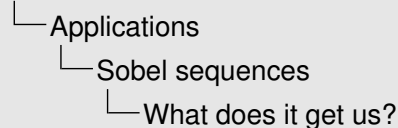
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2008-10-29

"Now that you mention it..."



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  - A: Of course she could reject him.
  - B: ... Did you mean she *won't* reject him, or hadn't you thought of it?

And here's some fun. The formal theory predicts that it matters what attentiveness attitude the speaker has to an abnormality condition (like "she rejects him") when making a conditional claim. But sometimes you, the hearer, just *don't know*: you weren't attending to the weird possibility so it didn't occur to you to check if the speaker was. That causes difficulties (you have to revise models, rethink, maybe there's no determinate interpretation) so we should expect to see considerate speakers trying to avoid the problem. And look: we see markers of discourse relations that seem to do exactly this! Formally speaking there's a difference between processing a conjunction and its conjuncts in sequence: the attention updates happen at different times. That looks like a weird formal artefact... and then you find people doing it!

## What does it get us?

- Uniform account (counterfactuals, indicatives, whatever)
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- Complicated pragmatic effects
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- Dynamics: difference between  $\varphi \wedge \psi$  and  $\varphi; \psi$ .



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"Now that you mention it..."

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# Vagueness (not all of it!)



2008-10-29

“Now that you mention it. . .”

- └ Applications
  - └ Vagueness and standards of precision
    - └ Vagueness (not all of it!)

Vagueness (not all of it!)

Gratuitous film reference.

# Vagueness (not all of it!)

## The Blues Brothers



- It's 106 miles to Chicago. We've got a full tank of gas, half a pack of cigarettes, it's dark, and we're wearing sunglasses.
- Hit it.

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2008-10-29

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- It's 100 miles to Chicago. (And 300 to Pittsburgh.)



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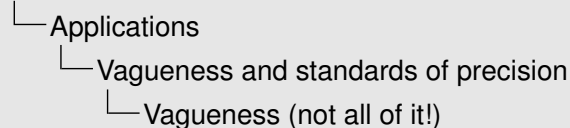
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"Now that you mention it. . ."



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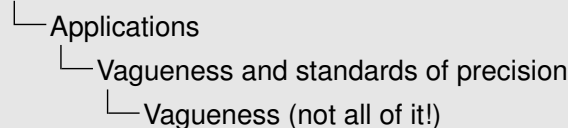
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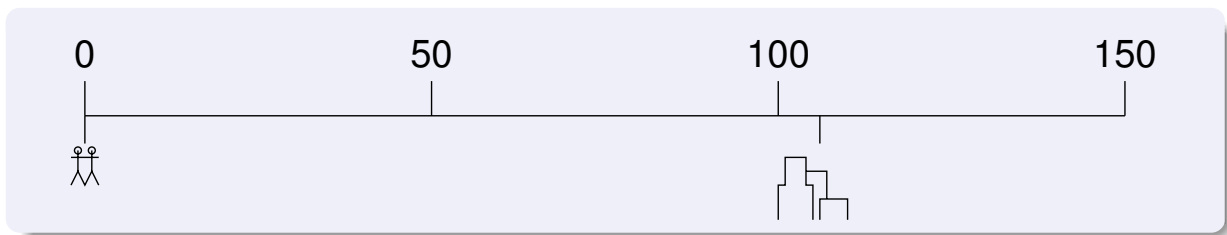
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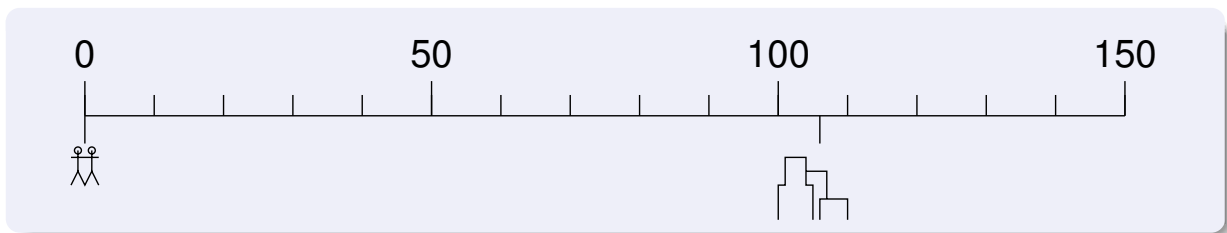


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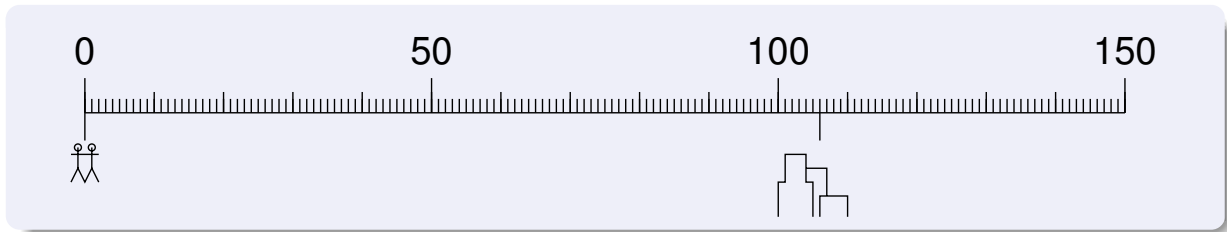


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# What does it get us?

- Simple (or at least general) semantics



2008-10-29

“Now that you mention it. . .”

- └ Applications
  - └ Vagueness and standards of precision
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What does it get us?

- Simple (or at least general) semantics

This leaves one less problem for the vagueness folk to deal with. But, if Lewis is right, knowledge attributions (and presumably truth judgements as well) are vague in just this way! So that puts vagueness in at the bottom too.

## What does it get us?

- Simple (or at least general) semantics
- Increasing standards of precision explained



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“Now that you mention it. . .”

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- Properties of (properly) vague predicates linked to . . . well, everything



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# Pragmatics of possibility statements

- A: How should I go work this morning?  
The tram is uncomfortable, but a taxi is expensive.
- B: There might be a tram strike today.

(AC talk)



2008-10-29

“Now that you mention it. . .”

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Do we want to put the pragmatics of “might” into semantics? Tricky to get right. . .  
And then people seem to use questions, hedged statements, and similar to the same effect — surely their semantics doesn't need adjusting in this way!  
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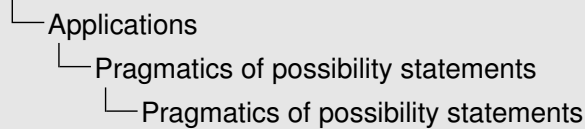


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“Now that you mention it . . .”



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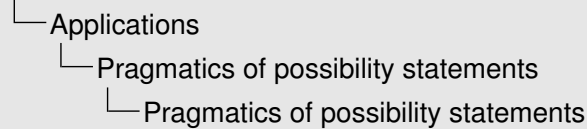


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“Now that you mention it...”



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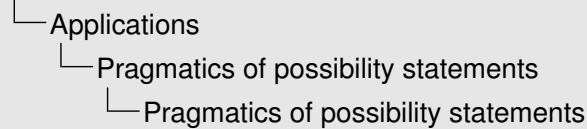


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# Pragmatics of possibility statements

- Possibility statements express possibility



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“Now that you mention it . . .”

- └ Applications
  - └ Pragmatics of possibility statements
    - └ Pragmatics of possibility statements

Pragmatics of possibility statements

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Mentioning possibilities produces an attention update, even if the informative update is vacuous.

We work this out in (painful) detail in the paper, in a decision-theoretic setting.



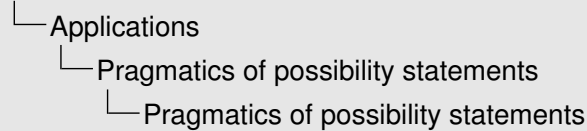
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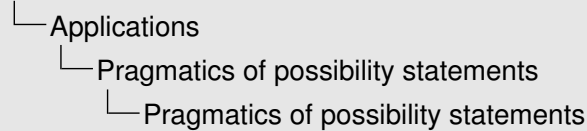
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“Now that you mention it . . .”



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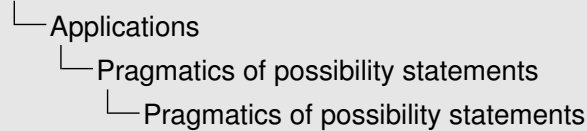
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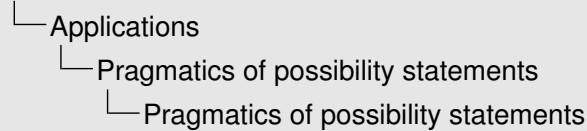
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- Why not say something stronger? *Weak* beliefs/*hearer* expertise.

Mentioning possibilities produces an attention update, even if the informative update is vacuous.

We work this out in (painful) detail in the paper, in a decision-theoretic setting.

# What does it get us?

- Uniform account (questions, “might”, pointing, ...)



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“Now that you mention it. . .”

- └ Applications
  - └ Pragmatics of possibility statements
    - └ What does it get us?

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This schema applies to pretty much all the applications: build attentiveness in at the bottom, and the top gets a lot simpler and more stable.

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“Now that you mention it...”

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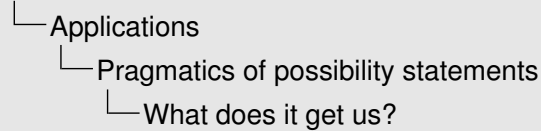
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“Now that you mention it . . .”



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# Progress

1 Intuitions

2 Details

3 Applications

- Sobel sequences
- Vagueness and standards of precision
- Pragmatics of possibility statements



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2008-10-29

“Now that you mention it. . .”

└─ Progress

## Progress

- Intuitions
- Details
- Applications
  - 
  - 
  -



# What I already said

- Attentiveness is ubiquitous — take it seriously!



2008-10-29

“Now that you mention it . . .”

└─What I already said

[What I already said](#)

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2008-10-29

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"Now that you mention it. . ."

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  - ▶ Possibility statements and deliberately drawing attention



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"Now that you mention it . . ."

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“Now that you mention it . . .”

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# What I didn't say

Things I know but couldn't cover:

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Tikitu de Jager (ILLC)

"Now that you mention it . . ."

LeGO 10/08

35 / 36

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"Now that you mention it . . ."

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Things I know but couldn't cover:

- Updates done formally (at least two options)



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Things I know but couldn't cover:

- Updates done formally (at least two options)
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- Reinterpretation (remembering utterances)



2008-10-29

"Now that you mention it . . ."

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2008-10-29

"Now that you mention it. . ."

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Things I don't yet know and would like to:

- How to do updates formally



2008-10-29

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- How to do updates formally
- A logic ( $A_1\varphi \rightarrow A_1B_2\varphi$ )



2008-10-29

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Things I don't yet know and would like to:

- How to do updates formally
- A logic ( $A_1\varphi \rightarrow A_1B_2\varphi$ )
- Suppression task: effect of ordering



2008-10-29

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- How to do updates formally
- A logic ( $A_1\varphi \rightarrow A_1B_2\varphi$ )
- Suppression task: effect of ordering
- Whether I will finish on time. . .



2008-10-29

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Thanks for your attentiveness!  
(questions . . . and then the pub)



2008-10-29

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