Epistemic Modals and Conditionals Revisited

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Outline of this Talk

What I Learned in Grad School

Complaints

An Expressive Analysis of Epistemic Modals and Conditionals?

Objectivity in Epistemic Meanings

Outline of Part 1

A Possible Worlds Semantics for Indicative Conditionals

(1) If Kai is here, he left Cambridge on time.

(2) Among the worlds where Kai is here, the ones that are most similar to the actual world are ones where he left Cambridge on time.

Gibbard's Problem (à la Edgington)

M, at a peep-hole, is spying on three hit-men, Tom, Dick and Harry, and their boss. M hopes to discover who will receive the order to kill. M sees Tom leave the room. He then hears the boss give the order. M thinks (and could easily assert)

(3) If he didn't tell Harry, he told Dick (not Tom)

Another spy, N, at a different peep-hole with a different view, saw Dick leave the room by a different door. He too heard the boss give the order. N thinks (and could easily assert)

(4) If he didn't tell Harry, he told Tom (not Dick)

Kratzer's Response

Angelika Kratzer: 1986, "Conditionals", *CLS*.

If epistemic interpretations of modals are relativized to the evidence available in the utterance situation, different utterances of one and the same sentence involving such a modal might express different propositions. Let us look at an example:

Kratzer's Response

Suppose a man is approaching both of us. You are standing over there. I am further away. I can only see the bare outlines of the man, in view of *my* evidence, the person approaching may be Fred. You know better. In view of *your* evidence, it cannot possibly be Fred, it must be Martin. If this is so, *my* utterance of (5) and *your* utterance of (6) are both true.

(5) The person approaching might be Fred.

(6) The person approaching cannot be Fred.

Had *I* uttered (6) and *you* (5), both our utterances would have been false.

Kratzer's Response

Certain bare indicative conditionals show strikingly similar properties as shown by a famous example invented by Allan Gibbard.

The Analysis

In indicative conditionals, the *if*-clause restricts an overt or covert epistemic modal.

The Epistemic Conditional Analysis

(7) *If P, Q* uttered in situation *s* is true iff all P-worlds compatible with the evidence available in *s* are Q-worlds.

(8) [More standardly phrased as follows]

If P, Q uttered in situation *s* is true iff all P-worlds compatible with what the speaker in *s* knows in *s* are Q-worlds.

(9) [Strawman version, often attacked]

If P, Q uttered in situation *s* is true iff the speaker in *s* has in *s* a high conditional probability for Q, given P.

Outline of Part 2

Conditionals in Dialogue

Lewis in "Probabilities of Conditionals . . ."

Presumably our indicative conditional has a fixed interpretation, for speakers with different beliefs, and for one speaker before and after a change in his beliefs. Else how are disagreements about a conditional possible, or changes of mind?

Conditionals in Dialogue

Bennett in *A Philosophical Guide to Conditionals*

But this is not what indicative conditionals mean. Winifred tells me 'If Pete called, he won', and I say 'Are you sure?' She replies 'Yes, I am pretty sure I'm right'. If she had meant that her value for the conditional probability is high, then her reassurance to me would have meant that she is pretty sure that it is indeed high. But confidence in a conditional is not like that. Common sense . . . [clamours] that Winifred is not assuring me that her value for a certain conditional probability is high, but assuring me of that high value. She has not asked herself 'How sure am I about the conditional probability?' but rather 'How high is the conditional probability?' She aims to convince me of that probability, not the proposition that it is her probability.

Examples: Conditionals in Dialogue

(10) A: If he didn't tell Harry, he told Tom.
B: Are you sure?

(11) A: If he didn't tell Harry, he told Tom.
B: You're wrong.

(12) A: If he didn't tell Harry, he told Tom.
A: [10 minutes later] I was wrong.

Conditionals under (Un)certainty

Bennett

There is abundant linguistic evidence that the spectrum of notions relating to confidence – doubt, indecision, certainty, and so on – when applied to indicative conditionals *all always* relate to the height of the person's conditional probability for C given A, and *never* to the person's confidence about what his or her probability for C given A is.

(13) I am almost certain that if the boss didn't tell Harry, he told Tom.

No Truth Value

The NTV Thesis ("No Truth Value")

"In an indicative conditional the speaker *expresses* but does not *report* a fact about his own state of mind. In the absence of anything else he could be reporting, the conclusion is that indicative conditionals are not reports at all; that is, they are not propositions with truth values." (Bennett)

In a sense, indicative conditionals are something like very sophisticated frowns or shrieks (*ouch!*).

What Now?

- The complaints against the epistemic conditional analysis seemed to show that the content of indicative conditionals needs to be less subjective – more objective. How can an analysis that assigns no propositional content to indicative conditionals deliver an objective enough meaning?
- If indicative conditionals do not have truth-values, how can they ever occur in embedded positions? What are the facts?
- How can the NTV theory be part of a systematic formal semantics for natural language? What is the semantic type of a frown or a shriek?

Outline of Part 3

Quoth the Traditional Linguist

Halliday 1970

"[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'."

Palmer 1986

"[Epistemic modality indicates] the status of the proposition in terms of the speaker's commitment to it."

Quoth the Modern Linguist

Drubig 2001

"[E]pistemic modals must be analyzed as evidential markers. As such they are part of the extrapropositional layer of clause structure and take scope over all propositional operators . . . ."

Huddleston & Pullum 2003

"[E]pistemic modality qualifies the speaker's commitment to the truth of the modalized proposition. While *It was a mistake* represents an unqualified assertion, *It must have been a mistake* suggests that I am drawing a conclusion from evidence rather than asserting something of whose truth I have direct knowledge. And *You may be right* merely acknowledges the possibility that 'You are right' is true."

A Philosopher's Parallel

(14) It's raining, I think.

Urmson on "Parenthetical Verbs"

"[W]hen these verbs are used in the first person of the present tense, as is very clear when they occur grammatically in parenthesis, the assertion proper is contained in the indicative clause with which they are associated, which is implied to be both true and reasonable. They themselves have not, in such a use, any descriptive sense but rather function as signals guiding the hearer to a proper appreciation of the statement in its context, social, logical, or evidential.

A Philosopher's Parallel

> They are not part of the statement made, nor additional statements, but function with regard to a statement made rather as READ WITH CARE functions in relation to a subjoined notice, or as the foot stamping and saluting can function in the Army to make clear that one is making an official report. . . . They help the understanding and assessment of what is said rather than being part of what is said." (Urmson 1952)

Arguments for this View

Challenge and Response

(15) Kai must have left Cambridge on time.

a. Is that so?
b. I don't believe it.
c. That's not true.
d. I agree.

Embedding

(16) ?I would be very surprised if Kai must have left Cambridge on time.

See Papafragou for discussion.

What Now?

- How can this view of epistemic modality be part of a systematic formal semantics for natural language?
- What is the semantic type of footstamping?

That damn Kaplan

Kaplan in "The Meaning of *Ouch* and *Oops*"

Assuming that the epithet 'damn' is an expressive and that it expresses a derogatory attitude on the part of the speaker, then: 'That damn Kaplan was promoted' is going to be expressively correct just in case the speaker has a derogatory attitude toward Kaplan, and descriptively correct just in case Kaplan was promoted.

ja ja

Kratzer on *ja*

(17) *Ja* α is appropriate in a context c if the proposition expressed by α in c is a fact of w_c which — for all the speaker knows — might already be known to the addressee.

(18) Webster schläft ja.
Are you sure?
(= are you sure that Webster is sleeping?)
(≠ are you sure that the addresse might already know this?)

The Basic Idea

We systematically associate with any sentence α a tuple of propositions, $\langle [\![\alpha]\!]_o, [\![\alpha]\!]_1, [\![\alpha]\!]_2, \ldots \rangle$; the first member of the tuple is the ordinary/descriptive/asserted meaning, while the others are expressive contents.

(19) $[\![\text{ja } \alpha]\!] =$
$\langle [\![\alpha]\!]_o,$ it may already be known to the hearer that $[\![\alpha]\!]_o \rangle$.

Compositional implementation: see Potts (galore)

Reconstructing the Tradition

(20) $[\![\text{must } \alpha]\!] = \langle [\![\alpha]\!]_o, [\![\alpha]\!]_o$ follows from the evidence$\rangle$

(21) $[\![\text{may } \alpha]\!] = \langle [\![\alpha]\!]_o, [\![\alpha]\!]_o$ is compatible with the evidence$\rangle$

But wait!

(22) Chris may be home.

Descriptive meaning: Chris is home
Expressive meaning: It is compatible with the evidence that Chris is home.

Weird! The speaker can't normally be taken to be asserting that Chris is home. [Chris Potts, pc, March 22, 2003]

Similarly

Actually, the same problem arises with Kratzer's *ja*: usually, assertion is not supposed to be correct unless the speaker believes that the asserted content is news to the hearer.

—

Again, an expressive analysis of Urmson-style parentheticals like

(23) It's raining, I guess.

would run into the same problem.

Weaker Speech Act Force

The obvious way out is to say that when a speaker utters

(24) Chris may be home.

there is no assertion at all. The speech act is one of conjecture.

How to derive weaker speech act force

But how can it be derived that *Chris may be home* does not assert the ordinary meaning (Chris is home)?

- Contextually Determined Speech Act Force
- Modal Compositionally Influences Speech Act Force

First Attempt

Proposal: Contextually Determined Speech Act Force

When a speaker utters ("assertively") a sentence α, this is understood as an assertive speech act which is as strong as possible given the expressive meanings conveyed by the sentence.

A speaker who puts forward *may* α does not assert $[\![\alpha]\!]_o$, since that is incompatible with the expressive meaning that $[\![\alpha]\!]_o$ is merely compatible with the evidence. Instead, the utterance is understood is a conjecture.

That's not how things work!

Compare

(25) a. It might be raining.
b. *It is raining – and it's quite possible that it is.

(26) a. ?If it might be raining, the game will be postponed.
b. ≠ If it is raining – and it's quite possible that it is, the game will be postponed.

There is a striking difference between the epistemic modal *might* and the "epistemic" side-remark *and it's quite possible that . . . .*

Diagnosis

- True side-remarks, even those with "epistemic content", cannot weaken the assertive force of a declarative, contrary to the idea of Contextual Determination of Speech Act Force.
- So, if epistemic modals can weaken the assertive force, they must do so in a different way.
- Epistemic modals are virtually impossible in *if*-clauses, and if they are possible, they enter into the at-issue meaning of the antecedent.
- Epistemic modals as assertion weakeners can only do so if a declarative speech act is already there (which it isn't in a conditional antecedent).

Two Kinds of "Modalizers"

We need to distinguish:

- Expressive sideremarks such as *. . . and it is quite possible that . . .* or *as my father had always suspected*.
- Speech act modifiers such as *obviously* and *might*.

Second Attempt

Proposal: Epistemic Illocutionary Modifiers

- Epistemic modals modify the speech act force of a sentence.
- While ASSERTION is the default speech act force associated with a declarative sentence, epistemic operators can augment/change that.
- How do they do that?

Two Ways to Implement Speech Act Modification

- Manipulating Representations. (Faller, Zeevat)
- Manipulating Denotations. (Krifka)

Speech Acts at the Denotational Level

Krifka in "Quantifying into Question Acts"

I consider speech acts as moves in conversational games, in the spirit of Wittgenstein (1958). Speech acts lead from one set of social commitments to another set (e.g., commitments may be added, as with questions and commands, or removed, as when a question is answered or a command is carried out). Let us call such sets of social obligations commitment states.

The Picture

- Tree Structure: Illocutionary Operator – Sentence Radical
- Sentence Radical denotes a proposition
- Illocutionary Operator is a function from propositions to speech acts
- Speech Acts are functions from commitment states to commitment states.

Assertion

(27) $[\![\text{ASSERT } \alpha]\!] =$
$\lambda s.\ s \cup$ the speaker is commited to defending $[\![\alpha]\!]$.
[plus other commitments probably]

Observation: couldn't weaken that, would lead to contradictions.

Decomposing Assertion

Putting forward

(28) $[\![\text{PUT } \alpha]\!] = \lambda s.\ s \cup$ the speaker has put forward $[\![\alpha]\!]$.

- Declarative sentences have PUT as their main illocutionary operator.
- ASSERT is a modifier of PUT, which adds to the simple putting forward of the underlying proposition the commitment by the speaker to defend its truth.
- Other illocutionary modifiers can take the place of the default ASSERT and add weaker or stronger commitments.
- Epistemic modifiers do exactly that.

must and *might* as illocutionary modifiers

(29) $[\![\text{must PUT}]\!](\alpha) =$
$\lambda s.\ s \cup$ the speaker has put forward $[\![\alpha]\!]$
$\cup\ [\![\alpha]\!]$ follows from the evidence

(30) $[\![\text{might PUT}]\!](\alpha) =$
$\lambda s.\ s \cup$ the speaker has put forward $[\![\alpha]\!]$
$\cup\ [\![\alpha]\!]$ is compatible with the evidence

How do conditionals fit in?

The Idea

If-clauses do their usual job of restricting an operator, here the illocutionary modifier.

(31) *if P, (must) Q* → the speaker puts forward Q and is committed to Q following from the evidence taken together with P

(32) *if P, might Q* → the speaker puts forward Q and is committed to Q being compatible with the evidence taken together with P

Conditional Assertion

The view emerging here is almost, but not quite, a close relative of the conditional assertion view of indicative conditionals. See DeRose & Grandy (1999).

How does this deal with the facts on the ground?

- The Gibbard Problem
- Dialogue
- (Un)certainty
- Embedding

The Gibbard Problem

- The Gibbard Problem points to the need of interpreting "the evidence" as referring to the speaker's evidence (at least in some cases).
- The speech act approach is independent of that but compatible with it.
- This unexpected result may need some discussion.

The Dialogue Problem

- The Dialogue Problem showed the need for more objective meanings.
- The speech act approach does not provide more objective meanings.
- In fact, the NTV advocates never really explain how dialogue works.
- So, we still need to think about how to get objectivity into the picture.

(Un)certainty and Embedding

Prediction: No embedding construction that needs a proposition as its argument should be able to embed a sentence modified by an epistemic modal (whether conditionalized or not).

Counter-Examples to No Embedding #1

(33) I am almost certain that if the boss didn't tell Harry, he told Tom.

The *if*-clause is actually restricting the operator *almost certain*.

Problem: how can the restrictor-operator relation be established in cases like

(34) A: If he didn't tell Harry, he told Tom.
B: Probably so.

Counter-Examples to No Embedding #2

(35) If the boss didn't tell Harry, then if he didn't tell Tom, he told nobody.

The two *if*-clauses are jointly restricting the covert epistemic modal. (see Kratzer 1986)

Counter-Examples to No Embedding #3

(36) Please check the weather forecast. If it might rain this afternoon, we should bring umbrellas.

Here, *might* clearly contributes to the antecedent proposition.

Conclusion: epistemic modals are ambigous between an illocutionary modifier meaning and a standard modal meaning.

A Similar Case of Ambiguity

(37) a. It is obvious that Joe made a big mistake.
b. Joe obviously made a big mistake.

(38) a. We have to fire Joe, because it is obvious that he made a big mistake.
b. We have to fire Joe, because he obviously made a big mistake.

(39) a. If it is obvious that Joe made a big mistake, he should be fired.
b. If Joe obviously made a big mistake, he should be fired.

Conclusion

- Epistemic modals (and conditionals) may have meanings at the illocutionary level.
- If so, we still also need their standard meanings for some cases of embedding.
- We still need to find objectivity to explain the Dialogue Problem.

Part 4: Objectivity in Epistemic Meanings

We saw that there was a large remaining problem. We need more objectivity.

Outline of Part 4

Hawthorne's Puzzle

Hawthorne forthcoming, p.29, footnote 69

[A]s far as I can tell, ordinary people evaluate present tense claims of epistemic modality as true or false by testing the claim against their own perspective. So, for example suppose Angela doesn't know whether Bill is alive or dead. Angela says *Bill might be dead*. Cornelius knows Bill is alive. There is a tendency for Cornelius to say *Angela is wrong*. Yet, given Angela's perspective, wasn't it correct to say what she did? After all, when I say *It might be that P and it might be that not P*, knowing that Cornelius knows whether *P*, I do not naturally think that Cornelius knows that I said something false. There is a real puzzle here, I think, but this is not the place to pursue it further.

MacFarlane's Version of Hawthorne's Puzzle

MacFarlane 2003 ms

(40) Sally: Joe might be in Boston. (= It might be the case that Joe is in Boston.)

George: He can't be in Boston. (= It is not the case that it might be the case that Joe is in Boston.) I saw him in the hall five minutes ago.

Sally: Oh, then I guess I was wrong.

MacFarlane's Version of Hawthorne's Puzzle

(41) Sally: Joe might be in Boston. (= It might be the case that Joe is in Boston.)

George: He can't be in Boston. (= It is not the case that it might be the case that Joe is in Boston.) I saw him in the hall five minutes ago.

Sally′: #Oh, okay. So he can't be in Boston. Nonetheless, when I said *Joe might be in Boston*, what I said was true, and I stand by that claim.

- MacFarlane: "I hope you'll agree that it would be odd and unnatural for Sally to say this."
- Compare with *I don't know that not p*.

This looks like trouble

Recall Kratzer's example:

(42) I: The person approaching might be Fred.
You: The person approaching cannot be Fred.

"My utterance and your utterance are both true."

But look at this:

(43) I: The person approaching might be Fred.
You: The person approaching cannot be Fred.
I: Oh yeah. I was wrong.

Assessment-Relativity à la MacFarlane

- The truth of sentences doesn't depend just on the context of utterance (and for embedded occurrences, on a shifted index of evaluation) but also on the context of assessment.
- Epistemic modals are assessment-relative expressions that quantify over the worlds accessible from the context of assessment.
- So, when Sally says "I was wrong" that's because in her current context of assessment (with a more refined body of evidence) her sentence is now false.
- Epistemically modalized sentences are uttered with the committment to defend their truth at any subsequent context of assessment.

Maybe We Don't Need to Go This Far

The standard analysis, which works with "evidence available in the utterance situation", already has plenty of objectivity built in. Let us count the ways.

1. *Evidence*: what counts is the evidence not what the speaker (or others) make of the evidence. This is more knowledge-based than belief-based.
2. *Utterance Situation*: unless we are dealing with a sotto voce soliloquy (which may well be what we have in the Gibbard Problem), evidence that is available to individuals other than the speaker counts.
3. *Available*: evidence that is available counts even if the speaker (and others) have not actually procured and processed the evidence.

Another Factor: Indirectness in Dialogue

(44) A: I'll put the keys on this shelf.
B: Are you sure?

(45) [Joe is late for the meeting]
Sally: He might be stuck in traffic.
George: No, I just saw him down the hall.
Sally: Oh, I guess I was wrong.

(46) Sally: It might rain this afternoon.
George [later that day]: It didn't rain.
Sally: Oh, I guess I was wrong.

The Gillies Puzzle

Gillies in "A New Solution to Moore's Paradox" (2001)

You come to my office one afternoon. The curtains are drawn. We have a nice chat, and you are about to head home. I have not been outside since early morning, but the forecast was for a 50%chance of rain. In such a situation, it seems perfectly acceptable for me to say before you leave *It might be raining out.*

The Puzzle: Why does what is happening behind the curtain (which is easily moved aside) not count as available evidence? Because if it did, the sentence would be predicted to be false.

The Grand Conclusion

- Maybe, all I really needed to know, I learned in grad school.
- Well, the speech act modifier story is kind of fun, too.
- Still, there's plenty to do in this area.
- Stay tuned to my homepage or my weblog for further developments of this material.