# The classic semantics

- modals quantify over a set of possible worlds
- that set is determined through the interplay of
  - a modal base: the set of eligible/accessible worlds
  - an ordering: evaluation the eligible worlds according to a set of criteria
- deontic *ought*, *have to*, etc. say that **all** of the best worlds are worlds where their prejacent is true

# Five challenges

1. (Non-)monotonicity
2. Information-sensitivity
3. Moral dilemmas
4. If p, ought p
5. Gradability

# The first challenge

(1) a. You { must / have to / need to / should / may } mail the letter. $\not\Rightarrow$

b. You { must / have to / need to / should / may } mail the letter or burn it.

(2) a. You ought to invite Professor Edgington. $\not\Rightarrow$

b. You ought to invite some expert on conditionals or other.

c. Du solltest irgendeinen Konditionalexperten einladen.

# Not

Apparent non-monotonicity disappears under negation:

(3) a. Lynn doesn't have to wear a tie or a scarf. $\Rightarrow$
b. Lynn doesn't have to wear a tie.

(4) #Lynn doesn't have to wear a tie or a scarf, but, of course, she has to wear a tie.

(5) #You don't have to bring alcohol to the party, but you do have to bring wine.

# Negating *ought*

(6) #You ought to go to the store as quickly as you can, but of course that doesn't mean you ought to go to the store.

(7) #You should go to the deartment but of course that doesn't mean you should go to campus.

# NPI-licensing

(8) You don't have to bring any alcohol to the party.

# Two ways to go

1. monotonic semantics + free choice *implicatures*
2. alternative-sensitive semantics cf. Kratzer & Shimoyama, Aloni

NB: alternative-sensitivity should be a superstructure on a monotonic semantics (modals are monotonic for singleton prejacents)

# Non-monotonicity?

The assumption that deontic modals are non-monotonic plays no useful role in the understanding of the data surrounding alternative-triggers.

So, is there any other evidence for non-monotonicity?

# Professor Procrastinate

*Professor Procrastinate receives an invitation to review a book. He is the best person to do the review, has the time, and so on. The best thing that can happen is that he says yes, and then writes the review when the book arrives. However, suppose it is further the case that were Procrastinate to say yes, he would not in fact get around to writing the review. Not because of incapacity or outside interference or anything like that, but because he would keep on putting the task off. (This has been known to happen.) Thus, although the best that can happen is for Procrastinate to say yes and then write, and he can do exactly this, what would in fact happen were he to say yes is that he would not write the review. Moreover, we may suppose, this latter is the worst that can happen. It would lead to the book not being reviewed at all, or at least to a review being seriously delayed.*

(9) $^{F}$He should accept.

(10) $^{T}$He should accept and write.

# Context-change

(11)
a. Do you want a trip on the Concorde?
b. No.
c. Do you want a free trip on the Concorde?
d. Sure.
e. So, do you want a trip on the Concorde?
f. Yes, but only if it's free. But that's not going to happen, so no.

(12) #Nicholas wants a free trip on the Concorde but he doesn't want a trip on the Concorde.

(13) #He should accept and write, { but / and furthermore } he shouldn't accept.

(14) He should accept and write. But that's not going to happen. So, he shouldn't accept.

# Conclusion

- We need to evaluate package deals:
  - Monotonic semantics plus mechanisms to explain non-monotonic phenomena (alternative-triggers, context evolution)
  - Non-monotonic semantics plus mechanisms to explain monotonic phenomena (weird conjunctions, NPI-licensing)

So far, there is no concrete proposal for a theory of the second kind. But cf. Moss on counterfactuals for beginnings of such a story in that (related?) domain.

# The second challenge

Deontic modals are ambiguous (?):

- a reading where all that matters is the right outcome
- a reading where rational decisions in the face of limited information are preferred

# What is needed

Modelling

- the distinction
- the interaction of the two readings with conditionals

# An example

Pascal and Mordecai are playing Mastermind (again). The code is red-red-blue-blue. Given the information Pascal has gathered so far, he will gain the best epistemic bang for the buck by testing red-red-red-red. But of course he would instantly win the game if he checked for red-red-blue-blue.

(15) Pascal ought to play red-red-red-red.

(16) Pascal ought to play red-red-blue-blue.

Pascal actually plays red-red-green-green(he's kind of a novice at the game). It takes him five more moves to find the answer. The code is revealed. They debrief.

(17) a. P: Oh man, I ought to have played red-red-blue-blue.

b. M: No, you ought to have played red-red-red-red.

# A more famous example

*Ten miners are trapped either in shaft A or in shaft B, but we do not know which. Flood waters threaten to flood the shafts. We have enough sandbags to block one shaft, but not both. If we block one shaft, all the water will go into the other shaft, killing any miners inside it. If we block neither shaft, both shafts will fill halfway with water, and just one miner, the lowest in the shaft, will be killed.*

# What's true

(18) We ought to block neither shaft.

(19) We ought to block the shaft that they are in.

# Classic semantic predictions

AA, BB > AN, BN > AB, BA

(20) $^{T}$We ought to block the shaft that they are in.

(21) $^{F}$We ought to block neither shaft.

# Fixes

- Charlow
- Cariani, Kaufmann[2]
- Lassiter
- Silk
- Dowell

# Antecedents

- Goble 1996
- van Rooij 1998
- Levinson 2003
- Büring 2003

# Finer grain

ABK miners in A, we block B, we know where the miners are

ANI miners in A, we block neither, we are ignorant of where the miners are

# Better lucky than rational

AAK, AAI, BBK, BBI > ANI, BNI > ABI, BAI

(22) $^{T}$We ought to block the shaft they're in.

(23) $^{F}$We ought to block neither shaft.

(24) $^{T}$We ought to have blocked A. after learning A

# Better rational than lucky

AAK, BBK > ANI, BNI > AAI, BBI, ABI, BAI

(25) $^{F}$We ought to block the shaft they're in.

(26) $^{T}$We ought to block neither shaft.

# “Better lucky” recast

Order worlds by how many of these propositions they make true:

p: we save all ten miners

q: we save at least nine miners

Kratzer’s ordering source

All that matters is the number of miners saved.

# “Better rational” recast

Order worlds by these propositions:

p: our action is known to save all ten miners
q: our action is known to save at least nine miners

Now, ANI is better than AAI.

# Miner conditionals

(27) If the miners are in A, we ought to block A.

(28) If the miners are in B, we ought to block B.

# What's the problem?

Conditionals knock non-antecedent worlds out of the modal base.

(29) If the miners are in A, we ought to block A.

better rational: AAK, ~~BBK~~ > ANI, ~~BNI~~ > AAI, ~~BBI~~ > ABI, ~~BAI~~

Just because the miners (by assumption) are in A doesn't mean we know that they are in A. So, we're still comparing only worlds in which we don't know where they are. No change in prediction: (29) is false. The *if*-clause is idle.

# What's the problem?

Conditionals knock non-antecedent worlds out of the modal base.

(30) If the miners are in A, we ought to block A.

lucky: AAK, AAI, ~~BBK~~, ~~BBI~~ > ANI, ~~BNI~~ > ABI, ~~BAI~~

Under the "better lucky" ordering, the conditional comes out true. As desired.

# Idle *if*s

(31) Even if the miners are in A, we ought to block neither shaft (because we don't know where they are).

(32) No matter where the miners are, we ought to block neither shaft (because we don't know where they are). $\approx$
$\forall$ locations *x*: if the miners are in x, we ought to block neither shaft

# Not enough

Appealing to the "better lucky" ordering is not enough.

(33) If the miners are in A, the rational thing is to block A.

# Not enough

- Three shafts A, B, C.
- If we block the shaft they're in, all ten are safe.
- If we do nothing, two will die.
- Blowing up A will kill them all if they're in A, but save exactly nine if they're not (blowing up A precludes blocking B or C unfortunately).
- We have no idea where they are.

(34) If they are not in A, we ought to blow A up.

# Options

- Make the ordering sensitive not to what is known but to a more abstract "information state"

  (various ways to do that, all(?) weakening the classic semantics)

- Have the conditional take us to a state that's not just one where A is the case but where A is known

# if A = if we learn A?

certainly not always:

(35) If my partner is cheating on me, I'll never know.

Thomason pc to van Fraassen

but sometimes:

(36) If my partner is cheating on me, I'd be surprised.

# if A = if we learn A?

(37) $^{F}$If they are in A but we don't know it, we ought to block A.

better rational

# Conclusion

- There are plenty of challenging data for the classic semantics.
- That's as it should be. A theory without challenges is likely too slick to be plausible.
- What needs to be done:
  - ascertain the empirical shape of the challenging data
  - weigh theories against the data
  - we'll always be looking at package deals (framework plus ancillary assumptions)
- The classic semantics is not dead yet, and at least sometimes offers attractive package deals.

# Re Nate

- Nate's probably right about me being right about moral dilemmas
- Nate's probably wrong about me being wrong about Ross Paradox
  - I don't care about a logic of obligation
  - what matters to me is how natural language works (semantics and pragmatics)
  - alternative-triggers create special effects
- Nate's probably wrong about me being wrong about Procrastinate
- Nate's probably wrong about how Procrastinate works
- We seem to largely agree on information-sensitivity