

Modality, Coherence and Logic

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Bridges 2
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Pronouns and Modals – An Analogy

Mechanisms for Resolving Context-Sensitivity

Under the Hood

Summing Up

The Counterexample (Yalcin, 2012)

There's an urn with a 100 marbles. 10 of them are big and blue, 30 big and red, 50 small and blue, and 10 are small and red. One marble is randomly selected and hidden (you do not know which).

1. If the marble is big, then it is likely red.
2. But, the marble is not likely red.
3. The marble is not big.

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Counterexample – Reactions

- ▶ **MT is invalid!**
 - ▶ Resist!
 - ▶ It's not merely a matter of conservativeness. This opens the flood-gates.

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Proliferation of Counterexamples

There's an urn with 100 marbles. 10 of them are big and blue, 30 big and red, 50 small and blue, and 10 are small and red. One marble is randomly selected and hidden (you do not know which).

4. Suppose the marble is big.
5. Then it is likely red.
6. But it's not likely red.
7. So, it is not big.

Proliferation of Counterexamples

There's an urn with 100 marbles. We know that 80 of them are blue, 18 are red and 2 are green. One marble is randomly selected and hidden (you do not know which).

8. The marble is either blue or it is likely red.
9. Suppose that the marble is not blue.
10. Then, it is likely red.
11. But the marble is not likely red.
12. So, it is blue.

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Counterexample – Reactions

- ▶ ~~MT is invalid!~~
- ▶ (1)–(3) is not an instance of MT.

Obligatory Wide-Scoping

13. Likely (if the marble is big, the it is red.)
14. But, the marble is not likely red.
15. The marble is not big.

Obligatory Wide-Scoping

16. If Bill comes to the party, then if John comes, it is likely that Margaret will come, too.
17. It is likely that if Bill comes then if John, comes Margaret will come.

Counterexample – Reactions

- ▶ ~~MT is invalid!~~
- ▶ 4 – 6 is not an instance of MT.
 - ▶ ~~Obligatory Wide Scoping.~~
 - ▶ Context-sensitivity at play.

Context-sensitivity – *ad hoc*?

18. If John drank all the milk, then the fridge is empty.
19. But the fridge is not empty.
20. So John didn't drink all the milk.

21. If Billy is 6'5" tall, he is tall.
22. But Billy is not tall.
23. So, Billy is not 6'5" tall.

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A Counterexample?

24. If Jane is out, then she is having fun.
25. She (pointing at Mary) is not having fun.
26. So Jane is not out.

A Counterexample?

As usual, Mary is stuck at home doing chores, jealous of Jane, who's always having more fun than she is.

27. If Jane is out, then she is having fun.
28. But *she* is not having fun.
29. So Jane is not out.

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Coherence

30. John took a train from Paris to Istanbul. He has family there.
31. John took a train from Paris to Istanbul. He likes spinach.
(Hobbs, 1979)
- ▶ An implicit organization of discourse establishes inferential connections among successive utterances.
 - ▶ Successive contributions to discourse must be linked together by a recognizable flow of interpretive relationships.
(Kehler 2002; Asher and Lascarides 2003)

Coherence, (Kehler, 2002)

- ▶ Cause-effect:
 32. Max spilt a bucket of water. He tripped over his shoelaces.
- ▶ Occasion:
 33. Max spilt a bucket of water. He spilt it all over the rug.
- ▶ Resemblance:
 34. Max spilt a bucket of water. John dropped a jar of cookies.

Coherence and Pronoun Resolution

35. Phil tickled Stanley. Liz poked him.(Kehler et al., 2008)

- ▶ result \Rightarrow 'him' = Phil.
- ▶ parallel \Rightarrow 'him' = Stanley.
- ▶ The problems of identifying coherence relations and resolving semantic ambiguities are mutually constraining.

Coherence and Pronoun Resolution: An Illustration

22. If Jane is out, then she is having fun.
 23. She is not having fun.
 24. So Jane is not out.
- ▶ 'She' in 22 is uttered in an elaboration concerning Jane's state, it is resolved to Jane.
 - ▶ If 23 is uttered in tandem with a pointing gesture, 'she' refers to the individual being pointed at.

Modals as Pronouns

36. She left me. (Partee, 1984)

37. My neighbors would kill me. (Stone, 1997)

38. John owns a donkey. He beats it.

39. There *may* be other 1961 state committee retirements come April 18, but they *will* be leaving by choice of the Republican voters. (Stone, 1997)

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Modals as Pronouns

40. Every woman believes that she is happy. (Partee, 1984)
 41. If a concert goer arrives late, he or she will not be permitted into the auditorium. (Stone, 1997)
 42. If John owns a donkey, he beats it.
 43. If a submarine can not self-destruct if an enemy captures it, the enemy will learn its secrets. (Stone, 1997)
- Interpretation of modals is an anaphoric process, just as the interpretation of tense and pronouns is. (Stone, 1997, 1999)

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Coherence and Modals

44. If a wolf walks in, it might eat Harvey. (Roberts, 1989)
45. A wolf might walk in. It would eat you first. (Roberts, 1989)
46. Sally is hiding because I might be on the bus. (Cappelen and Hawthorne, 2009)
47. If a wolf walks in, it would eat you. But, one probably won't/might not come in.
48. John might come to the party. He might drink quite a bit. We would all have fun. But then again, he might not drink anything. And then we wouldn't have fun. (Asher and McCready, 2007)

The Counterexample Reconsidered

4. If the marble is big, then it is likely red.
 5. But, the marble is not likely red.
 6. The marble is not big.
- ▶ If *Contrast* holds between 5 and the consequent of 4, then 'likely' is quantifying over the same set of worlds as the one in the consequent of 4.
 - ▶ If 4 and 5 are related by *Contrast*, then the two occurrence of 'likely' quantify over different sets of worlds.

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Summing Up

Key Ideas

- ▶ We treat modals as anaphoric expressions, searching for the most prominent set of worlds (possibility) as their antecedent.
- ▶ Standard: $might(q) = \{w \mid \exists w' : wRw' \ \& \ w' \in q\}$ (Kratzer, 1977, 1981)
- ▶ Stojnić: $might(p, q) = \{w \mid \exists w' : wRw' \ \& \ w' \in p \ \& \ w' \in q\}$

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Key Ideas

- ▶ Let the context include the prominence ranking of candidate possibilities; discourse initially, the top ranked-one = the set of epistemically accessible worlds.
- ▶ Linguistic items mark updates that affect the ranking.

Yalcin's Counterexample Formalized

1. If the marble is big, then it's likely red.
 2. But, the marble is not likely red.
49. **Contrast**(**Assert**(**If**($@p^*$, $\langle arg_0/p \rangle$,
Elab(w_0 , **Likely**($@p^*$, $\langle arg_0/q \rangle$)))));
Assert(**Not**(**Likley**($@p^*$, $\langle arg_0/q \rangle$))))
- ▶ ' $@p^*$ ' denotes the set of top-ranked epistemically accessible worlds (top-ranked possibility).
 - ▶ 'p' corresponds to 'the marble is big' and 'q' to 'the marble is red'.

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Summing Up

Summing Up: I have argued...

- ▶ Modals are like pronouns in two crucial respects: they are anaphoric expressions, and they are sensitive to exactly the same interpretive mechanisms of anaphora resolution as pronouns are.
- ▶ The “counterexamples” arise due to a failure to appreciate the import of mechanisms that govern the resolution of context-sensitivity of modals (just as they do with pronouns).
- ▶ The lesson is not that modal vocabulary requires a non-standard semantics but rather that discourse structuring mechanisms affect interpretation, and they do so in a highly systematic manner.
- ▶ (As I prove in the written version) the underlying logic preserves classical logic.

Thank you!

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