Graded Modality Comparison: A Modified Approach

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Talk Outline

- Graded Modal Operators
  - Five unary, one binary (comparative probability)
- Kratzer's (1981) formal definitions of these operators
- Problem: an empirical flaw
  - Two very probable propositions are impossible to compare
- My proposed solution to Kratzer's definitions
- Discussion of our new definition of "comparison":
  - Earlier predictions maintained and problem solved
  - Notion of "comparison" is better served

Model and Definitions

- The underlying model is **world-based**
  - worlds are priors
  - propositions are defined by their verifying worlds
- The **Modal Base** is the set of worlds where all known facts are true. Label it **F**.
- The **Ordering Source** is a prior (given) partial order "**≤**" between worlds:
  - Some world is **ideal** to us: denote it by ι, and call it "the ideal"
  - If a world **v** is **at least as close to the ideal as** a world **u**, we write **v ≤ u**.
- A set of worlds that are close to the ideal may be contextually selected, and labeled **G**.

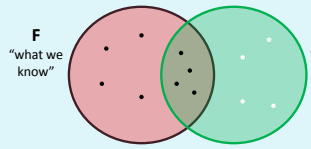
Grades of Modality
(Kratzer, 1981)

- Main Claim: there are more than just two modal degrees. Consider the following sentences:
  - A living human being necessarily has two lungs. **Necessity**
  - That conceited kid is probably an only child. **Human Necessity**
  - It can well be that the ocean water isn't too cold for a swim. **Human Possibility**
  - *Psycho* was possibly the best suspense movie ever made. **Possibility**
  - I got up at 7:15, but there's still a slight chance of me making it to my 8:00 class on time. **Slight Possibility**
  - It is more likely that Eve will eat her artichoke than Adam will eat his. **Comparative Probability**

Grades of Modality

Necessity

A living human being necessarily has two lungs



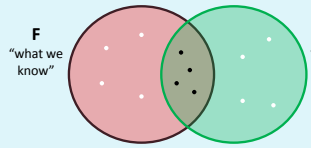
In all black worlds, a living human being has two lungs (and we don't care about the rest)

- True here
- False here
- Don't know

Grades of Modality

Human Necessity

That conceited kid is probably an only child



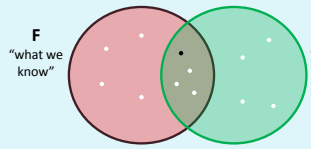
In all black worlds, the kid is an only child (and we don't care about the rest)

- True here
- False here
- Don't know

Grades of Modality

Human Possibility

It can well be that the ocean water isn't too cold for a swim.



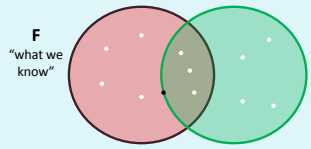
In at least one F∩G world, the water isn't too cold (and we don't know about the rest)

- True here
- False here
- Don't know

Grades of Modality

Possibility

Psycho was possibly the best suspense movie ever made.



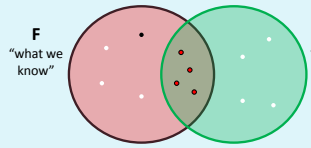
In at least one F world, *Psycho* was the best suspense movie ever made (and we don't know if this world is in G or not)

- True here
- False here
- Don't know

Grades of Modality

Slight Possibility

I got up at 7:15, but there's still a slight chance of me making it to my 8:00 class on time.



In at least one F world **which is not in G**, I'll make it to my class on time.

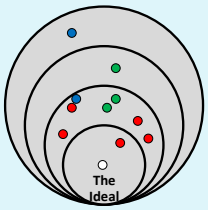
- True here
- False here
- Don't know

Grades of Modality

Comparative Probability It is more likely that Eve will eat her artichoke than Adam will eat his.

Two conditions:

1. If Adam eats his artichoke in **some** world…
   then Eve eats hers in a **world** at least as close.
2. There's a **world** where Eve eats her artichoke…
   such that in **no world** at least as close does Adam eat his.

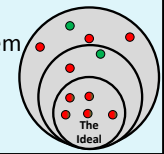


Predictions

- Some correct predictions:
  - A **Necessity** is more probable than a **Human Possibility**
  - So is a **Human Necessity**
  - All are more probable than a **Possibility**
  - Which is more probable than a **Slight Possibility**;
  - If a statement is a **Slight Possibility**, its negation is a **Human Necessity**
  - Both a statement and its negation may be simultaneously **Human Possibilities**

Predictions – the Flaw

- Consider the following sentences:
  - Paul will probably dance tonight. **Human Necessity**
  - Quentin will probably dance tonight. **Human Necessity**
  - It is more likely that Paul will dance tonight than Quentin will. **Comparative Probability**
- These three are fine together
- But Kratzer's analysis excludes them
  - In all "close" worlds both dance,
  - Failing Kratzer's second condition!



My Modification

- A change of perspective for Comparison
- Now we look only at the worlds where the two propositions have **different truth values**
- Whichever is closest to the ideal determines the more probable of the two
- So now, the F∩G worlds where **both** Quentin and Paul dance are **irrelevant**!

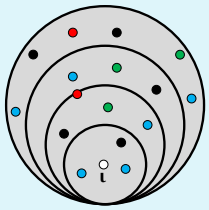
My Modified Conditions (I)

Comparative Probability

It is more likely that Eve will eat her artichoke than Adam will eat his.

1. There's a **world** where Eve eats her artichoke and Adam doesn't.
2. If Adam eats his artichoke in **some** world and Eve doesn't…
   then Eve eats hers in a **world** at least as close where Adam doesn't.

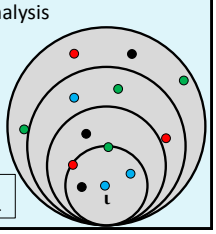
   (and we don't care at all about worlds where **both** eat their artichokes or **neither** eat them)



Observations

- All other (correct) predictions still hold
- Any two statements which are both ideally true may now be compared
  - And not so with the original analysis
- But wait! What if the closest worlds of each exclusive artichoke-eater are **as close as each other** to the ideal?
  - Introducing: "closer", or "<"

If a world **v** is **closer** to the ideal than a world **u**, we use the strong order sign from math and write **v < u**.



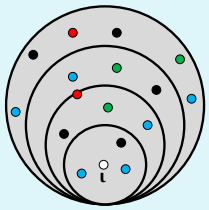
My Modified Conditions (II)

Comparative Probability

It is more likely that Eve will eat her artichoke than Adam will eat his.

1. There's a **world** where Eve eats her artichoke and Adam doesn't.
2. If Adam eats his artichoke in **some** world and Eve doesn't…
   then Eve eats hers in a **closer world** ~~at least as close~~ where Adam doesn't.

   (and we don't care at all about worlds where **both** eat their artichokes or **neither** eat them)



Discussion

- No world can simultaneously satisfy both condition 2's antecedent and consequence
  - So using the strong "**<**" has no downside
- Also, we're defining "*more likely than*", and not the weaker "*at least as likely as*", so using a strong order seems better
  - Note that defining "*at least as likely as*" and "*as likely as*" is now trivial: substitute "≤" and "=" for "<"
- All in all: I believe the notion of "comparison" is handled more naturally and economically
  - The approach is now: **observing differences**
  - Verifying the conditions requires **much less work**

Reference

- Kratzer, Angelika. 1981. The Notional Category of Modality. In *Words, Worlds and Contexts: New Approaches in Word Semantics.* Eikmeyer and Rieser, Eds.

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