Metaphysics of Modality

Lecture 1: Introducing Modality

Daisy Dixon
dd426
1. Introducing modality
1. Introducing modality

- The phenomenon of possibility and necessity
1. Introducing modality

- The phenomenon of possibility and necessity

1. Mark could have been an ancient historian (metaphysical)
1. Introducing modality

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4. 2 plus 2 must equal 4 (mathematical)
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2. Philosophical Contexts
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• Counterfactuals
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*Decision making:* If Mark hadn’t decided to hide he wouldn’t have ruined his wedding (he *could* have done otherwise)
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*Laws:* If some salt were in water, it *would* dissolve
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*Decision making:* If Mark hadn’t decided to hide he wouldn’t have ruined his wedding (he *could* have done otherwise)

*Laws:* If some salt were in water, it *would* dissolve

*Causation:* A causes B iff B *wouldn’t* have occurred if A hadn’t had occurred
2. Philosophical Contexts

- **Dispositions**

This mug is fragile/cheap mugs have a tendency to chip
2. Philosophical Contexts
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• Supervenience
2. Philosophical Contexts

• **Supervenience**

A-facts supervene on B-facts iff there *could be no change in the* A-facts *without some change in the B-facts*
2. Philosophical Contexts

• **Supervenience**
  A-facts supervene on B-facts iff there *could be no change in the A-facts without some change in the B-facts*

• **Logic**
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• **Supervenience**

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• **Logic**

Mathematic and logical truths are *necessarily* true, as opposed to those contingent truths of the natural sciences
2. Philosophical Contexts

• Supervenience
A-facts supervene on B-facts iff there could be no change in the A-facts without some change in the B-facts

• Logic
Mathematic and logical truths are necessarily true, as opposed to those contingent truths of the natural sciences
Validity is a modal notion
3. Language for modal logic
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◊ “Diamond” *It is possible that*...
3. Language for modal logic

◊ “Diamond” *It is possible that…*

□ “Box” *It is necessary that…*
3. Language for modal logic

◊ “Diamond” *It is possible that*…

□ “Box” *It is necessary that*…

“It’s possible that there are pink swans”
3. Language for modal logic

◊ “Diamond” \(\text{It is possible that...}\)
□ “Box” \(\text{It is necessary that...}\)

“It’s possible that there are pink swans”
◊\(\exists x (Sx \& Px)\)
3. Language for modal logic

◊ “Diamond” *It is possible that…*
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“It’s possible that there are pink swans”
◊∃x(Sx & Px)

“Necessarily, all swans are birds”
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“Necessarily, all swans are birds”
□ ∀x(Sx → Bx)
3. Language for modal logic
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\[ \square A \iff \neg \lozenge \neg A \]
3. Language for modal logic

\[ \square A \leftrightarrow \neg \lozenge \neg A \]

\[ \diamond A \leftrightarrow \neg \square \neg A \]
4. *De Dicto* and *De Re* modality
4. *De Dicto* and *De Re* modality

(1) The number of planets in our solar system is necessarily greater than 5
4. *De Dicto* and *De Re* modality
4. *De Dicto* and *De Re* modality

(2) There could have been pink swans
- It’s possible that there are pink swans
- $\Diamond \exists x (P_x \& S_x)$
4. *De Dicto* and *De Re* modality

(2) There could have been pink swans
- It’s possible that there are pink swans
- ◊∃x(Px & Sx)

(3) All robins must be birds
- It’s necessary that all robins are birds
- □∀x(Rx → Bx)
4. *De Dicto* and *De Re* modality

(2) There could have been pink swans
- It’s possible that there are pink swans
- $\Diamond \exists x (P_x \& S_x)$

(3) All robins must be birds
- It’s necessary that all robins are birds
- $\Box \forall x (R_x \rightarrow B_x)$
4. *De Dicto* and *De Re* modality
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(4) Mark could have had a daughter
- It’s possible that Mark has a daughter
- ◊Dm
4. *De Dicto* and *De Re* modality

(4) Mark could have had a daughter
- It’s possible that Mark has a daughter
- ◊Dm

(5) Any robin must be bird
- For any robin, it’s necessary that it’s a bird
- ∀x(Rx→□Bx)
4. *De Dicto* and *De Re* modality

(4) Mark could have had a daughter
- It’s possible that Mark has a daughter
- ◊Dm

(5) Any robin must be bird
- For any robin, it’s necessary that it’s a bird
- ∀x(Rx→◻Bx)

A formula with modal operators is *de re* iff it contains a modal operator \( R \) which has within its scope either (1) an individual constant, or (2) a free variable, or (3) a variable bound by a quantifier not within \( R \)’s scope. All other formulae with modal operators are *de dicto*. 
4. *De Dicto* and *De Re* modality

- The Barcan Formula:

\[ \Diamond \exists x F_x \rightarrow \exists x \Diamond F_x \]
4. *De Dicto* and *De Re* modality

\[ \Diamond \exists x Fx \rightarrow \exists x \Diamond Fx \]

- There could have been an individual that was a child of Wittgenstein
4. *De Dicto* and *De Re* modality

\[ \Diamond \exists x Fx \rightarrow \exists x \Diamond Fx \]

- There could have been an individual that was a child of Wittgenstein (true)
4. *De Dicto* and *De Re* modality

\[ \Diamond \exists x Fx \rightarrow \exists x \Diamond Fx \]

- There could have been an individual that was a child of Wittgenstein *(true)*
- There is an individual that could have been the child of Wittgenstein *(false)*
4. *De Dicto* and *De Re* modality
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- (6) Necessarily, the thing Sophie is thinking about is prime (*de dicto*) \textcolor{red}{False}
4. *De Dicto* and *De Re* modality

- (6) Necessarily, the thing Sophie is thinking about is prime (*de dicto*) False

- (7) The thing Sophie is thinking about is necessarily prime (*de re*) True
4. *De Dicto* and *De Re* modality

(1) The number of planets in our solar system is necessarily greater than 5

- Read *de dicto* about the number of planets our solar system happens to have: \( \square \forall x (N x \rightarrow G x) \)
  False
4. *De Dicto* and *De Re* modality

(1) The number of planets in our solar system is necessarily greater than 5

- Read *de re* about the **number** of planets itself:
  \[ \forall x (N_x \rightarrow \Box G_x) \text{ True} \]
5. Possible Worlds
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- What logical principles do ‘□’ and ‘◊’ obey?
5. Possible Worlds

- What logical principles do ‘□’ and ‘◊’ obey?
- Truth tables?
5. Possible Worlds

- What logical principles do ‘☐’ and ‘◊’ obey?
- Truth tables?

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- The modal operators resist a truth-functional analysis.
5. Possible Worlds
\( \Diamond p \) is true iff there is some world \( w \), such that \( p \) is true at \( w \)
5. Possible Worlds

◊p is true iff there is some world w, such that p is true at w

□p is true iff for any world w, p is true at w
5. Possible Worlds

✓ Applies to counterfactual discourse:

(8) If Cameron hadn’t promised a referendum on the EU, Brexit wouldn’t have happened.

• In the world that is closest to (most similar to) our world where Cameron is PM and there are apparent EU issues (etc.), Cameron doesn’t promise a referendum and Brexit does not happen.
5. Possible Worlds

✓ Applies to supervenience discourse:

“Among all the worlds, or among all the things in all the worlds...there is no difference of the one sort without difference of the other sort” (Lewis, 1986: 17).
### 6. The Debate

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Questions taken from Mat Simpson’s Metaphysics of Modality lectures 2015-2016, University of Cambridge
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✓ **Fidelity to modal opinion**: A theory should ratify the substantial body of prior modal opinion.
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✓ **Explanatory power**: A theory should be able to analyse many modal claims without much trouble

✓ **Epistemology**: A theory shouldn’t mystify the fact that we possess a lot of modal knowledge
Next lecture: David Lewis’s Concrete Modal Realism