Introduction to Metaphysics

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Note...

The contents of these slides are based on **Alyssa Ney's** book **'Metaphysics: An Introduction'** (2014, Routledge) and should be used in conjunction with this book.

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Metaphysics

Lecture 1: Introduction to Ontology

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Outline

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Ontology

- In philosophy, the study of *ontology* is the study of *what there is* or *what exists* (in the most general sense possible).
- Studying ontology, we are not simply concerned with what *physical* objects there are, but also with what non-physical objects there are.
- For example, do numbers exists? If so, in what sense? What about things like *events*, *processes*, *minds*?
- And what about fictional entities such as *unicorns*, *Santa Claus*, and *Sherlock Holmes*?

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The Puzzle of Nonexistent Objects

- Consider the following two sentences
  - (1) Pegasus does not exist.
  - (2) Santa Claus does not exist.
- (1) and (2) are intuitively true.
- However, if (1) and (2) are true, then presumably (1) and (2) are *meaningful*.
- If (1) and (2) are meaningful, then presumably their constituents (i.e. the words in these sentences) are also meaningful.
- Hence, the words 'Pegasus' and 'Santa Claus' must be meaningful. But what are their meanings?

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The Puzzle of Nonexistent Objects (cont.)

- The words in (3) and (4) below are *proper names*.
  - (3) Pegasus
  - (4) Santa Claus
- The meaning of a proper name N is normally assumed to be, simply, the thing that N refers to.
- Given that the meaning of a name is the the thing it refers to and that the names in (3) and (4) are meaningful, it seems to follow that *there is* something (i.e. that something exists) such that it is the thing referred to by the names in (3) and (4) respectively.
- But this appears to create a paradox: How can the sentences in (1) and (2) be true if 'Pegasus' and 'Santa Claus' both refer to things (that exist)?

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Two Theories of Non-Existent Objects

- Quine considers two possible theories that one might endorse in order to account for nonexistent objects.
  - **View 1: McX**
    Pegasus, Santa Claus, Sherlock Holmes, etc. are not concrete objects that exist somewhere in the world, but rather ideas in the mind.
  - **View 2: Wyman**
    Pegasus, Santa Claus, Sherlock Holmes, etc. are "unactualized possibilities". They are just like any other entity, except they lack the properties of *actuality* and *existence*. So, Pegasus is a real, physical horse with wings, just not one that exists in actual space and time.
- Quine raises objections to both these views. We will begin with **View 1: McX**.

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Objections to McX

- There is an obvious and intuitively devastating objection to **McX**.
- Remember, the puzzle raised by nonexistent entities is how sentences such as (1) and (2) can be true if the things that the names in (1) and (2) refer to do not exist.
  (1) Pegasus does not exist.
  (2) Santa Claus does not exist.
- But if 'Pegasus' and 'Santa Claus' refer to ideas (in the mind), then (1) and (2) are intuitively just false, because the ideas of Pegasus and Santa Claus *do* exist.

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Objections to Wyman

- To understand Quine's objections to **View 2: Wyman**, we need to explicate the view in a bit more detail.
- Wyman draws on a distinction between what is *actual* and what is *non-actual* (but possible).
- Intuitively, there are things that are *actually* the case and things that are *not actually* the case but *could have been*. For example:
  - 'Donald Trump is the president of the United States' is actually true.
  - 'Hillary Clinton is the president of the United States' is not actually true, but could have been true (had actuality been different).
- **Note:** everything that is *actual* is also *possible*.

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Objections to Wyman (cont.)

- Wyman draws a similar distinction about objects: Some objects actually exist and some objects do not actually exist, but *could*.
  - Objects that actually exist: *cars*, *phones*, *chairs*, ...
  - Objects that do not actually exist, but are possible: *flying cars*, *world peace*, ...
- According to Wyman, 'Pegasus' and 'Santa Claus' refer to things that do not *actually* exist, but could. They are *possible* objects.
- So, the sentence 'Pegasus does not exist' does not say that there is no thing that 'Pegasus' refers to, but rather that the thing that 'Pegasus' refers to simply does not have the property of *actually* existing.

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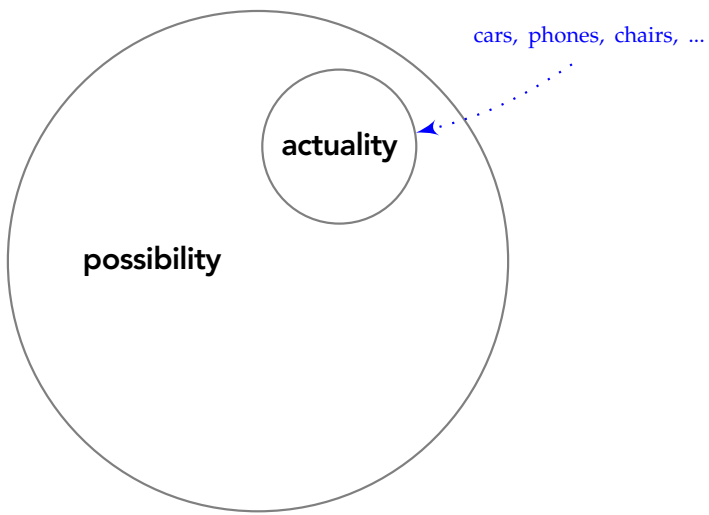
Objections to Wyman (cont.)

- Hence, Wyman distinguishes between *existence* and *being*.
  - *Being* is a property that applies to all possible objects.
  - *Existence* is a property that applies to all possible objects that are *actual*.
- According to Wyman, 'Pegasus' and 'Santa Claus' refer to things that do not *actually* exist, but are possible.



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Objections to Wyman (cont.)

- Quine's first objection to **Wyman** is that it obscures the meaning of 'exist'.

> Wyman ... is one of those philosophers who have united in ruining the good old word 'exist' [...] We have all been prone to say, in our common-sense usage of 'exist', that Pegasus does not exist, meaning simply that there is no such entity at all.
>
> *Quine, 1980: 3*

- Quine's point is that there is no obvious difference between *existence* and *being*. These are the same thing.
- So, to draw the distinction that Wyman does is to obscure the meaning of existence. That x is possible but not actual is simply not what we mean when we say that x does not exist.

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Objections to Wyman (cont.)

- Quine's second objection to **Wyman** can be summed up in the slogan: **No entity without identity**.
- Quine's point is here is that if something exists, then there are objective facts about what it is identical to.
- For example, because I exist, there are objective facts about what/who I am identical to. As it happens, it is objectively true that I am identical to the most recent hire from Denmark in the department of philosophy at Stockholm University, and that I am not identical to the queen of Denmark.
- More specifically, for any two existing things x and y, there are objective facts about whether x is identical to y or not.
- By contrast, with respect to merely possible beings, it need not be the case that there are objective facts about their identity.

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Objections to Wyman (cont.)

- Let 'Bob' refer to a nonexistent (but possible) **bald** man sitting in the back of the room.
- Let 'Jack' refer to a nonexistent (but possible) **tall** man sitting in the back of the room.
- Let 'Frank' refer to a nonexistent (but possible) **angry** man sitting in the back of the room.
- Now consider the following questions:
  - Is Bob identical to Jack?
  - Is Jack identical to Frank?
  - Is Frank identical to Bob?
- There are no objective facts that can settle this question. And given that there are no objective facts to settle these questions, we should be skeptical about assuming that are such things as *Bob*, *Jack*, or *Frank* in the first place.

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Interlude: Numerical vs. Qualitative Identity

- Generally, when philosophers talks about **identity**, they have something quite specific in mind, namely numerical identity.
- To state that two objects, a and b are identical, viz. $a = b$, what is said is that a and b are the same object: they are numerically identical, i.e. there is just *one* object.
- This contrasts with what is often referred to as qualitative identity.
- For example, we might point to two (numerically distinct) sweaters and (truly) say that the sweaters are identical because they share the same qualities: same color, same size, same shape, same fabric, same pattern, etc.
- One way to tell qualitative identity from numerical identity is that only the former allows for gradation. It makes sense to say of two sweaters that they are *nearly identical* or *almost identical* if they share almost all the same qualities.
- Numerical identity cannot be graded in this way. It does not make sense to say that the number 2 is almost identical to the number 3, because both are larger than 1 and smaller than 4, 5, 6, etc.

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Quine's Solution

- So, Quine denies that there *are* entities such as Pegasus and Santa Claus (e.g. that these have the property of *being* or *existence* in some abstract sense).
- However, Quine maintains that sentences such as (1) and (2) are true and, moreover, that for a sentence to be true, each of its parts must be meaningful.

  (1) Pegasus does not exist.
  (2) Santa Claus does not exist.

- So, how can we consistently maintain these theses?

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Quine's Solution (cont.)

- Quine argues that once we analyze these sentences in the correct way (once, they are *regimented* in the language of first-order logic), it will become clear what ontological commitments they incur.
- According to Quine, the proper way of *regimenting* (or *analyzing*) sentences such as (1) and (2) is as follows:

  (5) $\neg\exists x\big(x = p\big)$

  (6) $\neg\exists x\big(x = s\big)$
- Here p and s are names standing for Pegasus and Santa Claus respectively.
- When the sentences are analyzed in this way, it should be obvious that they incur no ontological commitments. In particular, what these sentences *say* is that it is not the case there is anything such that it is identical to Pegasus or to Santa Claus.
- But what about the names p and s? Don't these have to refer to something in order to be meaningful?
- No, says Quine.

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Interlude: Russell's Analysis of Names

- Quine adopts an analysis of names (due to Bertrand Russell) according to which names are covert descriptions. According to Russell, the meaning of a name is equivalent to some definite description that denotes the individual who bears the name.
- A definite description is a description of the form 'The *F*' where *F* is a 1-place predicate. For example:
    - The president of the United States
    - The mayor of Cincinatti
    - The tallest man in China
    - The queen of Denmark
- So, according to Russell, the meaning of the name 'Donald Trump' is actually 'The (current) president of the United States' or some other description that successfully picks out Donald Trump.

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Interlude: Russell's Analysis of Names (cont.)

- So, according to Russell, a sentence such as (7) should be be analyzed as in (8).

  (7) Donald Trump is bald.

  (8) $\exists x\big(P(x) \wedge \forall y\big(P(y) \rightarrow x = y\big) \wedge B(x)\big)$

- Here P is the predicate 'president of the United States' and B is the predicate 'bald'.

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Interlude: Russell's Analysis of Names (cont.)

- You might wonder why (7) is not simply analyzed as in (9).

(9) $\exists x\big(P(x) \wedge B(x)\big)$

- The reason is that (9) simply says that there exists *some* or *a* president of the United States who is bald. In other words, this analysis of (7) does not guarantee that the name 'Donald Trump' picks out Donald Trump.
- To circumvent this problem, Russell adds the clause below.

$$\ldots\ \forall y\big(P(y) \rightarrow x = y\big)\ \ldots$$

- This ensures that for the sentence to be true, there can only be one individual who has the property of being the president of the United States — and given that Donald Trump has that property, the description picks out him.

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Regimentation (cont.)

- Going back to Quine now, suppose we analyze the name 'Pegasus' as in (10).

  (10) The winged horse that was captured by Bellerophon.

- Given this, Quine argues that the proper regimentation of (1) is (11).

  (11) $\neg\exists x\big(W(x) \wedge \forall y\big(W(y) \rightarrow x = y\big)\big)$

- Here W is the predicate 'winged horse that was captured by Bellerophon'.
- This sentence says that it is not the case that there is a unique winged horse that was captured by Bellerophon — or in other words that the winged horse captured by Bellerophon does not exist.
- And this sentence clearly does not commit us to the existence of any winged horses or other non-existent entities.

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Outline

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Quine on Ontological Commitment

- Generally speaking, Quine's view of ontological commitment is the following:

  > **We are committed to the existence of some entity *e* if and only if we accept a sentence that quantifies over that entity**.

- For example, suppose you accept (12).

  (12) Cars exist.

- This, according to Quine, is equivalent to accepting an existentially quantified sentence such as (13).

  (13) $\exists x\big(C(x)\big)$

- For (12) to be true, the value of x in (13) must be an object in the domain that has the property of being a car. Hence, the sentence commits us to the existence of at least one car.

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Quine on Ontological Commitment

- So, as regards ontological commitments, Quine's proposes the following method:

    1. Determine which sentences are true.
    2. Regiment the sentences in first-order logic.
    3. Commit yourself to all and only those entities that are needed to stand in as the values of the bound variables in order to make the sentences true.

- So, that settles how to determine what exists and what does not exist.

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Interlude: Semantic Ascent

- It's important to understand the strategy that Quine is employing here.
- Quine's approach to the question of ontological commitments involves something called *semantic ascent*.
- The questions about ontological commitments are *metaphysical* questions, viz. a questions about *what there is* understood in the most fundamental way possible.
- But Quine takes an approach to answering these questions is *semantic*. That is, Quine's approach fundamentally involves analyzing the *meaning of sentences* such as 'Pegasus does not exist'.
- So, Quine ascends from the ontological/metaphysical plane up to the semantic plane.

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Interlude: Semantic Ascent (cont.)

- Semantic ascent is a common strategy in modern analytic philosophy.
- For example, philosophers interested in the epistemological question 'what is knowledge?' or 'what does it take to have knowledge?' sometimes choose to ascend to the semantic question 'under what conditions are sentences of the form '*S* knows that *p*' true?'
- Moral philosophers interested in understanding what it takes for something to be morally good or morally bad may ascend to the semantic question 'when are sentences of the form 'x is morally good' and '*x* is morally bad' true?
- Whether semantic ascent is an advisable strategy when it comes to solving philosophical problems is controversial.

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Avoiding Undesirable Ontological Commitments

- One worry about Quine's method is that there may be sentences that seem intuitively true, but which commits us to entities that one might think do not exist.
- Consider, for example, the sentence in (14).

  (14) Some species are cross-fertile.

- The most natural regimentation of (14) would be (15).

  (15) $\exists x\big(S(x) \wedge C(x)\big)$

- But this sentence appears to commit us to the existence of *species*.

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Paraphrases

- Quine thought that *abstract* objects such as *species* (or numbers, colors, propositions, etc.) are suspect and hence finds himself in a bit of a jam here.
- It seems that Quine must either reject the sentence in (14) (viz. conclude that it is false) or accept the existence of *species*.
- No, says Quine. There is another solution to this problem!

> When we say that some zoological species are cross-fertile we are committing ourselves to recognizing as entities the several species themselves, abstract though they are. We remain so committed at least until we devise some way of so paraphrasing the statement as to show that the seeming reference to species on the part of our bound variable was an avoidable manner of speaking.
>
> *Quine 1948, p. 13*

- So, what does Quine mean by this?

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Paraphrases (cont.)

- Quine suggests that in some cases there may be alternative ways of regimentating sentences that avoid the commitment in question.
- For example, assuming that species cross-fertilization is constituted by mating between animals belonging to different species, one could represent the meaning of (14) as (16).

(16) $\exists x \exists y \big(L(x) \wedge T(y) \wedge M(x,y)\big) \vee$
$\exists x \exists y \big(E(x) \wedge B(y) \wedge M(x,y)\big) \vee$
$\exists x \exists y \big(Z(x) \wedge C(y) \wedge M(x,y)\big) \vee$
...

- This sentence says: Either some lions mate with some tigers and produce offspring or some bears mate with some elephants and produce offspring or some zebras mate with some cobras and produce offspring or ... [for animals of all species].
- This sentence expresses essentially the same as (14) (it is true under the same circumstances), but does not commit us to the existence of species!

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Some Worries about Quine's Method

- This raises a question though, namely what exactly are the rules of paraphrasing? When and why is it ok to consider a different paraphrase in order to avoid commitment to the existence of various entities?
- For example, Alonzo Church criticized Quine's method by giving a parody argument where a devoted misogynist could use Quine's method to show that women do not exist.
- The way to do this would be to regiment all sentences quantifying over women as instead quantifying over "a man's *secondary presence*" – thereby eliminating any ontological commitment to women.
- This seems clearly absurd, so the crucial question for Quine is why we should think that such cases of paraphrasing are bad while the case above involving species are not.
- Finally, there may be many cases where it is simply not clear that there is any kind of helpful alternative regimentation. Consider, for example, (17) and (18).

  (17) Species are species.
  (18) Natural numbers are even or odd.

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Outline

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Ockham's Razor

- **Step 1** in Quine's Method is to determine which sentences we take to be true. But how do we go about doing this?
- Quine argues that we should proceed here in a way similar to the way one proceeds in constructing a scientific theory.
- We should start with the "simplest conceptual scheme", viz. prefer theories that entail the fewest number of entities (assuming that the theories in question has the same explanatory potential).

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Ockham's Razor (cont.)

- The principle that we should seek simplicity in theory building is sometimes referred to as *Ockham's Razor*.
- This principle says that *entities should not be multiplied beyond necessity*. In other words, if theory A can make the same predictions as theory B, but A commits us to fewer entities than B, then assuming Ockham's Razor, we should prefer A.
- The thought underlying Ockham's Razor is that (theoretical) simplicity is a *truth*-conducive property: A theory positing a minimal number of entities (a theory with a *sparse ontology*) is more likely to be true than a theory positing a higher number of entities (a theory with an *abundant ontology*). And since we are interested in finding the true theory of our ontological commitments, we should endorse Ockham's Razor.

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Interlude: Types vs. Tokens

- Note that when we are talking about *sparse* versus *abundant* ontologies, we are mainly concerned with the number of *types* of entities posited, not the number of *tokens*.
- For example, suppose that theory A and theory B are predictively equivalent.
- However, suppose that A posits 10^{82} atoms in the universe (and nothing else) and B posits 10^{83} atoms in the universe. In that case, theory A posits less **tokens** of entities than theory B.
- But A and B posit the same number of *types* of entities, namely one: **atoms**. And one might reasonably think that as far as *ontological commitments* are concerned, there is no substantial difference between A and B.
- By contrast, suppose A also claimed in addition to atoms, there are also numbers. In that case, theory A posits *two types* of entities as opposed to theory B and this does intuitively seem like a substantial difference — at least as far as *ontological commitments* are concerned.

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Outline

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Inputs

- One natural question to raise when it comes to metaphysical inquiries is what kinds of inputs to rely on?
- Suppose you accept Quine's claim that the simplest metaphysical theory is preferable, then it remains to determine how to discover the simplest theory.
- In an effort to determine the simplest theory, one could rely on any of the following factors:
  - Common or ordinary beliefs
  - Current scientific theories
  - Religious texts
- Some philosophers have assumed that a combination of these is the best approach to ontological inquiries.
- But many consider it illegitimate to rely on either common beliefs, religous texts or both. (notice, for example, that whether you consider religous texts a relevant input source to ontology will, likely, depend on your religious views).

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Inputs (cont.)

- There is a general consensus that current scientific theories should provide at least one essential input to any theory of ontology.
- According to two prominent approaches, a proper theory of ontology may *only* appeal to discoveries made by scientific theories. These are:
  - **Naturalism**
  - **Physicalism**

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Naturalism

- **Naturalism** is the position that *only* discoveries in the natural sciences such as physics, astronomy, chemistry, biology, and geosciences, can provide objective knowledge about what the world is like.
- So, **naturalists** reject the idea that one could rely on common beliefs or religious texts when engaging in theorizing about ontology.
- In short, the goal of ontology is to formulate current scientific theories as clearly and succintly as possible, then regiment them in the language of first-order logic, and read off their entailments.

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Physicalism

- **Physicalism** is a more extreme position than **naturalism**. This is the position that *only* physics can provide objective knowledge about what the world is like.
- The claim here is that to the extent that other sciences provide inputs into the metaphysical makeup of the world, e.g. discoveries in biology, chemistry, or even psychology and sociology, these claims must be grounded in claims originating from physics.
- However, both **physicalists** and **naturalists** accept that other areas of inquiry may provide important insights into ontology as long as these insights can be formulated or reduced to claims in physics or the natural sciences respectively.

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Interlude: The difference between Metaphysics and Ontology

- It is important to understand that ontology is just a (proper) part of metaphysics.
- Ontology concerns what things exist, but there are many other metaphysical issues that go beyond the question of mere existence.
- For example, what are the entities that exist like? What properties do they have? Do entities persist through time or do they only exist at specific space-time points? Do these entities enter into causal relations?

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Fundamental Metaphysics

- Many philosophers believe that what we need is a **fundamental metaphysical theory**.
  - A fundamental metaphysical theory is a theory that aspires to completeness in the sense that every fact about the world is either a part of that theory or can be accounted for completely in terms of that theory.
- There may be many facts that are not fundamental, but a fundamental metaphysical theory should be capable of accounting for those facts *in terms of* the fundamental metaphysical facts
- The crucial question then is what facts are fundamental and what facts are non-fundamental.

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Fundamental Metaphysics (cont.)

- Suppose that **a complete theory of the world** could be given in terms of the following kinds of facts (and not in terms of less).
  1. Facts about the existence of a certain number of physical particles.
  2. Facts about these particles' initial locations in three-dimensional space and their stable identity through time.
  3. Facts about these particles' intrinsic features which include only their *masses*, *charges*, and *velocities*.
  4. A list of dynamical laws (a physics) that specify how these particles will move at future times given their initial locations, velocities, masses, and charges.
- If so, this would be our fundamental metaphysical theory.
- We would be committed to an ontology that includes physical particles (of various sorts) having the features described above and acting in accordance with the laws described above.
- Any additional facts, say facts about the causal relations and dependencies between different physical particles would then be *non-fundamental* facts, viz. facts that must be explained in terms of the fundamental facts.

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Simple Ontological Dependence vs. Fundamental Facts

- Here is a crude but simple example.
  - It may be a fact that there is a chair in this room.
  - However, that fact is plausibly a non-fundamental fact as the existence of a chair can be explained in terms of other more fundamental facts.
  - For example, the existence of various physical particles arranged in a specific way, occupying a certain location in three-dimensional space, having a certain stable identity over time, etc.
- However, it is important to understand that there is a difference between the dependence relations obtaining between fundamental and non-fundamental facts and, what we might call, **simple ontological dependence**.
- The existence of a chair may depend on the existence of its legs. However, we cannot conclude from this that the existence of table legs is a fundamental fact.

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Ontological Dependence

- There are many different kinds of ontological dependence.
  - MEREOLOGICAL RELATIONS
    The relations that hold between objects where one object is part of another object. For example, the relation between leg and table, and brick and house.
  - REALIZATION RELATIONS
    This is the sort of relation that holds between objects when one object *implements* the other. For example, when a piece of hardware realizes a piece of software. Or when physical properties realize mental properties.
  - SUPERVENIENCE RELATIONS
    This is a more abstract kind of relation. Essentially, one set of facts about an object o (or class of objects O) supervenes on another object o' (or class of objects O') when there can be no change in the facts about o (or O) without a corresponding change in facts about o' (or O'). For example, at what time the sun sets supervenes on latitude. (whether supervenience is in fact an *ontological dependence relation* remains controversial).

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Grounding

- Another important notion in metaphysics is the notion of **grounding**. This denotes the relation that a set of facts bear to another set of facts when one metaphysically **explains** the other.
- So, if we say that a fact is **grounded** in another fact, we are saying that there is a complete explanation of the former fact in terms of the latter fact.
- For example, the existence of any composite object (e.g. a chair) is grounded in the existence of its parts (viz. its legs, seat, back, etc.).
- However, **grounding** is not simply another ontological dependence relation. Grounding is a fundamentally *explanatory* relation: If A grounds B, then the existence of A *explains* the existence of B.
- This need not be the case with respect to simple ontological dependence. There is nothing inherent in the notion of ontological dependence that rules out that an object o ontologically depends (for its existence) on itself (even if such objects are hard to imagine). In such cases, we cannot plausibly say that the existence of o *explains* the existence of o.

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Dependence Relations

- In short, the fundamental vs. non-fundamental distinction is distinct from mere ontological dependence. That an object o ontologically depends on another object o' does not entail that o is fundamental.
- Similarly, ontological dependence does not entail grounding. That an object o ontologically depends on o' does not strictly entail that o grounds o'.
- Of course, in many cases, if some class of objects O are deemed to be fundamental, then every non-fundamental object o' will **ontologically depend** on the objects in O. Similarly, in many such cases, the existence of the objects in O **grounds** the existence of o'.

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Metaphysics

Lecture 2: Abstract Objects

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Outline

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Abstract Entities

- In the previous lecture, we considered the general topic of ontology, viz. the study of what exists.
- We looked closely at Quine's method for determining ontological commitments, namely the method of regimentation.
- In this lecture, we are going to focus on a particular class of entities, namely so-called abstract entities.
- So, for the purposes of this lecture, we will take for granted that concrete entities exist, e.g. tables, chairs, rivers, stars, persons, etc.

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Examples of Abstract Entities

- Natural candidates for abstract (viz. non-concrete) entities are:
  - Mathematical Objects (sets, numbers, fractions, square roots, vectors, primes, ...)
  - Propositions
  - Properties (colors, shapes, sizes, ...)
  - Virtues (wisdom, honesty, humility, ...)
  - Fictional Entities (Harry Potter, Sherlock Holmes, ...)
- This is a classification based entirely on brute intuition, so ideally we want a more precise definition of the distinction between **concrete** and **abstract** entity.

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The Concrete/Abstract Distinction

- Abstract entities are often characterized using the following heuristics.
  1. Concrete entities have observable properties such as colors, shapes, sizes, smells, whereas abstract entities often lack these.
  2. Concrete entities have spatial locations. They are located in space and time. By contrast, abstract entities are typically conceived of as **transcendent**—located outside space and time.
  3. Only concrete entities are generally assumed have causal influence on surrounding objects. For example, you can bang your head against a door, but you cannot bang your ahead against a number.
- This classification works very well for several cases, but not so well for others.

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The Concrete/Abstract Distinction (cont.)

- Let's first consider some clear cases.

Table 1

DISTINGUISHING FEATURES OF CONCRETE AND ABSTRACT ENTITIES

	Rivers	*Tables*	*Numbers*	*Virtues*
Shape?	✓	✓	×	×
Size?	✓	✓	×	×
Color?	✓	✓	×	×
Spatial Location?	✓	✓	×	×
Causal Interactions?	✓	✓	×	×

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The Concrete/Abstract Distinction (cont.)

- And now for some more difficult cases.

Table 2

DISTINGUISHING FEATURES OF CONCRETE AND ABSTRACT ENTITIES

	electrons	*colors*	*space/time*
Shape?	×	×	?
Size?	✓	×	✓
Color?	×	✓	×
Spatial Location?	✓	?	×
Causal Interactions?	✓	?	?

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The Concrete/Abstract Distinction (cont.)

- An alternative to thinking of concrete vs. abstract entities in terms of *observable properties*, *spatial location*, and *causal influence* is to think of abstract entities as **abstractions from** concrete entities.
- For example, suppose you have a collection of four marbles in front of you. Now disregard (or abstract away) all features of these marbles, i.e. their shape, color, the material they are made of, their density, etc. Doing this, you will soon be left with only their number, viz. 4. So, the number four is an abstraction from the collection of marbles.
- Defining abstract entities in terms of abstractions from concrete entities can either be conceived of as a psychological process or a metaphysical relation.
  - PSYCHOLOGICAL PROCESS
    Abstract entities are just those entities that can be conceptualized through a psychological process of abstracting away other features.
  - METAPHYSICAL RELATION
    An abstract entity is just the entity that is left when all other features of a concrete entity has been abstracted away.

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Outline

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The Ontological Status of Properties

- Let's turn our attention now to *properties*.
- Properties such as shape (e.g. *roundness*) and color (e.g. *blue*) are often considered to be examples of so-called **universals**.
- Universals are entities that are *repeatable*, viz. capable of being instantiated at multiple locations at once by several different entities.
  - For example, right now, there are multiple things in this room that are round.
  - In other words, right now there are multiple objects in this room that **instantiate** the property of *roundness*.
- So, we may distinguish between properties that are multiply instantiated (**universals**) and properties that are not (**particulars**).

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Platonism

- According to Plato, there are universal entities called **the** (Platonic) **Forms**.
- Platonic forms include features such as *beauty*, *justice*, *the good*, but also colors, shapes, etc.
- In addition to being repeatable, Plato holds that the forms are (a) transcendent, (b) ideal, and (c) only a priori knowable.

  (a) TRANSCENDENCE
  The forms exist outside of space and time—they have no spatial or temporal location.

  (b) IDEAL
  The forms are perfections. For example, the form of *beauty* is entirely beautiful in contrast to concrete entities that may instantiate the form *beauty*. Such entities are *never* entirely beautiful.

  (c) A PRIORI
  The forms can only be known (or understood) by pure reasoning—not by observation or any kind of sense perception. Although you may perceive the beauty instantiated by some entity, you can never perceive the *form of beauty* according to Plato.

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Interlude: A Priori vs. A Posteriori

- In philosophy, an important distinction is the distinction between a priori knowledge and a posteriori knowledge.
- **A priori knowledge** is the kind of knowledge that can be acquired (in principle or practice) by *reasoning* alone. So, for example, logical truths ($p \vee \neg p$), mathematical truths (2+2=4), or analytical truths (all vixens are female), would count as a priori knowledge (if known).
- By contrast, **a posteriori knowledge** is the kind of knowledge that requires something beyond reasoning, namely empirical evidence. For example, that some swans are white or that it is raining can only be known by empirical observation.

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Aristotle's View of Universals

- According to Aristotle, properties are **immanent**, i.e. instantiated in space and time and located where the objects that instantiate them are located.
- In other words, on Aristotle's view, the property *roundness* exists in all the concrete objects that instantiate this property. Since this property is repeatable, it is a universal.
- David Armstrong, a contemporary proponent of the Aristotelian view of properties, maintains not only that properties are repeatable (universal), located in space and time (wholly located at each of their instantiations), but also that they are therefore observable by ordinary empirical means. In other words, properties can only be understood through experience.
- So, on this kind of **naturalist** view of properties, you come to know which properties there are in the same way you come to know which concrete objects there are: by observation.

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Terminology

- **REALISM ABOUT UNIVERSALS**
  This is the view that there *are* universals.
- **PLATONISM ABOUT UNIVERSALS**
  The view that (a) there are universals and (b) that they have the features that Plato assumed them to have: *immanence*, *ideality*, and *a priority*.
- **NOMINALISM ABOUT UNIVERSALS**
  The view that there are *no* universals.
- **CONCEPTUALISM ABOUT UNIVERSALS**
  The view that there are universals, but that they are mind-dependent entities. Universals are *psychological* abstractions from concrete entities. (while this is explicitly not a nominalist view, it is an *anti-realist* view of universals).

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Realism about Universals: One over Many

- The classic argument for REALISM ABOUT UNIVERSALS is the so-called *One over Many* argument.
- This argument proceeds as follows:
  1. There are red houses, red roses, and red cars.
  2. Therefore, these houses, roses, and cars have something in common: the universal redness.
- So, from the observation that there are **many** objects that share a **one** single feature, it is concluded that there must exist a universal corresponding to the feature that each of the objects share.

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One over Many

- Formally, the *One over Many* argument always takes roughly the following form.
  1. There is an x and x is F and there is a y and y is F and x is not identical to y.
  2. So, there exists a universal F-ness that both x and y instantiate.
- This argument form can now be used to demonstrate the existence of a *very* wide range of universals.
- Simply assume that F is 'the property of being a chair' or 'the property of being a dog or a cat' or 'the property of being in this room' or ...
- Accepting the *One over Many* argument in this form thus leads to what is normally called an **abundant theory of universals**.

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Restricting One over Many

- However, if for example you are partial to Ockham's Razor and generally inclined towards limiting the number of entities posited in your ontology, you might want to try to restrict applications of the *One over Many* argument form.
- Armstrong, for example, has argued that the *One over Many* argument should be restricted to cases in which the objects in the first premise are **genuinely similar** in a certain respect.
- According to Armstrong, the argument should only apply to types of objects that are recognized by our best physical theories since only such theories can reveal genuine similarities among various entities.
- This, of course, rules out universals such as *being a chair* and *being a dog or a cat'* and *being in this room* since neither of these properties are recognized by our best physical theories as genuine similarities between fundamental entities.
- By taking this approach, one ends up with a so-called **sparse theory of universals**.

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Arguments Against One over Many

- However, some philosophers, e.g. Quine, har argued that the *One over Many* is not a legitimate argument in favor of universals as it is plainly invalid.
- That the argument is invalid is fairly easy to see when it is regimented in first-order logic.
  - Let F denote: *is red*.
  - Let H denote: *is a house*.
  - Let R denote: *is a rose*.
- We can state the first premise of the *One over Many* argument as follows then:
  1. $\exists x \exists y \big(F(x) \wedge H(x) \wedge F(y) \wedge R(y) \big) \wedge x \neq y \big)$
- The problem, of course, is that it does not follow from this premise that there exist anything but two things, namely x and y — and these are just concrete particulars, namely a (red) house and a (red) rose.

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Arguments Against One over Many (cont.)

- To see this, consider how the intended conclusion of the *One over Many* argument would need to be regimented:
  - Let g denote the universal: *redness*
  - Let $I(x,y)$ denote: *x instantiates y*

  2. $\exists z\big(z = g \wedge \big(\exists x\big(H(x) \wedge I(x,z)\big) \wedge \exists y\big(R(y) \wedge I(y,z)\big) \wedge x \neq y\big)$
- But, again, this conclusion simply does not follow from the first premise.

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Arguments Against One over Many (cont.)

- The question, of course, is what this *really* shows.
- Armstrong, for example, simply rejects this point—simply pointing out that when there is a genuine similarity in nature, there must be some entity that **explains** or **grounds** this similarity.
- Even if the conclusion of the *One over Many* argument doesn't follow from the premise in first order logic, this similarity needs explaining nonetheless.
- So, Armstrong effectively assumes that the argument that Quine is claiming to be invalid is not the *right* form of the *One over Many* argument. Specifically, Quine's version of the argument is **enthymematic**: The correct argument actually involves a couple of tacit premises that reflect that these similarities need explanation.
- **NB.** An argument is said to be **enthymematic** when its invalidity can be explained as a result of missing one or more (relevant) premises.
- For example, the argument '**Socrates is human. Therefore, Socrates is mortal**' is enthymematic. It is invalid, but only because a relevant premise, namely '**All humans are mortal**' has been suppressed.

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Arguments Against One over Many (cont.)

- So, according to Armstrong, the *One over Many* argument form is really the following:
  1. There are houses and roses that are red.
  2. If some houses and some roses are both red, they are genuinely similar in some way.
  3. If a group of objects are genuinely similar in some way, then there must be a common entity that they all instantiate, a universal, that explains or grounds their similarity.
  4. **Therefore**, there is a universal, redness, that these houses and roses instantiate.
- Of course, while this argument is valid, Quine would argue that it is unsound since he would take the third premise to be false.

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Truthmaker Theory

- Armstrong's commitment to the validity and soundness of the *One over Many* argument is a consequence of another more specific meta-ontological commitment, namely the commitment to the **truthmaker principle** **(TM)**.

  (TM) Every truth has a truthmaker. In other words, for every truth, there is some entity or entities that make it true.

- This principle comes with heavy ontological commitments, namely that whenever a sentence is true, e.g. 'this flowerpot weighs one kilogram', then you are committed to there being entities (concrete or abstract) that make it true, e.g. the property of weighing one kilogram.

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Interlude: Second-Order Predicate Logic

- While Quine argued that the *One over Many* argument was invalid, this was based on the assumption that the *correct* logic to use is first-order logic. And since first-order logic is limited to quantification over individuals, it is simply not possible to reach conclusions that would involve quantification over properties. In first-order logic these are normally treated as *sets* of individuals).
- However, if one took second-order predicate logic to be the *correct* logic, then the *One over Many* argument would be valid (and not enthymematic). Here is why.
- In first-order logic, there is a rule of existential generalization. This rule simply says that whenever a formula such as (1*) is true, you may infer (2*)

(1) $F(a)$
(2) $\exists x\big(F(x)\big)$

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Interlude: Second-Order Predicate Logic (cont.)

- Since in second-order logic, quantifiers may range over both individuals and predicates (properties), the rule of existential generalization can be used in the following way:

  (1*) $F(a)$

  (2*) $\exists F\big(F(a)\big)$

- Now if we apply this to a sentence such as 'There are red houses and there are red cars' which may be translated as follows:

  (3*) $\exists x \exists y\big(H(x) \wedge R(x) \wedge C(y) \wedge R(y) \wedge x \neq y\big)$

- Using the rule of existential generalization, we may now infer the conclusion of the *One over Many* argument, namely:

  (4*) $\exists F \exists x \exists y\big(H(x) \wedge F(x) \wedge C(y) \wedge F(y) \wedge x \neq y\big)$

- And from this it follows:

  (5*) $\exists F \exists x\big(F(x)\big)$

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Interlude: Second-Order Predicate Logic (cont.)

- However, using second-order logic might be considered problematic for a variety of reasons:
- First, on this interpretation of second-order logic, the validity of the *One over Many* argument is essentially built into the logic, so it might seem somewhat question-begging to appeal to it when trying to justify relying on that argument.
- For example, Quine maintained that whether or not there exist such things as properties or universals shouldn't *follow* from logic alone.
- Second, unlike first-order logic, second-order logic is known to be *incomplete*. That is, it is known that there are valid arguments in second-order logic that cannot be proved or disproved in the logic. Because of this, it is not possible to actually prove that the logic is consistent! This, in itself, is a strong reason to be skeptical of appeals to second-order logic.
- Third, there are alternative versions of second-order logic where the second-order quantifiers are not ontologically committing. So, even though one can quantify over predicates (viz. properties), one cannot conclude from this that these properties exist.
- It is important to note though that metaphysicians such as Armstrong do not appeal to second-order logic to make their case for the validity of the *One over Many* argument.

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Paraphrasing Away Commitments to Universals

- But what should the Quinean say about sentences such as the following

  (1) Red is more similar to pink than it is to blue.

- Following the standard Quinean method of determining the ontological commitments on the basis of regimentation into first-order logic, one might think that sentences such as these commits us to the existence of various colors as the most natural regimentation of this sentence appears to be the following:

  (2) $S(r,p,b)$

- Here S denotes the predicate '_ is more similar to _ than _' and r, p, and b are names for the colors *red*, *pink*, and *blue* respectively.

- But from (2), using existential generalization, a commitment to the existence of *red*, *pink*, and *blue* seems to follow.

  (3) $\exists x \exists y \exists z \big(S(x,y,z) \big)$.

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Paraphrasing Away Commitments to Universals (cont.)

- With respect to this problem, the Quinean appears to have two options.

  Option 1
  Produce an alternative regimentation of the sentence that avoids commitment to the existence of colors yet conveys the same truth conditional content.

  Option 2
  Argue, somehow, that the original sentence is actually false.

- Which of these options is better is, perhaps, not entirely clear. Neither option seems particularly good.

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Outline

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Ostrich Nominalism

- The immediate alternative to the realist views about universals discussed previously is **nominalism**.
- As mentioned before, nominalism is an anti-realist view according to which there are no abstract objects.
- According to Quine's preferred version of nominalism (sometimes referred to as *Ostrich Nominalism*), there is simply no metaphysical explanation of the fact that some predicates apply to more than one object.
- In short, Quine maintains that there simply are no properties. There are only objects/entities and these entities may exhibit various features. But in virtue of what these entities/objects exhibit these features is irreducible, viz. something that cannot be further explained.
- For obvious reasons, this view is not particularly popular today as it simply appears to refuse to give answers to rather pressing metaphysical questions.

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Set Nominalism

- An alternative to Ostrich Nominalism is so-called **class** or **set nominalism**.
- The basic idea here is that properties are simply sets (of individuals). So, for example, the *property of being blue* is simply the set of all blue entities.
- Since sets are not universals, but rather particulars, according to this conception of properties there are no universals. Properties are particulars, namely sets of individuals.

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Set Nominalism (cont.)

- This view is in many ways a lot more palatable than Quine's Ostrich Nominalism.
- However, since this view commits one to the existence of *sets*, a stern anti-realist such as Quine would object to this view as much as any realist view.
- Set Nominalism is also faced with another immediate problem, namely the objection from co-extension:

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The Objection from Co-Extension

- The argument from co-extension can be summarized as follows:
  - If two sets A and B have the same members, then $A = B$.
  - Consider the two properties of 'having a kidney' and 'having a heart'.
  - These are clearly distinct properties.
  - However, as it turns out, every creature that has a kidney also has a heart (or, at least, let's suppose that this is the case).
  - If so, then the set of individuals denoted by the predicate 'has a kidney' is identical to the set of individuals denoted by the predicate 'has a heart'.
  - Hence, the properties of 'having a kidney' and 'having a heart' are predicted to be identical.
- In more general terms, we don't want our theory of properties to predict that mere co-extension means identity.

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Responding to the Objection from Co-Extension

- One natural solution to the problem from co-extension is to switch to *intensions*.
- In particular, the proponent of set nominalism could argue that properties should not be identified with mere extensions, but rather with intensions. Whereas the extension of a predicate is the set of individuals that *actually* instantiate the property denoted by the predicate, the intension of a predicate is a function from possible worlds w to the sets of individuals that instantiate the property denoted by the predicate at w.
- So, even though every creature that *actually* has a heart also happens to *actually* have a kidney, it is not the case that every creature with a heart has a kidney in every possible world.
- Hence, the intensions of 'has a kidney' and 'has a heart' are different.
- So, if properties are identified with intensions, the problem appears to go away.

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Responding to the Objection from Co-Extension (cont.)

- However, the problem comes back (albeit in a more limited way) when we consider predicates that are co-intensional.
  - If two predicates A and B have the same extension in every possible world, then $A = B$
  - Consider the two properties of 'being trilateral' (having exactly three sides) and 'being triangular' (having exactly three angles).
  - These seem to be distinct properties.
  - However, as it turns out, every trilateral object is also trilateral. This is true in every possible world
  - If so, for any world w, the set of individuals denoted by 'is trilateral' in w is identical to the set of individuals denoted by the predicate 'is triangular' in w.
  - Hence, the intensions of 'is trilateral' and 'is triangular' are identical—and so, they are predicted to mean the same thing.
- In response to this problem, the set nominalist might just bite the bullet and maintain that these predicates do mean the same thing and hence that being trilateral and being triangular is the same thing. Whether this is plausible is a different question.

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Trope Theory

- According to **Trope Theory**, properties are mind-independent abstract entities, however they are not universals.
- Rather, properties such as colors or shapes, are particulars that are instantiated at each location where an object with that property is located.
- So, for example, a red car may instantiate the color redness and a red house may also instantiate the color redness. Each of these properties are abstract mind-independent objects, however they are particulars. There is no universal that is instantiated by each object.
- Trope theory has a couple of advantages over the previous views. Let's consider some of them.

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Trope Theory (cont.)

- First, if you dislike the idea of universals, i.e. some abstract object that can be instantiated at multiple places at one time, then trope theory may seem appealing.
- Second, according to some proponents of trope theory, we have more reasons to believe in the existence of tropes than in the existence of universals: Tropes are the things that we first encounter in the world, i.e. particular occurrences of various properties (redness, roundness, etc.).
- Thirds, trope theory is more theoretically parsimonious. Instead of positing two distinct categories of particulars and universals, according to trope theory there are only particulars.
- Moreover, insofar as one wants to speak of properties in abstraction, say, *redness* or *roundness*, the trope theorist can treat these as collections of tropes (or *sets* of tropes). So, the term 'redness' just refer to a collection of tropes (namely all the red tropes).

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Outline

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The Indispensability Argument

- Perhaps the most obvious candidates for abstract objects (insofar as there are any) are mathematical objects, e.g. numbers.
- One particular argument that has been given in favor of the existence of numbers differs from the arguments that we have considered so far. This argument is referred to as the **Indispensability Argument**.
- The Indispensability Argument is an argument for realism about mathematical entities. It has, roughly, the following form:
  1. We ought to have ontological commitment to all that is indispensable to our best scientific theories.
  2. Mathematical entities are indispensable to our best scientific theories.
  3. **Therefore**, We ought to have ontological commitment to mathematical entities.

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The Indispensability Argument (cont.)

- The first premise follows from a commitment to naturalism (as discussed previously).
- The second premise is an empirical claim, namely that as a matter of fact, mathematical entities (numbers, vectors, fractions, etc.) are indispensable to scientific theorizing.
- What is meant by 'indispensable' here is that reference to various mathematical entities in current scientific theorizing cannot be paraphrased away without doing significant damage to the explanatory success of these theories.

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Challenging the First Premise

- There are various ways to respond to the indispensability argument.
- For example, one might question the first premise. In particular, one might argue that simply because some kind of representation is used in some science and perhaps plays an essential role in the statement of a prevalent scientific theory, it does not follow that are ontologically committed to the existence of the representation.
- One analogy, due to Penelope Maddy, is the state of atomic theory and ontological commitment to atoms: There was a point in time where atomic theory was quite well established and where many researchers believed the predictions of atomic theory were correct yet were clearly skeptical about the existence of atoms. It's not clear that there is anything inherently inconsistent about that.
- Another response to the argument is to note the widespread use of idealizations in science, e.g. the assumption in mechanics that there are frictionless surfaces. Idealizations are used to simplify various theories and make natural laws easier to state, thereby making it easier to use the theory in practice. However, very few, if any, believes that there *are* frictionless surfaces.

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Challenging the Second Premise

- The other option is to challenge the second premise, namely that the sciences make essential reference to mathematical entities.
- The logician and philosopher Hartry Field, for example, has tried to show that one can reformulate Newtonian physics without quantifying over any mathematical entities, however it remains controversial whether Field was successfull in this endeavor and the project would need to be expanded to cover all sciences to be perfectly effective.

Benacerraf's dilemma

- The philosopher Paul Benacerraf also noticed a more general problem with regards to the ontological status of numbers.
- Consider some simple mathematical truth, e.g. '2 + 2 = 4'. Ideally, we want a semantic theory (a theory of meaning) that explains why this statement is true. Moreover, we also want an epistemological theory that explains how we know this.
- What Benacerraf pointed out was that it is very difficult to get both of these things at the same time.
- Let's spell out Benacerraf's argument:

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Benacerraf's dilemma (cont.)

- Consider the sentences below.
  - (4) There are at least three large cities older than New York.
  - (5) There are least three perfect numbers greater than 17.
- Both these sentences have a similar structure and are intuitively true, but what ontological commitments do they incur?
- (4) seems to ontologically commit us to the existence of three cities.
- (5) seems to ontologically commit us to the existence of (at least) three (perfect) numbers.

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Benacerraf's dilemma (cont.)

- So, a good semantic theory (i.e. a theory of meaning) seems to require some form of realism, e.g. Platonism, about numbers.
- But from an epistemological point of view, this is somewhat undesirable, because if numbers are mind-independent abstract objects, this makes it very difficult to explain how we could know anything about them. After all, if numbers are mind-independent abstract objects, we cannot causally interact with numbers — and hence acquiring any kind of knowledge involving numbers seems to be difficult.
- It seems plausible that the way we come to know mathematical truths is by proving them. And if mathematics is simply a system of axioms and deduction rules, then the truth of mathematical statements follows from precisely these axioms and deduction rules, then their truth conditions are not determined by some realm of mind-independent abstract objects.
- Given this, we cannot take the semantics of (5) to be structurally similar to the semantics of (4). In particular, we cannot understand (5) as a sentence that makes reference to three (abstract) objects whose existence is required for its truth. And hence we are forced to adopt an intuitively unappealing semantic theory where (4) and (5) are treated non-uniformly.

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Metaphysics

Lecture 3: Material Objects

Dr. Anders J. Schoubye

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Outline

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What is a Material Object?

- In this lecture, we are going to focus on concrete/material objects. What exactly makes an object a material (rather than abstract) object?

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Preliminary Definition

- Early definitions of "material" (going back to Descartes) assume that an object is *material* only if it is spatially extended and persists through time.
- However, with the advent of modern physics, we now tend to permit "material" to also include objects that do not have spatial extension (point particles), e.g. electrons, leptons, and quarks. So, instead of talking about spatial extension, we should instead talk about *occupying space*.
- Moreover, assuming that it is possible for some material objects to exist for only one moment, we should probably not require persistence *over* time, but rather just *location* in time.
- And, finally, it seems plausible to include as a criterion for "material" objects that they have a non-zero *mass*.
- So, our preliminary definition is the following: An object is a material object if and only if it occupies space, has a location in time, and has a non-zero mass.
- However, as should be evident, whether an object is a material object is clearly an empirical question and our definitions may change as we make further empirical discoveries.

Paradoxes of Material Constitution

- We now turn our attention to some infamous paradoxes concerning material objects.

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Outline

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The Ship of Theseus

- Paradox 1: **The Ship of Theseus**.

Theseus had a large wooden ship that he sailed from Crete to Athens. After some time, the ship needed repairs as its planks started to rot. Gradually the Athenians replaced the planks of Theseus's ship with new planks. After many years, all of the wood of the original ship was replaced with new planks. By this time, the ship contained not a single plank of the original wood. But the original planks were not destroyed. Instead as each was replaced, the original planks were stored and finally used to assemble all of the original planks into the form of the original ship. Soon, two ships stood side by side.

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The Ship of Theseus (cont.)

- Let's refer to the original ship (the ship that originally arrived in Athens from Crete) as S_1.
- Let's refer to the ship that resulted from gradual replacement of all the planks in S_1 as S_2.
- And, finally, let's refer to the ship that was assembled using the original planks of S_1 as S_3.
- Consider the following question: **Which of the two ships (S_2 or S_3) resting side by side is identical to the original ship of Theseus (S_1)?**

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The Ship of Theseus (cont.)

- There are four options:
  1. $S_1 = S_2$ (viz. only the repaired ship is identical to the original, so $S_1 \neq S_3$)
  2. $S_1 = S_3$ (viz. only the reconstructed ship is identical to the original, so $S_1 \neq S_2$)
  3. $S_1 = S_2$ and $S_1 = S_3$ (viz. both ships are identical to the original)
  4. $S_1 \neq S_2$ and $S_1 \neq S_3$ (viz. neither ship is identical to the original)
- In each option above, the identity in question ('=') is *numerical identity*.

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The Ship of Theseus (cont.)

- Let's consider each option in turn. Let's start with Option 1: *Only the repaired ship is identical to the original.*
- Here is an argument for choosing this option. Consider what happens after the first plank of S_1 is replaced. Call the result S_1'.
- It seems eminently reasonable to assume that $S_1 = S_1'$. Just consider more rudimentary cases such as changing your hair style or the battery on your phone. Presumably, you are still the same person after cutting your hair and your phone doesn't seize to exist the second you change the battery.
- Given this, changing one plank does not change the identity of the ship. It's still S_1.
- Now change another plank, viz. S_1''. Again, since it is such a trivial change to S_1', we get $S_1' = S_1''$.

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The Ship of Theseus (cont.)

- So, after changing two planks, we can conclude:

$$S_1 = S_1' = S_1''$$

- Of course, repeating this process until we have changed every plank, we get:

$$S_1 = S_1' = S_1'' = \ldots = S_2$$

- However, note that the identity relation is transitive:

$$\forall x \forall y \forall z \big((x = y) \wedge (y = z) \rightarrow (x = z) \big)$$

- So, it follows that regardless of the numbers of planks we change, the resulting ship is identical to the original ship:

$$S_1 = S_2$$

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The Ship of Theseus (cont.)

- Let's now consider Option 2: *Only the reconstructed ship is identical to the original.*
- There is a very simple and compelling argument in favor of this option, namely that **S_1 and S_3 are made of exactly the same (numerically identical) constituents**!

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The Ship of Theseus (cont.)

- Given that there are good arguments for both $S_1 = S_2$ and $S_1 = S_3$, then maybe the best option is Option 3: *Both ships are identical to the original*.
- However, there is an obvious problem with this option, namely that it leads to a contradiction. This is easily demonstrated.
- First, since at the end of the rebuilding process there are clearly two (numerically distinct) ships, we assume P1.

  P1. $(S_2 \neq S_3)$

- Going with Option 3, we assume P2:

  P2. $(S_1 = S_2) \wedge (S_1 = S_3)$

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The Ship of Theseus (cont.)

- However, the identity relation is not only transitive, it is also symmetric.

$$\text{Symmetry: } \forall x \forall y \big((x = y) \leftrightarrow (y = x) \big)$$

- So, P3 follows from P2:

  P3. $(S_2 = S_1) \wedge (S_1 = S_3)$

- By transitivity of identity we get P4:

  P4. $\big((S_2 = S_1) \wedge (S_1 = S_3) \big) \rightarrow (S_2 = S_3)$

- And, finally, by simple modus ponens, we reach the conclusion P5:

  P5. $(S_2 = S_3)$

- This directly contradicts P1, namely that $(S_2 \neq S_3)$. And we would be very hard pressed to give up this premise.

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Interlude: The Indiscernability of Identicals

- An important (and intuitively plausible) metaphysical principle used in the reasoning above is the so-called principle of the **Indiscernability of Identicals** (also referred to as **Leibniz Law**).
- This principle says that if some thing a has a property F that another thing b does not have, then a is not identical to b. I.e. if two things are (numerically) identical, then they would have *all* the same properties. If this was not the case, then it should be possible for $F(a)$ and $\neg F(a)$ to be true simultaneously.
- The Indiscernability of Identicals is standardly defined formally as follows:

$$\Box\forall x\forall y\forall F\big((x = y) \rightarrow (F(x) \leftrightarrow F(y))\big)$$

- **NB.** The '$\Box$' here is a symbol used in modal logic to mean 'necessarily' or 'in all (metaphysically) possible worlds'.
- But S_2 and S_3 clearly do not share all the same properties (they are in different locations, made from different materials, etc.), hence they cannot be identical.

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The Ship of Theseus (cont.)

- The last option is Option 4: viz. *neither ship is identical to the original*.
- This option is appealing for a few reasons. First, it avoids the problems associated with the previous options.
- Second, despite assuming that neither ship is identical so S_1, we may still assume that S_2 and S_3 share various similarities with S_1.
- However, this option also comes with various counterintuitive consequences. For example, we are forced to say that S_1 has simply ceased to exist.
- Moreover, the general problem seems to stem from the assembly of S_3. If S_3 had not been assembled, there would be no problem accepting that $S_1 = S_2$.
- But, how can the assembly of S_3 have any impact on whether $S_1 = S_2$?

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The Statue and the Clay

- The second puzzle of material constitution is the puzzle of **The Lump and The Clay**.

A sculptor takes a lump of clay (call this object *Lump*) and makes a statue of the warrior Goliath (call this object *Goliath*). Suppose that at noon, there is only the lump of clay, but at midnight, the statue Goliath is finished and placed alone on a pedestal. At midnight, should we say there are two objects on this pedestal or only one?

- It might seem natural to think that there is only one object, viz. that *Lump* (l) = *Goliath* (g).
- But this seems inconsistent with **Leibniz' Law** since there exist at least one property F such that $F(l)$ and $\neg F(g)$.
- From this it seems to follow that $l \neq g$.

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The Statue and the Clay (cont.)

- With respect to which properties do l and g differ?
- First, l and g differ with respect to various **temporal properties**, e.g. l has the property of existing at noon, g does not.
- Second, they also differ with respect to certain modal properties, e.g. l has the property of being capable of surviving being squashed or rolled into a ball, g does not.
- g could also be argued to have the property of being a statue *necessarily*, whereas l would only have this property *contingently*.
- Given these differences, and despite them being constructed of the exact same material and occupying the same spatiotemporal location, one might be inclined to conclude that $l \neq g$.

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The Statue and the Clay (cont.)

- Another way to argue for the non-identity of l and g is the following:
- Let l_1 denote l at noon. Let l_2 denote l at midnight. Finally, we take for granted that l_1 is not identical to g. Here is the argument:

P1.	$l_2 = g$	assume for *reductio*
P2.	$l_1 = l_2$	initial assumption
P3.	$l_1 \neq g$	initial assumption
P4.	$l_1 = g$	P1, P2, transitivity of identity

P5.	**Therefore**, $l_2 \neq g$	P3, P4, and *reductio*

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The Statue and the Clay (cont.)

- If one accepts this argument, the result is the so-called *Two Object View*.
- According to this view, material objects are distinct from the matter from which they are composed.
- This is a completely general view, since this type of puzzle can be raised for many material objects (e.g. tables, chairs, phones, cars, etc.). Quite generally, on the **Two Object View**, no material object is identical to its matter.
- One striking consequence of this view is that **the** (quite plausible) **principle that two distinct material objects cannot be at the same place at the same time** is predicted to be false.

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The Statue and the Clay (cont.)

- If one wants to avoid the **Two Object View**, one option is to relinquish the assumption $l_1 \neq g$.
- This, however, would entail that l_1, viz. the lump of clay at noon, is in fact already a statue of Goliath at noon.
- This is quite counterintuitive in itself, but it also entails the truth of various strange counterfactuals such as (1) and (2).

  (1) The statue Goliath could have been a coffee mug.
  (2) The statue Goliath could have been an ashtray.

- But this seems intuitively incorrect; it is not the statue that could have been a coffee mug or an ashtray, it is the lump of clay that could.

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The Problem of the Many

- The last problem of material constitution is the **Problem of the Many**.
- Whereas the previous problems concerned *identity over time* (diachronic identity), the **Problem of the Many** concerns what is the case at a single time (synchronic identity).
- Here is a way of describing the problem:

> Take a moment to examine your own body. At first, it may seem to you that there are clear facts about what is a part of your body and what is not. Take a look at a hand. It is easy with your eyes to trace the outlines of this hand and in this way mark the boundaries between what is a part of your body and what is part of the surrounding environment. But now imagine zooming in closer on your body with a microscope. If you did this, things would appear differently. You could see the cells making up your skin. Zoom in further with a scanning tunneling microscope and you might observe the individual atoms and molecules making up these cells. At this level of magnification, the boundary between your body and the surrounding environment would become much less clear.

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The Problem of the Many (cont.)

- The average number of atoms in the human body is 7×10^{27}. Call this collection of atoms **C**.
- There are many collections of atoms just slightly different from **C** that also seem capable of constituting your body. These are *located* in almost the exact same place as **C**.
  - Let **C1** refer to **C** minus one hydrogen molecule (viz. $(7 \times 10^{27}) - 1$).
  - Let **C2** refer to **C** minus one (different) hydrogen molecule (viz. $(7 \times 10^{27}) - 1$).
  - Etc.
- It is easy to see that there is a very high number of collections that could easily constitute your body.
- So, it seems that we are forced to accept that there is a very high number of *other* human bodies (extremely similar to yours) that are located in the same location as **C**, yet are not identical to **C**.

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Responses to the Problem of the Many

- Of course, this observation is completely general and can easily be extended to *any* material object.
- So, we reach the bizarre conclusion that whenever there is a material object, e.g. a chair or a table, in front of us, there are in fact billions upon billions of chairs and tables in front of us.
- The philosopher Peter Unger's response to this problem is to conclude that material objects (such as chairs and tables) simply do not exist.
- But this seems almost as difficult to accept as the conclusion that there are billions of chairs and tables in front of us.

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Responses to the Problem of the Many (cont.)

- Another response is Theodore Sider who has argued that material objects should only be identified with *largest* collections, viz. the maximal property. On this view, neither **C1** nor **C2** count as bodies simply because it is part of the concept of a body that it is the largest collection of any sequence of collections.
- However, Sider's account is vulnerable to a closely related problem, namely that cases where a collection is slightly bigger seem just as problematic as cases where the collection is slightly smaller.
- For example, let **C+** denote your body plus one single hydrogen molecule. **C+** seems just as plausible a candidate for constituting your body as **C1** and **C2**.
- Given this, an appeal to maximality is not going to solve the problem.

Outline

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The Special Composition Question

- In the discussions above, we have been tacitly assuming something, namely that individual particles (maybe electrons, quarks, etc.) **compose** to form various collections, e.g. chairs, lumps, and statues. The composition of various individual particles to form some material object is often referred to as their **mereological sum** or their **fusion**.
- However, some philosophers think an argument is needed for this assumption to be warranted. Peter van Inwagen is one philosopher who has considered this issue quite carefully. He considers, what he calls *The Special Composition Question*, to be one of the most fundamental questions in metaphysics, namely:
  - **The Special Composition Question**
    Under what circumstances, if any, do particles compose to form material objects?

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Stating the Composition Question

- More specifically, van Inwagen is interested in completing the following biconditional.
  - $\forall xx \exists y$(the xx compose y iff the xx ...)
- Here, '$\forall xx$' is a **plural quantifier**, viz. an operator that quantifies over pluralities rather than individuals.

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Moderate Answers to the Composition Question

- A moderate answer to the special composition question is one that lines up, more or less, with our pretheoretic intuitions. On a moderate view, composition occurs *some* of the time, namely when particles compose to form collections of tables, chairs, and other rudimentary material objects, but not strange objects such as the mereological sum of the particles of the Eiffel Tower and the Queen of Denmark.
- The crucial question for proponents of a moderate answer to the special composition question is how to state precisely the conditions under which composition occurs, i.e. how to fill out the biconditional above.

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Moderate Answers to the Composition Question (cont.)

- One attempt is the so-called **Contact** view:
  - **Contact**
    $\forall xx \exists y$(the xx compose y iff **the xx are in contact**)
- This view has some initial appeal: First, it correctly predicts that any rudimentary material object (a chair, a table, a car, etc.) is the result of composition. Each of these objects is the mereological sum of its parts.
- Second, it predicts that composition does not occur to form strange objects such as the object which is the mereological sum of the Eiffel Tower and the Queen of Denmark.

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Moderate Answers to the Composition Question (cont.)

- However, it also has some problems:
- **First**, there are many cases of objects that intuitively compose yet are not in direct contact:
  - The planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune together compose our solar system, yet are not in contact.
  - The physical borders of Sweden compose the country Sweden yet are not (all) in contact (think of islands).
- **Second**, If contact is a necessary and sufficient condition for composition, **Contact** predicts that composition happens whenever there is contact. However, simply coming into contact does not seem to entail composition:
  - If two chairs are stacked on top of each other, it seems wrong to think that they compose a new object consisting of both chairs.
  - If two people shake hands, they do not compose to form a third human or third object.

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Moderate Answers to the Composition Question (cont.)

- Given the problems with **Contact**, other moderate views have been proposed, namely:
  - **Fastening**: $\forall xx \exists y$ (the xx compose y iff the xx are **fastened** to one another, where the xx are fastened when among the many sequences in which forces of arbitrary directions and magnitudes might be applied, at most a few of them would be capable of separating them without breaking or permanently deforming them).
  - **Cohesion**: $\forall xx \exists y$ (the xx compose y iff the xx **cohere**, where the xx cohere when they cannot be pulled apart or moved in relation to each other without breaking).
  - **Fusion**: $\forall xx \exists y$ (the xx compose y iff the xx are **fused**, where the xx are fused when they are joined together such that there is no boundary).
- While these improve on the problems with **Contact**, they each face different counterexamples.

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Brutal Composition

- Another position is the position endorsed by Ned Markosian. Markosian recognizes the problems associated with giving a coherent and counterexample immune formulation of a moderate composition principle, and therefore concludes that such a formulation simply cannot be given.
- Markosian's position is thus the following: It is true that composition occurs in some cases, but not in many others. However, it is just a **brute fact** when it happens and when does not. One simply cannot give a coherent metaphysical account of when it happens.
- In slogan form, Markosian's view is this: **Composition occurs when it occurs**. There is nothing more to be said.
- Markosian calls his position **Brutal Composition**, but a more apt name would probably be **Deflationary Composition**.

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van Inwagen's Argument

- van Inwagen has argued that any kind of account of composition that appeals to the spatial positions of the mereological parts is going to prone to counterexamples. Hence, such a strategy is not going to work.
- However, van Inwagen is certain that at least one mereologically complex object exists, namely himself!
- So, he concludes that there must be something about the objects that compose him that makes composition occur.

van Inwagen's Argument (cont.)

- van Inwagen argues that what makes some mereological simples compose him is that they participate in a kind of complex activity that allows them to constitute a life.
- So, van Inwagen's proposed answer to **the Special Composition question** is the following:
  - $\forall xx \exists y$(the xx compose y iff the activity of the xx constitutes a life)
- What it takes to constitute a life is, van Inwagen assumes, an empirical matter — a question for biologists essentially.

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van Inwagen's Argument (cont.)

- So, in conclusion, according to van Inwagen's view:
  - Electrons exist (mereological simples)
  - Humans exist (the only case of composition)
  - No other material objects exist (i.e. no chairs, tables, nothing)
- Although van Inwagen's view explains one case of composition, it's unclear this view is explanatorily superior to any of the views considered earlier.

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Outline

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Mereological Nihilism

- There are two further answers to the Special Composition question that are both rather extreme, but that we have not considered.
- The first is **Mereological Nihilism**:
  - $\forall xx \exists y$(the xx compose y iff the xx are exactly one)
- So, according to **Mereological Nihilism**, there are cases of composition, namely simple objects that compose themselves.
- But no other material objects exist. No tables, chairs, cars, etc.

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Mereological Nihilism (cont.)

- This is clearly an extreme position, but there is *one* compelling argument in favor of it: The theory is extremely *simple* — which one might take to be a significant virtue of any scientific theory.
- However, there are also arguments against the position. For example, consider the argument below from van Inwagen:

  P1. I exist.
  P2. I am not a mereological simple.
  P3. So, at least one entity exist that is not a mereological simple.

  P4. **Therefore**, **Mereological Nihilism** is false.

- In order to resist this argument, the proponent of **Mereological Nihilism** must reject either P1 or P2.

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Mereological Nihilism (cont.)

- One option is to reject P1. However, since it is very difficult to deny that van Inwagen exist, the proponent of **Mereological Nihilism** must at least explain *why* it seems that van Inwagen exists (if indeed he does not).
- Here, the proponent of **Mereological Nihilism** might argue that while (3) is false, (4) is true.

  (3) van Inwagen exists.
  (4) There exist some mereological simples that are arranged van-Inwagen-wise.

- If the argument is paraphrased this way, then the proponent of **Mereological Nihilism** is only committed to mereological simples.
- And the same kind of paraphrase can obviously be used for anything that would ordinarily be considered a rudimentary material object, e.g. chairs, tables, cars, etc.

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Mereological Universalism

- **Mereological Universalism** is the view that mereological composition is *unrestricted*.
  - $\forall xx \exists y$(the xx compose y iff the xx are disjoint)
- In this case, what is meant by *disjoint* is that the xx do not spatially overlap.
- In other words, according to **Universalism**, for any material object (simple or complex), there is something that they compose. For example, there is a material object consisting of the Eiffel tower and the Queen of Denmark. There is also a material object consisting of every Nike Air Jordan 1 and every poodle in Birmingham, and so on.
- A famous defense of this view is given by David Lewis who writes:

> *I claim that mereological composition is unrestricted: any old class of things has a mereological sum. Whenever there are some things, no matter how disparate and unrelated, there is something composed of just those things.*
>
> *(Lewis 1986, 211)*

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Mereological Universalism (cont.)

- In response to this view, Markosian has argued that it should be rejected because it comes into too much conflict with our background beliefs about when composition occurs and when it does not.
- And, although one might argue that many significant results in e.g. physics (and other natural sciences) are not intuitive in any way and in direct conflict with whatever background beliefs we might have had, there is something to said for respecting our intuitions with respect to composition.
- Propoponents of **Mereological Universalism** want us to accept that composition always occurs, but understanding the very notion of *composition* seems to rely on an understanding of precisely when it occurs and when it does not.
- So, what would it even mean to say that composition always occurs? Wouldn't understanding this require giving up our usual understanding of the notion of composition? And is it then, really, an answer to the special composition question?
- Put another way. The **Special Composition question** could be taken to presuppose that composition does not always occur. As a result, a relevant answer to that question seems to require that composition sometimes occurs and sometimes does not.

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Mereological Universalism (cont.)

- Moreover, **Mereological Universalism** involves a significant cost in ontological parsimony.
- If one is concerned with maintaining a sparse ontology (for reasons concerning parsimony), i.e. a theory that posits as few material entities as feasible (given what we take to be the relevant data), mereological universalism is going to look very promiscuous.
- The standard response from proponents of **Mereological Universalism** with respect to this point is that if one does not endorse **Mereological Universalism** (or **Mereological Nihilism**), then one will be forced to accept that there are cases in which whether composition occurs (or not) is **vague**.
- **In the next section, we will clarify in more detail what it means for something to be vague, but for now you can think of it as *indeterminate*.**
- The reason is that every **moderate** view of composition appeals to *vague* concepts, e.g. *contact*, *fastening*, *cohesion*, *fusion*, etc.
- For example, in the case of **Contact**, it will often be vague (~ indeterminate) whether two material objects are in contact or not.

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Interlude: Vagueness

- The **problem of vagueness** is a problem typically discussed in philosophy of language and it is closely related to the so-called **Sorites Argument**.
- Imagine a lineup of one million and one men. The first man has zero hairs on his head. The second man has one hair. The third, two hairs. And so on. The last man in the lineup has a million hairs on his head. The **Sorites Argument** proceeds as follows:

P1	Man_1 is bald.	premise
P2	If Man_1 is bald, so is Man_2	premise
P3	Man_2 is bald.	P1, P2, MP
P4	If Man_2 is bald, so is Man_3	premise
P5	Man_3 is bald.	P4, P3, MP
	...	
$\therefore$	$\text{Man}_{1.000.001}$ is bald.	conclusion

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Interlude: Vagueness (cont.)

- Here is the argument in a more concise form:

P1	$\text{Bald}(m_1)$	premise
P2	$\forall n\big(\text{Bald}(m_n) \rightarrow \text{Bald}(m_{n+1})\big)$	premise
$\therefore$	$\text{Bald}(m_{1.000.001})$	conclusion

- The problem with this argument is that it leads to an absurd conclusion, but no premise can easily be rejected. For example, if you reject the first premise, then there must be a bald man who has zero hairs on his head.
- If you reject the second premise, then there must be a *perfectly specific cut-off* for numbers of hairs below which you count as bald and above you do not. But that seems extremely implausible. How could there be such a number? What would determine what the number is? And how would we discover it?

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Interlude: Vagueness (cont.)

- Of course, this argument would work equally well with an abundance of other predicates, e.g. 'is tall', 'is red', 'is a heap', 'is flat', etc.,
- This is the problem of vagueness: There are predicates that seem to resist sharp cut-off points, and this means that in *borderline* cases, it will be vague (i.e. indeterminate) whether the predicate applies or not.
- As a result, in a borderline case, sentences such as (7)–9 are arguably neither true nor false.

  (7) Frank is bald.
  (8) The car is red.
  (9) The table is flat.

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Interlude: Vagueness (cont.)

- It is widely agreed **vagueness** is a problem about language and thought — not a problem about the world.
- As Lewis puts it,

> *The only intelligible account of vagueness locates it in our thought and language. The reason it's vague where the outback begins is not that there's this thing, the outback, with imprecise borders; rather there are many things, with different borders, and nobody's been fool enough to try to enforce a choice of one of them as the official referent of the word 'outback'. Vagueness is semantic indecision.*
>
> *(Lewis 1986, 212)*

- Relatedly, it makes sense to say that it is unclear (to us) whether an object exists or even that it is indeterminate (for us) whether an object exists, but this is a linguistic or epistemic kind of vagueness. It concerns what is the right (or agreed) application of our words (or perhaps limits of what we can know).
- Metaphysical vagueness on the other hand just seems unintelligible. What could it even mean for the existence of an object (a mereological sum) to be vague? That it kind of exists? That it partially exists? It is not clear that partial existence is even an intelligible notion.

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The Universalist Response

- So why, according to the proponents of **Mereological Universalism** do moderate views have a problem with vagueness?
- Well, think of the **Contact** view: According to this view, composition occurs whenever material objects (simple or complex) are in *contact*.
- But exactly when two objects are in fact in contact is *clearly* vague. So, the moderate **Contact** view predicts that it is genuinely vague when composition occurs.
- Hence, according to moderate views, there is metaphysical vagueness. Or, in other words, for certain objects, it is vague whether they exist.
- But as argued above, it is not clear that this is an intelligible position.

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Outline

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A Need for Therapy?

- At this point, you might have started to become sympathetic to Wittgenstein's infamous claim that the best way to settle a philosophical problem is through therapy.
- Not only Wittgenstein, but a rather broad movement in analytic philosophy maintained a very skeptical attitude to the field of metaphysics quite generally.
- This movement was known as **Logical Positivism** and one of the most prominent proponents of **Logical Positivism** was Rudolph Carnap.

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Carnap's Critique of Metaphysics

- Carnap's main criticism of metaphysics was that the language used by metaphysicians is either hopelessly vague, undefined, or non-sensical.
- One example is the notion 'essence' which is often used by metaphysicians. A clear meaning, Carnap complains, is never supplied for this term and hence it is unclear that exactly essences are supposed to be.
- Carnap had a very specific conception of meaning. In particular, according to Carnap, the questions in (11) and (12) are just reformulations of the question in (10). In the questions below, S is an arbitrary sentence:

  (10) What is the meaning of S?
  (11) Under what conditions is S supposed to be true and under what conditions false?
  (12) How is S to be verified?

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Carnap's Critique of Metaphysics

- Carnap endorsed what is known as a **Verificationist Theory of Meaning**.
- According to this theory, the meaning of any sentence *S* is given by its *verification* conditions — or the *means* by which it is verified.
- From this conception of meaning, it follows that if a sentence simply *has no* verification conditions, then it does not have a meaning. A sentence that cannot be verified or falsified is thus meaningless.
- Carnap assumes that there are essentially two fundamental methods of verification:
  - SYNTHETIC: This is verification by empirical means, e.g. by observation or sense experience.
  - ANALYTIC: This is verification using logical (or mathematical) reasoning, namely proofs.
- In other words, if a claim cannot be proven using logic or established using empirical methods, then it is unverifiable and hence *meaningless*.

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Carnap's Critique of Metaphysics (cont.)

- So, the problem, according to Carnap, with using words such as 'essence' or perhaps 'fundamental' is that these words have no precise definition. Since they have no precise definition, it is not clear how any sentence containing any of these words could be verified. As a result, such sentences are meaningless and pointless.
- Another example of problematic language use, according to Carnap, is when metaphysicians distort the syntax of the language in ways that are non-sensical.
- For example, in famous essay on the nature of metaphysics, Martin Heidegger argues that only by contemplating *nothingness* can nature really be understood. He concludes in that essay that "The nothing nothings" ('Das Nichts selbst nichtet').
- Carnap makes a point out of demonstrating that this kind of sentence is simply grammatically ill-formed: 'nothing' is a noun phrase (or quantifier phrase) and hence not a word that can be used as a verb. So, when it is used as a verb, the result (if not carefully explained) is simply gibberish. Given this, it follows that the sentence as a whole cannot have clear verification conditions and for this reason it is meaningless.

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Carnap's Critique of Metaphysics (cont.)

- But what about less exotic metaphysical claims. Claims such as (13)–(15)

  (13) Are there material objects?
  (14) Are there universals?
  (15) Are there numbers?

- Carnap thought that there are problems with these sentences even if the metaphysician has taken good care to define what is meant by key terms such as 'material object', 'universal', and 'number'.
- To understand Carnap's general objection here, we have to start with his notion of **framework**

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Carnap's Critique of Metaphysics (cont.)

- According to Carnap, meaningful questions can only be asked from within a **framework**.
- A **framework**, Carnap argues, is essentially a grammar and a semantics:
  1. A list of expressions (a lexicon) for the relevant language and a list of syntactic rules, viz. rules for the formation of sentences in the language.
  2. Rules that permit one to derive the truth conditions of any sentence generated by the grammar.
- The syntactic rules ensures that a sentence such as (16) is deemed wellformed, whereas (17) is not.

  (16) A cat is on a mat.
  (17) A on is mat cat a.

- The second rule ensures that we can clearly state what the truth conditions of wellformed sentences such as (16), viz.

  (16′) 'A cat is on a mat' is true iff $\exists x \exists y \big(\text{cat}(x) \wedge \text{mat}(y) \wedge \text{is-on}(y,x)\big)$

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Carnap's Critique of Metaphysics (cont.)

- Of course, since the truth of a sentence depends on whether it can be verified, ultimately what matters is its verification conditions.
- Since (16) is a clearly empirical claim, the proper method of verification will be observation.
- So, Carnap has to introduce additional semantic rules that states the kinds of observation that is required in order to verify the sentence.
- In the case of (16), the needed observation is one which satisfies (16').

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Carnap's Critique of Metaphysics (cont.)

- With this notion of a **framework** in the background, Carnap distinguishes between **internal** and **external** questions and statements.
  - **Internal questions** are questions stated from within a specific framework and whose answer is evaluated within that framework.
  - **Internal statements** are statements made from within a specific framework.
  - **External questions** and **external statements** are interpreted from outside of any specific framework.
- **Internal questions** and **internal statements** are meaningful because they are made within a framework where there are rules determining both which statements are wellformed, but also what the verification conditions of those statements are.
- By contrast, since **external questions** and **external statements** are not made in the context of rules governing what counts as a meaningful sentence nor a specification of how to determine verification conditions, such statements are simply meaningless.

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Carnap's Critique of Metaphysics (cont.)

- So, what is the problem with the kinds of questions that metaphysicians ask, e.g.

  (13) Are there material objects?
  (14) Are there universals?
  (15) Are there numbers?

- The problem is that these questions are only meaningful if they are internal questions. But if these really are questions raised *within* a specific framework, their answer is always going to be trivial.
- Consider (13): If we evaluate this question from within a framework where it is presupposed that there are material objects (for example, if the frame work contains any term referring to a material object), then the asnwer to the question will be trivially 'yes'. If it does not contain any such terms, the answer will be trivially 'no'.
- By contrast, if (13) is asked from outside a framework, then it will simply be meaningless, because there will be no rules that determine what counts as a wellformed question and no rules determining its verification conditions.

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Carnap's Critique of Metaphysics (cont.)

- Of course, taking a step back, one might wonder what Carnap would say about questions such as (18)

  (13) Would it be a good idea to adopt a framework where there are material objects?

- This might seem like a perfectly sensible question to ask. But since this is, by definition, an external question, namely a question about what framework to adopt, Carnap simply thinks that it is meaningless.
- In general, as concerns ontological statements, Carnap expresses his attitude as follows:

  > *An alleged statement of the reality of [a] system of entities is a pseudo-statement without cognitive content. To be sure, we have to face at this point an important question, but it is a practical, not a theoretical question; it is a question of whether or not to accept the new linguistic forms. The acceptance cannot be judged as being either true or false because it is not an assertion. It can only be judged as being more or less expedient, fruitful, conducive to the aim for which the language is intended.*
  >
  > *(Carnap 1950, p. 214)*

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Responses to Carnap's Critique

- There are three standard responses that have been given to Carnap's position.
  - **Does a lack of verification conditions really entail lack of meaning?**
    This is far from obvious. If Carnap is correct, then the status of an ontological question such as (13) is the same as an ungrammatical question such as (20).

    (13) Are there material objects?
    (20) Are material there objects?
  - But, intuitively at least, even if (13) is problematic for some reason, the problem seems to be very different than the problem with (20).

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Responses to Carnap's Critique (cont.)

- Moreover, one the consequences of Carnap's view is that a extremely wide range of questions would be considered *meaningless* simply because they cannot be verified either logically or empirically. This includes qusetions such as (21)–(24)

  (21) Is murdering the innocent wrong?
  (22) Is the Mona Lisa beautiful?
  (23) Does God exist?
  (24) Is there life after death?

- One might think that there are no answers (or perhaps no *good* answers) to these questions, but they are hardly meaningless.

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Responses to Carnap's Critique (cont.)

- The second argument against Carnap's view is that it is self-undermining.
- To illustrate, when Carnap proclaims...

  > *An alleged statement of the reality of a system of entities is a pseudo-statement without cognitive content*
  >
  > *And ...*
  >
  > *The meaning of a statement lies in the method of its verification.*

- Then given Carnap's own view, these statements would have to be verifiable by either logical proof or empirical observation.
- But it is very difficult to understand how either of those statements could be so verified.
- The analog of this objection is the paradox that arises from subscribing to the claim that 'everything is relative'.

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Responses to Carnap's Critique (cont.)

- The third and final objection comes from Quine.
- According to Carnap, there are two methods of verification, logical (analytic) or empirical (synthetic). If a statement cannot be verified by any of these means, it is meaningless.
- One of Quine's main contentions that there is no way to draw a sharp distinction between analytic and synthetic truths.
- Quine has a so-called **coherentist** conception of belief: No belief is justified solely on the basis of empirical observation or logic alone. Rather any belief must be supported by a variety of other beliefs. This holds for both analytic and synthetic beliefs.

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Responses to Carnap's Critique (cont.)

- Consider your belief that the bell is ringing. This is the kind of belief that is verified directly by observation.
- However, even when faced with what appears to be clear empirical evidence, this belief can be overriden by other factors.
- For example, you may not be able to rule out that you are under the influence of hallucinating drug, that you are in the matrix, that it was not a sound from the computer rather than the bell, etc.
- This means that confirmation of this belief does not rely solely on the relevant empirical evidence pertaining to the bell, but rather on a host of other beliefs you may or may not have.
- The same is true for analytic beliefs. Your belief that $(p \vee \neg p)$ again relies on various axioms of the background logic. If any of these axioms are revised or discarded, then your belief could be false.

Responses to Carnap's Critique (cont.)

- So, Quine's general point here is that simply because a statement cannot be verified by analytic (logic) or synthetic (empirical) means, this does not entail that the statement is meaningless.
- In fact, according to Quine, very few things can be verified solely by analytic or synthetic means.
- So, while Quine agrees that ontological questions such as 'Are there material objects?' are external questions, Quine simply thinks that many scientific questions are also external questions.
- When we are asking scientific questions, we are, according to Quine, also effectively making a practical choice about what overall system of beliefs we want to adopt. So, if ontological questions are meaningless because they are unverifiable by analytic or synthetic means alone, then so is all of science.

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Next Week....

Time...

Metaphysics

Lecture 4: Time

Dr. Anders J. Schoubye

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Outline

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Past, Present, and Future

- With respect to the concept of time, we normally distinguish between three different things: **The past**, **the present**, and **the future**.
- Intuitively, the things or events that are in **the past** are not real anymore, but they *were* real. Various events in **the past** have shaped **the present** and if these events *were not* real in some sense, that would be hard to explain.
- The things or events that are **present** are, intuitively, just the things that are currently the case (the case right **now**). They will soon be in the past, and hence not real anymore, but they were real when they were **present**. Both the past and present are intuitively fixed.
- What happened in the past and what is happening right now is not undecided or an open question (even if it may be *unknown*). For example, suppose that Aristotle flipped a coin on his 15th birthday. If so, the coin either came up heads or tails. We may never know which one it was, but it was one or the other.
- By contrast, the future is generally assumed to be open: It is not determinate or decided how the future will unfold. This assumption about the future is typically referred to as the **openness of the future**.

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The Argument Against the Ordinary View from Special Relativity

- Ordinarily, it is also assumed that time's passing is **objective** and **absolute**. Time's passing is independent of human minds or human perspectives. Time is not within anyone's control.
- However, there is a strong and convincing argument against this ordinary view of time's passing and the objectivity of time.
- This argument is due to Hilary Putnam and is called the **Argument Against the Ordinary View from Special Relativity**.

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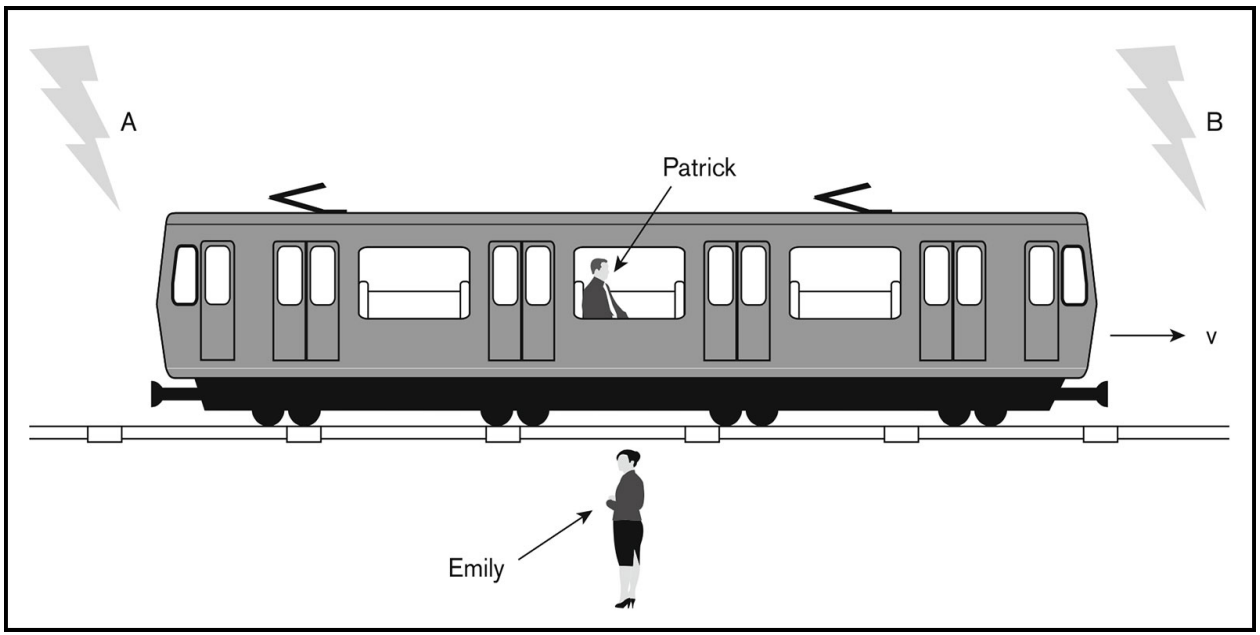
The Argument Against the Ordinary View from Special Relativity (cont.)

A train is passing through a station at constant velocity v. Patrick is a passenger on the train. Emily is standing on the embankment watching Patrick's train pass by. While Patrick's train is passing through the station, two strikes of lightning occur. Both strikes are visible to both Patrick and Emily. Lightning strike **A** occurs in the distance back from where Patrick's train came. Strike **B** occurs in the distance ahead, in the direction where Patrick's train is heading. The strikes occur at an equal spatial distance from Emily's location.



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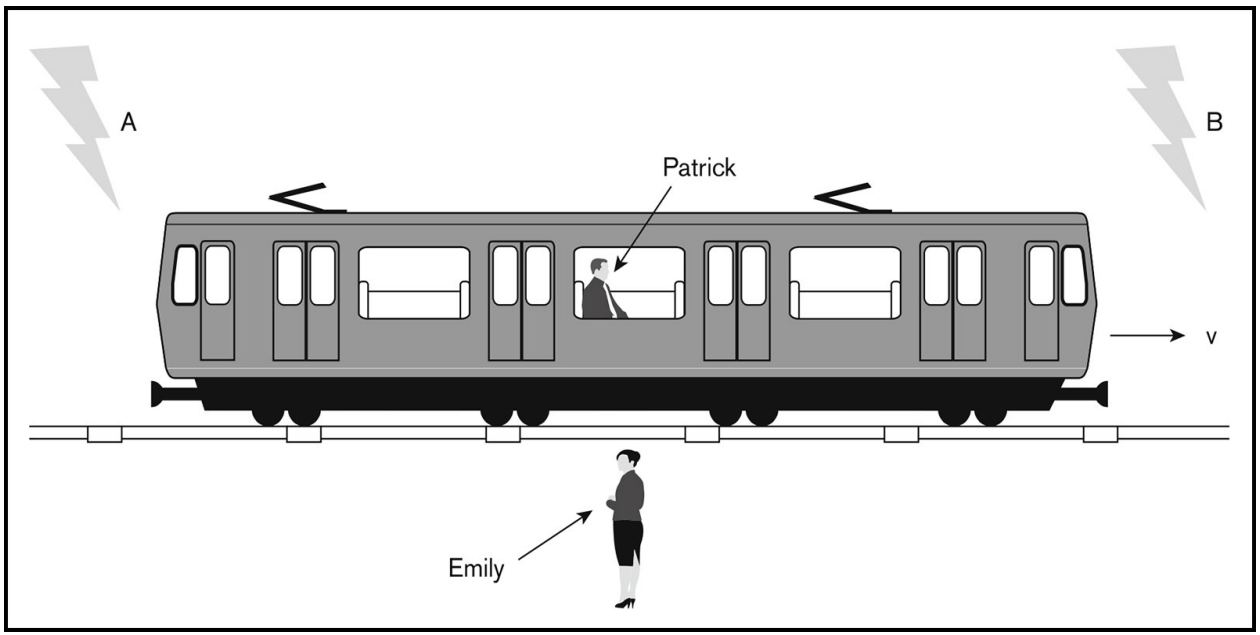
The Argument Against the Ordinary View from Special Relativity (cont.)

Suppose Emily sees the strikes at the same time. Then assuming that light always moves at a constant speed, she can infer that strike **A** is simultaneous with strike **B**. The strikes are at equal distances away from her, so if light from each of them travels at the same constant speed and she sees the two flashes at the same time, she will reason that they occurred at the same time, that they were simultaneous. Here is a question Einstein considers: Will Patrick, the passenger on the train, agree with Emily that **A** occurred at the same time as **B**, that **A** and **B** are simultaneous events?



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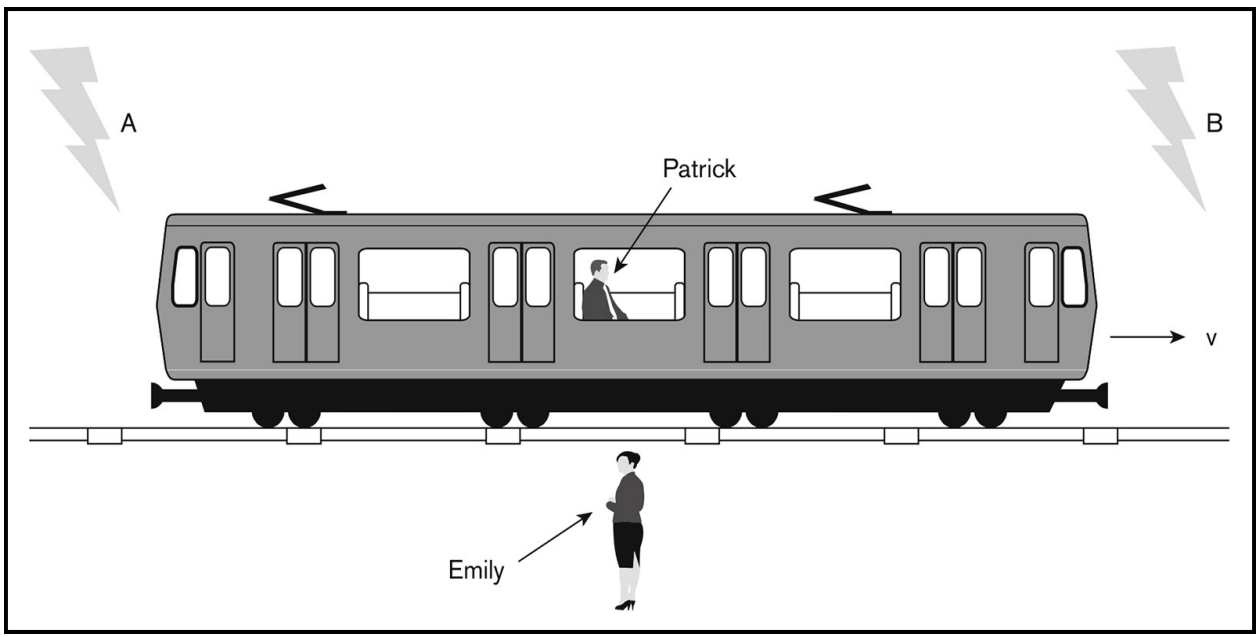
The Argument Against the Ordinary View from Special Relativity (cont.)

- According to Einstein, Patrick will say that the strikes did not occur at the same time.
- Why? Since Patrick is moving (at velocity v) towards **B** and away from **A**, it will seem to him as if **B** happened before **A**.
- So, Unlike Emily, Patrick will conclude that **A** and **B** are not simultaneous.



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The Argument Against the Ordinary View from Special Relativity (cont.)

- **So, who is right**?
- Natural answer is to say that Emily is right, since she is the one at rest and Patrick is the one moving.
- But, as was established in physics even before Einstein's Theory of Relativity, **there is no such thing as absolute rest**.
- Put another way, from Patrick's perspective, *he* is the one at rest and Emily is simply traveling at velocity *-v*.
- In other words, there appears to be no objective fact about who is at rest. As a result, there can be no objective fact about who is right. There are only **relative** facts about **simultaneity**.

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The Argument Against the Ordinary View from Special Relativity (cont.)

- **How does this relate to the passage of time?**
- Well, if facts about simultaneity are relative, then facts about which events are *present* and which events are *past* must also be relative.
- For example, for Emily, at the moment where she sees **A** and **B**, it is fact for Emily that **A** and **B** are present.
- However, for Patrick, it is a fact that at the moment when he sees **A**, **B** is already in the past.
- The level disagreement between the two protagonists will depend on the divergence in velocity between them. If, for example, Patrick is traveling at a speed near the speed of light, the difference in observations will be much more dramatic.

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Presentism and the Growing Block Theory

- There are four important views about the ontology of time that we will consider here, but only two of these are consistent with the openness of the future.
- These two views are **Presentism** and **The Growing Block Theory**. They both agree that future objects/events are not real, because they have not yet happened. They also agree that present objects and events are real. They only disagree with respect to the past where **Presentism** assumes that the past is not real, **The Growing Block Theory** assumes that it is.

Ontologies of Time: Which Objects and Events Exist

	PAST OBJECTS/EVENTS?	PRESENT OBJECTS/EVENTS?	FUTURE OBJECTS/EVENTS
Eternalism	✓	✓	✓
Presentism	×	✓	×
Growing Block Theory	✓	✓	×
Shrinking Block Theory	×	✓	✓

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The Shrinking Block Theory

- **The Shrinking Block Theory** is the view that present and future objects/events are real, but that past objects/events are not.
- The motivation for this view is slightly less intuitive. Roughly the idea is that as time passes, the number of things that are real decreases.
- What is happening now and in the future are real, but once they have happened, they then seize to be real and drop into oblivion.
- It should be noted that this is a fairly rarely held view.

Ontologies of Time: Which Objects and Events Exist

	PAST OBJECTS/EVENTS?	PRESENT OBJECTS/EVENTS?	FUTURE OBJECTS/EVENTS
Eternalism	✓	✓	✓
Presentism	×	✓	×
Growing Block Theory	✓	✓	×
Shrinking Block Theory	×	✓	✓

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Eternalism

- **Eternalism** is the view that all objects, *past*, *present*, and *future*, are real.
- According to Eternalism, times are like locations. So, just like the Eiffel Tower is not located where you are right now, that does make it any less real. Similarly, just because the past and future are not located, temporally, where we are now, this does not make it any less real.

Ontologies of Time: Which Objects and Events Exist

	PAST OBJECTS/EVENTS?	PRESENT OBJECTS/EVENTS?	FUTURE OBJECTS/EVENTS
Eternalism	✓	✓	✓
Presentism	×	✓	×
Growing Block Theory	✓	✓	×
Shrinking Block Theory	×	✓	✓

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The Argument for Eternalism from Special Relativity

- There is one prominent argument in favor of **Eternalism**:

P1. If either **Presentism** (Pr), **The Growing Block Theory** (GBT), or **The Shrinking Block Theory** (SBT) are correct, then which objects/events are real depends on which are *past*, *present*, and *future*.
P2. Which objects/events are *past*, *present*, or *future* depends on facts about simultaneity (namely which events are simultaneous with *here* and *now*).
P3. If the **Theory of Special Relativity** is true, then simultaneity depends on perspectives.
P4. The **Theory of Special Relativity** is true.
P5. Hence, which events are simultaneous (with *here* and *now*) depends on one's perspective.
P6. So, which objects are *past*, *present*, and *future* is a matter of **perspective**.
P7. Consequently, if either **Pr**, **GBT**, **SBT** are correct, then which objects/events are real is a matter of perspective.
P8. But what is real is not a matter of one's perspective (because what is **real** is an objective matter).

∴ Neither **Pr**, **GBT**, or **SBT** are true.

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The Argument for Eternalism from Special Relativity (cont.)

- One might be tempted to deny Premise 8, viz. that what is real is not matter of perspective (indeed, many people, in e.g. sociology, have).
- Perhaps, one could argue that what is real is ultimately subjective. But this leads to a rather radical form of truth relativism — one that is intuitively highly implausible.
- Since **Eternalism** is the only view that avoids making existence subjective, **Eternalism** is also thought to be the only ontology of time that is implied by Einstein's **Theory of Special Relativity** (which most physicists take to be true).

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Time and Space vs. Space-Time

- One the main lessons of Einstein's **Theory of Special Relativity** is that reality does not consist of objects spread out in three-dimensional space that persists through time.
- Rather, reality should be conceived of as a four-dimensional manifold of **space-time** (also called **Minkowski space-time**).
- Some features of **Minkowski space-time**:
  - Space-time is 4-dimensional, so to specify a location in space-time, one has to provide *four* coordinate numbers: (x,y,z,t).
  - There is no preferred or objective partition of this manifold into slices of time. So, different observers moving at different speeds will each slice space-time up into different but equally correct slices of spaces and times.
  - There are objective facts about distances between space-time points, i.e. distances between locations in space-time. But there are no objective facts about spatial distances or temporal durations as these are always relative to observers.

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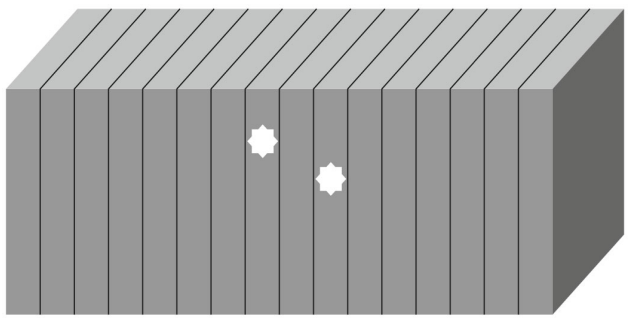
Time and Space vs. Space-Time (cont.)

- So, for example, with respect to the two lightning strikes discussed earlier, each strike takes place at distinct locations in space-time and there is a objective fact about the distance between these strikes (also called the **space-time interval**).

- However, since there is no preferred way of slicing this block up into spaces and times, there objective facts about which happens first — this is *observer relative*.
- For there to be objective facts about which event occurs first, one would have to assume some privileged way of carving up space-time, e.g.



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Time and Space vs. Space-Time (cont.)

- But what **the Theory of Special Relativity** tells us is that there are no such privileged ways of carving up space-time — these kinds of ways of slicing up space-time are simply not part of the objective structure of the world.

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Outline

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Tensed and Tenseless Interprations of 'Exist'

- According to the **Eternalist**, future events are as real as present and past events.
- So, the future is already set in the sense that there is a fact about what happens in the future.
- However, to spell out this view, it is helpful to distinguish between **tenseless** (or **eternal** senses of 'is' and 'exists' and **tensed** senses of 'is' and 'exists'.

  (1) Unlike Harry Potter, Aristotle exists (i.e. Aristotle is a real individual just like Barack Obama).
  (2) Aristotle existed, but he does not exist.

- According to the **Eternalist**, both of these sentences are true. Yet, the sentences appear to be contradictory.
- The explanation is that we must distinguish between two senses (meanings) of 'exist'.

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Tensed and Tenseless Interprations of 'Exist' (cont.)

(1) Unlike Harry Potter, Aristotle exists (i.e. Aristotle is a real individual just like Barack Obama).
(2) Aristotle existed, but he does not exist.

- The sense of 'exist' in (1) is a tenseless (eternal) sense. Something exist in a tenseless sense as long as it existed at some time or other.
- By contrast, the sense of 'exist' in (2) is tensed, so there 'exists' really means 'exists *now*'.
- Since the **Eternalist** believes there are objects that exist in the timeless sense that nevertheless do not exist *now*, she can endorse both (1) and (2) without contradiction.
- By contrast, the **Presentist** who holds that existence is limited to what exists *now* maintains that only (2) is true. For the **Presentist**, 'exists' is equivalent to 'exists *now*'.

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Tensed and Tenseless Interprations of 'Exist' (cont.)

- In other words, the **Eternalist** assumes that there is **existence** in the tenseless eternal sense. This is just what plainly exists in the whole 4-dimensional block.
- But there are also facts about what exists in the block at certain points, facts about what exists *now* and *prior to now* and *later than now*.
- However, the latter facts (given that the **Theory of Special Relativity** is true) are **subjective** facts — facts that are relative to one's motion.
- By contrast, the former facts, eternal facts about what exists in the whole 4-dimensional block, are **objective** facts — and as far as the ontology of space and time is concerned, the latter is what matters.

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The Relation Between Tensed and Tenseless Facts

- One question that divides proponents of **Eternalism** is whether tensed facts (i.e. subjective facts about the past, present, and future) are reducible to facts of the fundamental tenseless kind.
- To understand this disagreement, we first have to understand the difference between two conceptions of the *series of time*.

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A-Series and B-Series

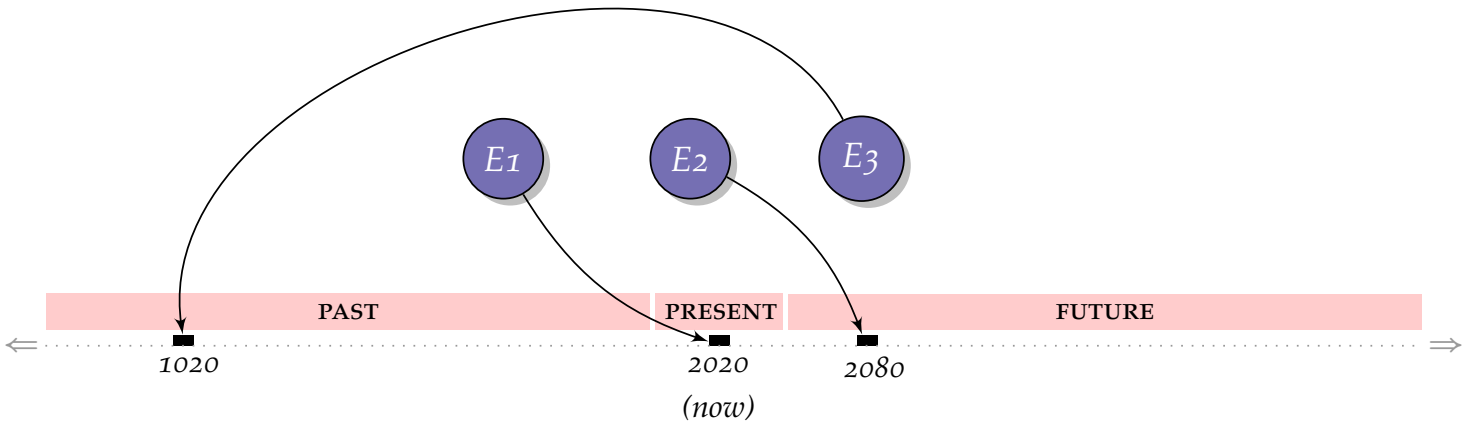
- J.M.E. McTaggart distinguished between the **A-series** of time and the **B-series** of time.
- The **A-series** orders events in terms of their being *past*, *present* or *future* (their tensed **A-features**).
- You can think of the **A-series** as a long timeline along which events are placed. The events **farthest in the past** are all the way at one end, the events **farthest in the future** are all the way in the other end.
- (You may assume that the timeline is infinite, if you also assume that time is infinite).

The A-Series

- Consider the event-describing sentences below.

  (3) It is raining in Stockholm (now). (E1)
  (4) It will rain in Stockholm in sixty years (from now). (E2)
  (5) It rained in Stockholm one thousand years ago (from now). (E3)

- These can then be plotted into an **A-series** as follows:



- Event locations change in the **A-series** as time passes.

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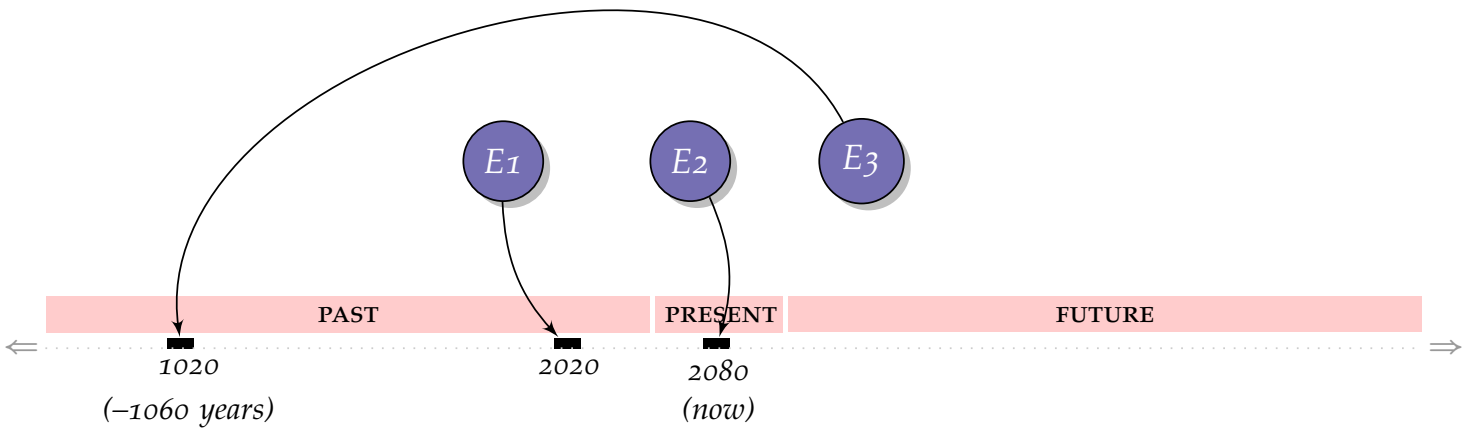
The A-Series

- As time progresses, the events described by the sentences (asserted in 2020) will change places in the timeline. Future events will become present events, present events will become past events, and past events will move farther into the past.

  (3) It is raining in Stockholm (now). (E1)
  (4) It will rain in Stockholm in sixty years (from now). (E2)
  (5) It rained in Stockholm one thousand years ago (from now). (E3)



- In other words, as time progresses, events will move down the **A-series**. We will refer to the facts that attribute locations to events **A-facts**.

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The B-Series

- According to the **B-series** conception of time, events are ordered not relative to *past*, *present*, and *future*, but simply their date and time.
- Since the **B-series** does not make any reference to *past*, *present*, or *future* events and no events change position in the **B-series**.
- For example, the event described by the sentence in (3) is just **the event of rain in Stockholm in 2020**...

  (3) It is raining in Stockholm. (E1)

- ... and this has a fixed position in the **B-series** timeline.
- So, while **A-facts** change, **B-facts** do not.
- For example, it may be an **A-fact** for some event E that E is *present*, but as time progresses that will no longer be a fact about E.
- There are no corresponding **B-facts**. A **B-fact** about E would, for example, be that E occurs in 2020. But that remains a fact regardless of the progression of time.

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A-Facts and B-Facts

- Almost all metaphysicians agree that there are both **A-facts** and **B-facts**.
- The main point of disagremment is over which of these facts are more fundamental.

The B-Theory

- Proponents of the **B-Theory** maintain that all **A-facts** are ultimately grounded, i.e. can be explained, in terms of **B-facts**.
- In other words, all *tensed* facts **are reducible to** *tenseless* facts.
- So, for example, the fact expressed by (3) is grounded in the fact expressed by (6).

  (3) It is raining in Stockholm (now).
  (6) It is raining in Stockholm on 25 March, 2020.

- So, while (3) appears to express a fact that changes (from *present* to *past*), it really just expresses a tenseless fact that is fixed.

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The A-Theory

- The opposing view, the **A-theory**, is really just the negation of the main claim of the **B-theory**, viz. that all **A-facts** are reducible to **B-facts**.
- There is one very simple argument for the **A-Theory**: Since **A-facts** change over time and **B-facts** do not, **A-facts** simply *cannot* be reduced to **B-facts**.
- In order to accommodate the genuine objective sense in which time *passes*, **A-facts** are needed.
- So, there must exist **A-facts** in order to explain the passing of time.

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McTaggart's View

- According to one prominent proponent of the **A-theory**, **A-facts** are **more** fundamental than **B-facts**.
- The reason is that without **A-facts**, i.e. facts about which events are *past*, *present*, and *future*, there is simply no such thing as **time**.
- The concept of time, according to McTaggart, essentially involves the concept of **change**: For time to be real, some things must change.
- But, if all there is to time is **B-facts**, viz. facts about the absolute and relative locations of events in the **B-series**, then there is no change.
- McTaggart points out that for any event, in a **B-series**, it was always the case that the event was so. For example, if Barack Obama was to die before Donald Trump, it was always a fact that Barack Obama's death occurred before Donald Trump's death.
- Relatedly, assuming a **B-series** conception of time, (7) and (8) just express two tenseless facts, but one might think that to understand **time**, we need an explanation of the fact that when (7) seizes to be *present*, it necessitates that (8) instead becomes present.

  (7) Donald Trump is alive.
  (8) Donald Trump is dead.

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Objects and Change

- However, the proponent of the **B-theory** may have a response: The **B-theorist** may claim that change is not only reflected in terms of events, it is also reflected in terms of the properties that objects have.
- Moreover, there is nothing in the **B-theory** that prohibits proponents of the view from assuming that objects can change.
- I.e. at one (space-time) point, an object may have one property (e.g. being alive) and another (space-time) point, it may have a different property (e.g. being dead).
- But, if all there is to time is **B-facts**, viz. facts about the absolute and relative locations of events in the **B-series**, then there is no change.
- In this way, the proponent of the **B-theory** can respond to the claim that the **B-theory** of time is a **static** theory where one cannot account for *change*.

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Objects and Changes (cont.)

- The question is whether this explanation of change is really sufficient.
- Proponents of the **A-Theory** tend to think it is not. Their claim is that this does not reflect genuine change, as in e.g. events going from *future* to *present* or *present* to *past*.
- Simply allowing in your theory that an object *o* may have a property at one (space-time) point and not have that property at another (space-time) point, doesn't seem to fully capture the unfolding of time. This is the standard response from proponents of the **A-theory**.

Objects and Changes (cont.)

- It should be obvious that if you are an **Eternalist** about time, then the **B-theory** is perhaps the most natural theory to adopt. This combination is standardly called the **Block Universe View**.
- Intuitively, it is harder to imagine how one could accept the **A-theory** of time while also being an **Eternalist** (since the **A-theory** seems to assume a privileged perspective and this is inconsistent with the **Theory of Special Relativity**.
- However, there may be a way of endorsing the **A-theory** while at the same time being an **Eternalist**. This is called **the Moving Spotlight View**.

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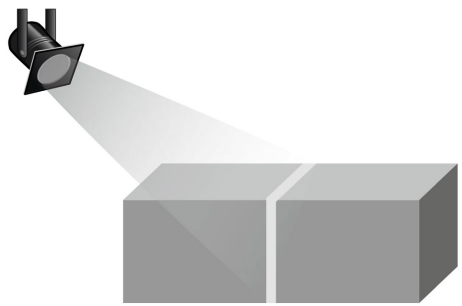
The Moving Spotlight View

- On **the Moving Spotlight View**, the Minkowski space-time block is supplemented with an additional set of facts about what exists *now*.



- The metaphor often used is that of a spotlight that lights up a different location in the in space-time block corresponding to what is happening *now*.
- But, insofar as this view assumes an *objective* passage of time, it has trouble with the argument from **The Special Theory Relativity** discussed previously.
- However, this view is also often argued to be incoherent.

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The Moving Spotlight View

- The view is supposed to be **Eternalist**, so both the *past*, *present*, and *future* exists.
- However, the view is supposed to make room for **objective** passage of time in that events and objects instantiate actual **A-properties** (of being *past*, *present*, or *future*. For example, **present events** are happening *now* — they are in the spotlight).
- But this, of course, is just a metaphor. It is not like time involves an actual spotlight. So, what is the distinguishing feature of *present* events? It cannot be that they are anymore real than events in the *past* or *future*.
- There does not appear to be a good answer to this question that does not result in a contradiction.

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Taking Stock

- So, in conclusion, there are generally speaking two combinations of views that are generally considered coherent and acceptable.
  - **Presentism + the A-Theory**:
    Only present events exist and there are irreducible **A-facts**, viz. facts about which events are *past*, *present*, and *future*.
    Advantage: Corresponds well with our pretheoretical intuitions about time.
    Disadvantage: Appears to be inconsistent with the **Theory of Special Relativity**.
  - **Eternalism + the B-Theory**:
    Past, *present*, and *future* events always exist and all supposed **A-facts** are grounded in tenseless **B-facts**.
    Advantage: Is easier to reconcile with the **Theory of Special Relativity**.
    Disadvantage: Is significantly more counterintuitive.

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Outline

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The Truthmaker Objection

- Another objection to the combination of **Presentism** and **The A-Theory** of time comes from **Truthmaker Theory**.
- According to **Truthmaker Theory**, all truths have truthmakers, i.e. some thing that makes them true.
- In other words, the truth of any proposition cannot just be a brute fact or free flowing from reality. There must be something in reality that makes them true.
- It is generally assumed that truthmakers must have certain *categorical* features that stand in the right relations to make the proposition in question true.
- For example, for (3) to be true, there has to be something (real) that makes it true, e.g. that three pandas exist that reside in the San Diego Zoo.

  (9) There are three pandas in the San Diego Zoo.

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Interlude: Categorical vs. Non-Categorical Features

- **Categorical features** are features that do not concern how the object is relative to other objects or in other possible situations or at other times.
- **Categorical features** are features that capture something, for a lack of a better word, *essential*, about the object.
- For example, it is a categorial feature of a tennisball that it is *spherical* and *made of rubber*.
- By contrast, it is not a categorical feature of a tennis ball that it is *yellow*, *made by Slazinger*, *can bounce* or *was used in the Australian Open*.

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The Truthmaker Objection (cont.)

- The problem for the **Presentist** is that there does not appear to be any relevant truthmakers for various statements that seem clearly true, e.g. (10)–(11)

  (10) Dinosaurs once roamed the earth.
  (11) The 2024 Olympics will be held in Paris.

- To see the problem, let's consider how the **B-theorist** would account for the truth of these sentences.
- First, according to the **B-theorist**, (11) and (12) express tenseless propositions. Formally, we can regiment their analysis as follows:

  (10_B) $\exists t\big(t < 25\text{ March, }2020 \wedge \text{Dinosaurs roamed the earth at } t\big)$
  (11_B) $\exists t\big(t = 2024 \wedge \text{the Olympics will be held in Paris at } t\big)\big)$

- In other words, it seems that for the **B-theorist**, the truth of these sentences involves a commitment to the existence of *past* and *future* times.

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The Truthmaker Objection (cont.)

- This analysis of (10) and (11) is obviously not feasible for the **A-theorist** since it commits them to the existence of *past* and *future* times.

  (10$_B$) $\exists t\big(t < 25$ March, 2020 $\wedge$ Dinosaurs roamed the earth at $t\big)$
  (11$_B$) $\exists t\big(t > 25$ March, 2020 $\wedge \big(t = 2024 \wedge$ the Olympics will be held in Paris at $t\big)\big)$

- So, the **A-theorist** prefers a different method for regimenting these sentences. This involves using so-called **tense logic**.
- In tense logic, rather than quantify over times, one introduces a set of so-called **operators**, namely **P** (Past) and **F** (Future).
- The formalization of (10) and (11) is thus:

  (10$_A$) **P**(Dinosaurs once roamed the earth)
  (11$_A$) **F**(The 2024 Olympics will be held in Paris)

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The Truthmaker Objection (cont.)

- There is nothing in principle that precludes **B-theorists** from using tense logic. They would simply have to assume that the operators of tense logic, (**P** and **F**), can ultimately be reanalyzed in terms of quantifiers over time.

  (10$_A$) **P**(Dinosaurs once roamed the earth)
  (11$_A$) **F**(The 2024 Olympics will be held in Paris)

- However, the **A-theorist** maintains that this is the right analysis of the sentences in (10) and (11) but that this analysis is **not reducible** to quantification over past and future times.

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The Truthmaker Objection (cont.)

- The problem for the **Presentist** is that if the formulas below are the right formalizations of (10) and (11), but these are not reducible to quantification over times...

  ($10_{\mathbf{A}}$) $\mathbf{P}$(Dinosaurs once roamed the earth)
  ($11_{\mathbf{A}}$) $\mathbf{F}$(The 2024 Olympics will be held in Paris)

  ... then in virtue of what are these sentences true?

- In other words, what then are the truthmakers for ($10_{\mathbf{A}}$) and ($11_{\mathbf{A}}$)?
- According to many metaphysicians, there is simply no good answer to this question.

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The Truthmaker Objection (cont.)

- Let's state the argument underlying the truthmaker objection in a more conspicuous form:

P1 All truths have truthmakers.
P2 So, if any sentence about the past or future are true, their truth will require the existence of past and future objects or events.
P3 Some sentences about the past or future are true.
P4 So, there must exist some past and future objects or events.
P5 If **Presentism** is true, no past or future objects or events exist.

∴ **Presentism** is not true.

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Responding to The Truthmaker Objection

- How can the proponent of **Presentism** respond to this argument?
- **Reject Premise 1**?

  P1 All truths have truthmakers.

- One argument one could give against the truthmaker assumption is that there appears to be many sentences for which it is unclear that there are any truthmakers.
- (13), for example, seems true, but distinctly lacks a truthmaker.

  (13) Unicorns do not exist.

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Responding to The Truthmaker Objection (cont.)

- Also, consider (14)

  (14) Harry Potter is a wizard.

- This sentence seems true, but the explanation is not, intuitively at least, that it has a truthmaker in the form of a real existing individual (Harry Potter) who has the property of being a wizard.
- Rather, this sentence seems true, because of a certain fiction (viz. the Harry Potter novels). So, rather than regimenting (14) as (15), many have argued it should be regimented as in (16)

  (15) *Wh*
  (16) $\mathbf{F}_{\text{HP}}(Wh)$

- Here, '$\mathbf{F}_{\text{HP}}$' is a (harry-potter) fiction-operator which takes sentences as arguments and outputs true iff what the sentence says corresponds to the relevant fiction and false otherwise.

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Responding to The Truthmaker Objection (cont.)

- Of course, there will be a wide variety of other fiction-operators, e.g.
  - In the fiction of Star Wars ...
  - In the fiction of Sherlock Holmes ...
  - In the fiction of The Lord of the Rings ...
- Whenever a sentence S is prefixed with a fiction operator, the truth of S depends on what is true in the relevant fiction.
- The proponent of the **A-theory** could then argue that **P** and **F** are just like fiction operators. So, $(10_{\mathbf{A}})$ and $(11_{\mathbf{A}})$ are true just in case in *the fiction of the past*, dinosaurs roams the earth and in *the fiction of the future*, the Olympics are held in Paris in 2024.

$(10_{\mathbf{A}})$ $\mathbf{P}\big($Dinosaurs once roamed the earth$\big)$
$(11_{\mathbf{A}})$ $\mathbf{F}\big($The 2024 Olympics will be held in Paris$\big)$

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Responding to The Truthmaker Objection (cont.)

- A second option: **Reject the move from Premise 1 to Premise 2**?

  P1 All truths have truthmakers.
  P2 So, if any sentence about the past or future are true, their truth will require the existence of past and future objects or events.

- The **Presentist** might argue that (10) and (11) do have truthmakers, it is just that these truthmakers do not consist of past or future objects or events.
- One strategy here is to ground the truth of past and future sentences in present facts.
- For example, the truthmaker for (10) might be argued to be the presently available evidence for dinosaurs (dinosaur bones, testimony from scientist, etc.)
- Similarly, the truth of (11) might be argued to be the current plans, e.g. records of meetings, e-mails and whatnot, to hold the 2024 Olympics in 2024 in Paris.

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Responding to The Truthmaker Objection (cont.)

- Alternatively, the **Presentist** could argue that truthmakers about *past*-tensed and *future*-tensed claims are conditions in the present **that necessitate what will happen in the future or has happened in the past**.
- For example, knowing the full state of the universe, one might think that it is in principle possible to deduce what all *past* and *future* truths are.
- For this to be a viable response, one would have to assume that the laws of nature are **deterministic**, i.e. it cannot be the case that the natural laws leave it open how things will unfold. Assuming that the natural laws have this feature is obviously controversial.
- Another worry with this view is that it confuses **metaphysical issues** with **epistemological issues**.

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Responding to The Truthmaker Objection (cont.)

- Intuitively, we should not equate the ways things are (or *were* or *are going to be*) with what it is possible for us to know about the way things are (or *were* or *are going to be*). The way things are is a mind-independent, metaphysical issue. What we can know about these issues is an epistemological issue.
- Both of these responses on behalf of the **Presentist** seem to be subject to this problem. Consider (9) again.

  (9) There are three pandas in the San Diego Zoo.

- Intuitively, what makes this true? **Answer:** That there are three pandas in the San Diego Zoo.
- Does it matter whether this can be predicted on the basis of the natural laws? Does it matter whether there are any presently existing objects that would be evidence of this?
- Intuitively, it certainly does not seem that way.

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Responding to The Truthmaker Objection (cont.)

- A third option: **Reject Premise 3**?

  P3 Some sentences about the past and future are true.

- A proponent of **Presentism** could also adopt the view that all statements about the *past* and *future* are just straightforwardly false (or perhaps *neither true nor false*). For example, one could argue that the operators **P** and **F** both presuppose the existence of a *past* and a *future* and for this reason, any past tensed or future tensed sentence cannot be true.
- There is, however, immediate problems with respect to this move:
  - First, this seems directly inconsistent with our intuitions about the truth values of sentences about the *past* and *future*.
  - Second, this would entail that we are consistently wrong (and hence making mistakes all the time) when we talk about what happened in the *past* and *future*. What could explain this?

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Metaphysics

Lecture 6: Modality

Dr. Anders J. Schoubye

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Outline

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Possible and Necessary Truths

- Modal statements are statements about what is possible or necessary. In other words, a modal claim does not (necessarily) concern what the world is actually like, but rather what the world *could* be like or *has* to be like.
- Some paradigmatic examples of modal statements.
  - It is **possible** that it is raining.
  - It **might** be raining.
  - It **could** be raining.
  - It is **necessary** that it is raining.
  - It **must** be raining.
  - **Necessarily**, it is raining.

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Possible and Necessary Truths (cont.)

- As mentioned before, modal statements cannot be verified/falsified simply by considering what the world is actually like. Consider, for example, (1).

  (1) The train might arrive on time.

- Must the train arrive on time for (1) to be true? **No**. Even if the train does not arrive on time, (1) may still be true. In other words, what is required for a modal claim to be true appears to be independent of how things **actually** are or unfold.
- This raises the following question: What are the truth conditions of modal claims?
- But before we can answer that question, we need to consider what varieties of modalities there are.

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Flavors of Modality

- Consider (2).

  (2) The students could get an A.

- It seems that a variety of different types of modal claims could be made using this statement. For example, (2) could be used to make a claim about what is **logically possible**, what is **nomologically possible**, and what is **epistemically possible** (to name just a few).
- **Logical Possibility**: Something is a logical possibility as long as it does not entail a contradiction. So, flying saucers, that I am Harry Potter, and that Santa Claus is real, etc. are all logical possibilities. That $(p \wedge \neg p)$ or that 2+2=5 are not.
- **Nomological Possibility**: Something is a nomological possibility iff it is consistent with the natural laws. So, a plane traveling at 100.000km/hour is a nomological possibility, but a plane traveling faster than the speed of light is not.
- **Epistemic Possibility**: Something is an epistemic possibility (for an agent a) iff it is consistent with a's information state. So, as long as something is not ruled out by the agent's evidence, it is an epistemic possibility. For example, it is an epistemic possibility for many kids that Santa Claus is real, but it is not an epistemic possibility for (most) adults.

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Flavors of Modality cont.

- Logical possibility, nomological possibility, and epistemic possibility are some of the broad categories of modality that are often discussed in philosophy. But, in fact, in natural language, one can use modals to make much more specific claims. For example:

  (3) **Given the rules of the university**, the students could get an A.
  (4) **Given what I desire**, the students could get an A.
  (5) **Given what is morally right**, the students could get an A.

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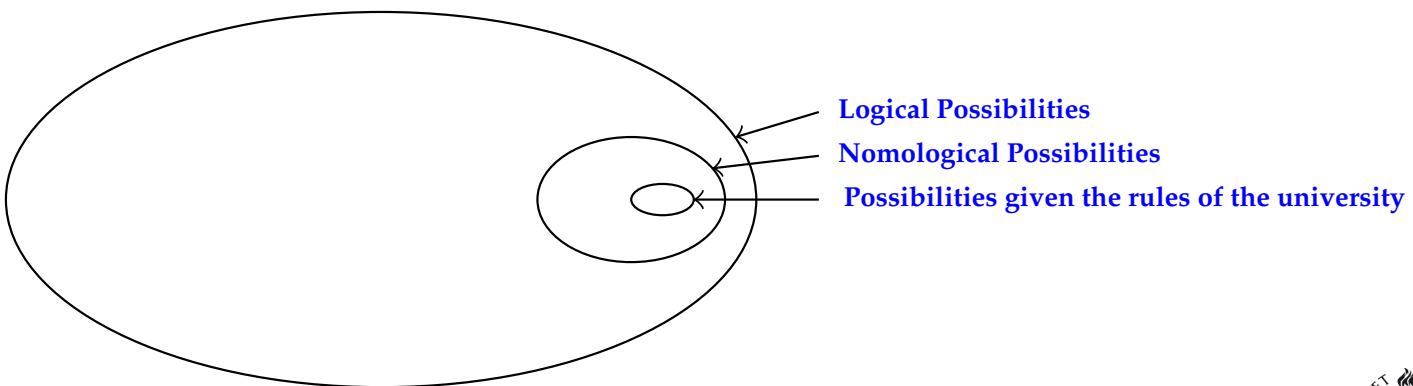
Relations between Modality

- As witnessed above, there is a vast number of different modalities (or, more specifically, ways to restrict modal terms). However, often, these modalities are essentially (proper) subsets of other more general modalities.
- Logical possibility is the least restrictive modal notion.
- And, nomological possibility is arguably a proper subset of the logical possibilities.
- And what is possible given the rules of the university is a proper subset of the nomological possibilities.



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Modal Strength

- Generally speaking, modal terms come in two varieties: possibility modals and necessity modals.
  - **Necessity Modals**:
    Necessarily, *It is necessary that*, *Must*, *Have to*, *Need to*, *It is impossible that*.
  - **Possibility Modals**:
    Possibly, *It is possible that*, *Might*, *May*, *Could*.
- Also, you will sometimes hear people say that a proposition p is **contingent**. What this means is simply that p is neither necessarily true nor necessarily false. I.e. p is possibly true and possibly false.
- So, while the truth of any mathematical or logical statement is (logically) **necessary**, the truth of any observational or empirical statement will be (logically) **contingent**.

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De Re Modality

- Thus far, I have been talking about **necessity** and **possibility** as it relates to states of affairs. However, these notions also apply to other things.
- Consider the following sentences.

  (6) The number 7 **is necessarily prime**.
  (7) Penguins **are essentially birds**.
  (8) Socrates **was necessarily wise**.

- These are claims about specific objects but they concern whether a property instantiated by those objects are **necessary properties**. This is called **de re modality**.
- **De re modality** contrasts **de dicto modality**.
- Here is another way of demonstrating this distinction:

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De Re Modality

- Consider (9).

  (9) The president of the United States must have a degree from Harvard.

- This sentence is ambiguous between a **de re** and **de dicto** interpretation of the modal 'must'.
- If the sentence is interpreted **de re**, it is then a claim **specifically** about Donald Trump, namely that it is necessary (for whatever reason) that Donald Trump has a degree from Harvard.
- By contrast, if it is interpreted **de dicto**, it is **not** a claim about Donald Trump specifically, but rather a general claim about what degree you must have if you are president of the United States.

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Outline

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Modal Logic

- One question one might ask is how we should regiment (i.e. formalize) modal statements. In so-called **modal logic**, the standard is to introduce two sentential operators, namely '$\Box$' and '$\Diamond$'.
- So, if p, q, r, etc. are sentences in propositional logic, then:
  - '$\Box p$' means **it's necessary that p**.
  - '$\Diamond p$' means **it's possible that p**.
- Similarly, in first-order logic where sentences consists of constants, quantifiers, variables and predicates:
  - '$\Box\exists x\big(F(x)\big)$' means **it's necessary that some x is F**.
  - '$\Diamond\exists x\big(F(x)\big)$' means **it's possible that some x is F**.
- When modal operators interact with standard (nominal) quantifiers, de dicto/de re ambiguities arise. When the modal operators take wide scope, as in the sentences above, the modality involved is **de dicto**. When the modal operators take narrow scope, the modality is **de re**.
  - '$\exists x\Box\big(F(x)\big)$' means **For some x, it's necessary that x is F**.
  - '$\exists x\Diamond\big(F(x)\big)$' means **For some x, it's possible that x is F**.

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Modal Logic

- One crucial question is how these modal operators should be interpreted in the logic. In particular, we need to give a semantics for '$\Box$' and '$\Diamond$'.
- It might seem natural to treat these operators the same way that we treat other sentential operators, e.g. **negation** ($\neg$), **conjunction** ($\wedge$), **disjunction** ($\vee$), and **implication** ($\rightarrow$).
- The standard connectives are **truth functional** connectives. What this means is that the truth value of a complex sentence containing one of these connectives is simply a function of the truth values of its constituents.
- Here is an illustration:

ϕ	ψ	$\phi \vee \psi$
$\top$	$\top$	$\top$
$\top$	$\bot$	$\top$
$\bot$	$\top$	$\top$
$\bot$	$\bot$	$\bot$

ϕ	$\neg\phi$
$\top$	$\bot$
$\bot$	$\top$

ϕ	ψ	$\phi \rightarrow \psi$
$\top$	$\top$	$\top$
$\top$	$\bot$	$\bot$
$\bot$	$\top$	$\top$
$\bot$	$\bot$	$\top$

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Modal Logic (cont.)

- But if we treat '$\Box$' and '$\Diamond$' as truth functional operators, we run into problems. Here is why:
- Let ϕ be an arbitrary sentence.
  Let p = 'Kanye West is in Montana'
  Let q = '4 is a prime number'

  — Suppose ϕ is true. What should we say about $\Diamond\phi$?
  True (it would seem).

  — Now suppose that ϕ is false. What should we say about $\Diamond\phi$?

  — If $\phi = p$, then $\Diamond\phi$ should be true. But if $\phi = q$, then $\Diamond\phi$ should be false.

  — Relatedly, suppose ϕ is true. What should we say about $\Box\phi$?

  — If $\phi = p$, then $\Box\phi$ should be false. But if $\phi = q$, then $\Box\phi$ should be false.

ϕ	$\Diamond\phi$
$\top$	$\top$
$\bot$	?

ϕ	$\Box\phi$
$\top$	?
$\bot$	$\bot$

- In short, no truth functional treatment of $\Box$ and $\Diamond$ can consistently yield correct results.

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Modal Logic (cont.)

- So, instead of treating $\Box$ and $\Diamond$ as **truth functional connectives**, it is now standard to treat them as **quantifiers**.
- However, instead of treating them as **quantifiers over individuals**, they are treated as **quantifiers over possible worlds**.
- Remember, in first order logic, we assume that there is a domain (D) of objects x and that the quantifiers ($\exists$, $\forall$) quantify over those individuals (viz. $\exists x$, $\forall x$).
- In modal logic, we simply assume that there is a **domain of possible worlds** (W) and that $\Box$ and $\Diamond$ quantify over these. Hence:
  - '$\Box\phi$' means $\forall w\big(\phi$ is true at $w\big)$
  - '$\Diamond\phi$' means $\exists w\big(\phi$ is true at $w\big)$
- In other words, **possibility modals** are equivalent to existential quantifiers over possible worlds: such sentences are true as long as the embedded sentence is true at at least one possible world.
- And, **necessity modals** are equivalent to universal quantifiers over possible worlds: such sentences are true as long as the embedded sentence is true at every possible world.

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Results

- With this analysis of modal expressions, we immediately get some results.
- First, because necessity modals are analyzed as universal quantifiers and possibility modals are analyzed as existential quantifiers, we get the following **logical equivalences**:

$$\Box\phi \leftrightarrow \neg\Diamond\neg\phi \qquad\qquad \Diamond\phi \leftrightarrow \neg\Box\neg\phi$$

- This is just like the standard equivalence between first order quantifiers in first order logic:

$$\forall x\big(F(x)\big) \leftrightarrow \neg\exists x\neg\big(F(x)\big) \qquad\qquad \exists x\big(F(x)\big) \leftrightarrow \neg\forall x\neg\big(F(x)\big)$$

- Moreover, given the semantics outlined above, the following are **logical theorems**.
  - $\vDash \Box\phi \rightarrow \phi$
  - $\vDash \phi \rightarrow \Diamond\phi$
  - $\vDash \Box\phi \rightarrow \Diamond\phi$
- **NB!** What I have presented above is a highly simplied modal logic. There are many other modal logics where these would not be theorems.

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Quick Exercises

- Let's try formalizing the following sentences:

  (10) Necessarily, all bachelors are unmarried.
  (11) Married bachelors are impossible.
  (12) It is possible there exists a bachelor who drinks cocktails.

- Let:
  - '$M(x)$' denote *x is married*
  - '$B(x)$' denote *x is a bachelor*
  - '$D(x)$' denote *x drinks cocktails*

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Counterfactuals

- The possible worlds analysis of modality has proven extremely useful as it can be used to illuminate a variety of complex concepts.
- One area where the possible worlds framework has proven very useful is in the analysis of **counterfactuals**.
- Loosely speaking, a **counterfactual** is a (subjunctive) conditional where the antecedent is (known to be) false, for example (13) and (14).

  (13) If Oswald hadn't killed Kennedy, someone else would have.
  (14) If kangaroos didn't have tails, they would topple over.

- Counterfactuals are particularly challenging because they cannot plausibly be analyzed simply as material implication ('$\rightarrow$').
- Remember, a material implication (e.g. '$p \rightarrow q$') is true whenever its antecedent is false or its consequent is true. But this entails that every counterfactual is trivially true which seems clearly wrong. Just consider the counterfactual below.

  (15) If I had one more pair of sneakers, then 4 would be prime.

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Counterfactuals (cont.)

- David Lewis and Robert Stalnaker developed (independently of each other) **a possible worlds analysis of counterfactuals**.
- Their main idea is to analyze counterfactuals as claims about what is the case in the possible world most similar to the actual world where the antecedent is true.
- Consider again (14).

  (14) If kangaroos didn't have tails, they would topple over.

- To determine whether (14) is true, first look at the set of possible worlds where kangaroos do not have tails. Obviously, there are going to be (infinitely) many of these.
- Next, **find the world(s) that are most similar to the actual world**. So, exclude the possible worlds where kangaroos do not have tails, but instead have wings and the possible worlds where kangaroos do not have tails, but instead are standing on crutches.
- Next, **check whether the consequent** ('they topple over') **is true at the most similar possible world(s)** (viz. the world where kangaroos have no tails and simply have nothing instead).
- If the consequent is true there, then the counterfactual is true.

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Counterfactuals (cont.)

- While this analysis is not without problems (and also relies heavily on a rather vague notion of **similarity**), it is a significant improvement over the analysis of counterfactuals as material implication.
- However, as should be obvious, quantification over possible worlds is crucial to this analysis. Without the assumption that there are possible worlds, it would not work.

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Belief

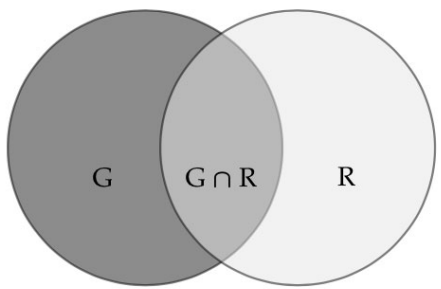
- Another concept where the possible worlds framework has proven extremely useful is with respect to the analysis of **belief**. The possible worlds analysis of belief is originally due to Finish philosopher, Jaakko Hintikka.
- Hintikka's idea was to **analyze beliefs as sets of possible worlds**. To understand his idea, we need a bit of setup.

  – First, it is widely assumed that sentences express **propositions** and that **propositions** are **sets of possible worlds**

  – For example, the sentence 'grass is green' expresses the proposition which denotes the set of possible worlds where grass is green. Call this set **G**

  – Similarly, the sentence 'roses are red' expressses the proposition which denotes the set of possible worlds where roses are red. Call this set **R**

  – The conjunction of these two sentences then denote the intersection of these two sets, viz. **G** ∩ **R**.



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Belief (cont.)

- Belief can now be modelled as **the intersection of the propositions that an agent believes**.
- For example, if a believes p, q, and r, then a's belief is the set of worlds denoted by $p \cap q \cap r$. Call this set Γ.
- When an agent **updates her beliefs**, this can then be modeled as follows. Suppose a comes to believe s. Then we simply intersect Γ with the set of worlds denoted by s.
- Similarly, if a had come to believe $\neg s$, then we would simply remove every world from Γ where s is true, viz. $\Gamma \backslash s$. (The relative complement of s in Γ).
- Or, if a came to believe that $s \vee t$, then we would simply update Γ so as to remove any possible world where both $\neg s$ and $\neg t$ are true. Specifically, the we would use the following operation $(\Gamma \cap s) \cup (\Gamma \cap t)$.

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De Dicto and De Re Belief

- There are several reasons to adopt a modal analysis of belief. One reason is that so-called belief reports also exhibit a de dicto/de re ambiguity just as standard modal claims do.
- Consider the sentence below.

  (15) Alfred believes the president of the United States is a Harvard graduate.

- On the de re interpretation of (15), Alfred believes (specifically) of Donald Trump that **he** is a Harvard graduate. Alfred may have no beliefs **at all** about presidents of the United States.
- On the de dicto interpretation of (15), Alfred has a general belief that whoever instantiates the property 'is the president of the United States' is also a Harvard graduate.
- This de dicto belief is fully compatible with having no beliefs at all about Donald Trump. That is, Alfred may not even be aware that Donald Trump exists and still believe (15).

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In Sum

- Summing up, there are many compelling reasons to endorse a possible worlds analysis of modality.
- Such an analysis helps elucidate a wide variety of complex phenomena, e.g.
  - Modal entailment relations
  - The semantics of counterfactuals
  - The semantics of belief
- And this list is far from exhaustive. The possible worlds analysis is used to explain many other phenomena in addition to these.

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Outline

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Back to Metaphysics

- From the point of view of metaphysics, modal logic might seem somewhat dubious. After all, this logic assumes a **domain of possible worlds!**
- This, obviously, raises several questions:
  - What exactly is a possible world?
  - What is the ontological status of possible worlds?
  - Does the use of a modal expression commit one to the existence of alternate universes?

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Modal Realism

- By far, the most controversial view when it comes to the ontological status of possible worlds is **Modal Realism**.
- This view was introduced and defended by David Lewis in his book 'On the Plurality of Worlds'.
- A possible world, according to Lewis, is a "maximally connected space-region". So, the actual world, for example, includes everything that exists at any space-time distance from us.
- Moreover, Lewis arguess, that every possible world is literally a **concrete** and real existing thing with its own space-time. The possible world where I'm watching a movie on Netflix right now is just as real as the **actual world** where I am currently giving this lecture!
- However, notice that on Lewis' view, what counts as the **actual** world is simply a matter of perspective (the word 'actual' is **context-sensitive**: what it refers to depends on when/where it is used).
- So, while this is the actual world for us, in the world where I am watching a movie right now instead of giving this lecture, that world is the actual world for me there.

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Modal Realism (cont.)

- Despite its rather extensive ontological consequences, **Modal Realism** has one significant advantage.
- It makes the appeal to possible worlds in the analysis of counterfactuals, belief, properties (set nominalism), and many other analyses completely unproblematic.
- The value of this is difficult to understate as the possible worlds framework has proven incredibly fruitful and is very widely used by philosophers today in both theoretical and practical philosophy.

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Ersatz Modal Realism

- However, unsurprisingly, many philosophers have found the inflationary consequences of Lewis' view to implausible to accept.
- A popular alternative to **Modal Realism** is thus what is called **Ersatz Modal Realism**.
- Generally speaking, proponents of **Ersatz Modal Realism** accept the possible worlds analysis of modality, but reject the claim that possible worlds are concrete objects. Instead, they maintain that possible worlds are **abstract** objects.
- The question, of course, is what exactly kind of abstract objects possible worlds are supposed to be.

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Ersatz Modal Realism (cont.)

- One view is so-called **Linguistic Ersatz Modal Realism** (**LEMR**). According to this view, possible worlds are **maximally consistent (conjunctive) sentences**.
- That is, a possible world w, according to **LEMR**, is a conjunction of sentences $p_1 \wedge p_2 \wedge p_3 \ldots p_n$.
- They are **maximal** in the sense that for any atomic or complex sentence s in the language, either s or $\neg s$ occurs in the sentence.
- They are **consistent** in the sense that the sentence never contains both s and $\neg s$.

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Ersatz Modal Realism (cont.)

- Given this conception of possible worlds, the proponent of **LEMR** assumes the following semantics for $\Box$ and $\Diamond$:
  - '$\Box p$' is true iff every maximal consistent sentence in the worldmaking language of **LEMR** says that p.
  - '$\Diamond p$' is true iff some maximal consistent sentence in the worldmaking language of **LEMR** says that p.
- With this linguistic conceptions of possible worlds as sentences, the proponent of **LEMR** can maintain that possible worlds are not concrete entities, but rather abstract objects — and hence avoid commitment to the existence of an infinity of concrete (but imperceptible) objects.
- In support of this view, notice that possible worlds have many of the standard characteristics of abstract objects: possible worlds **cannot be perceived**, they have **no spatio-temporal location** (in the actual world), and they are **causally inefficacious**.

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Objections to Ersatz Modal Realism

- Lewis' main argument against **LEMR** is that it fails to *explain* what it means for something to be **possible** or **necessary**.
- The problem, Lewis argues, arises when the proponent of **LEMR** chooses the language in which to state the sentences (that make up possible worlds) — **the worldmaking language**.
- Suppose they choose a **rich worldmaking language** — a language in which all intuitive possibilities can easily be expressed, e.g.

  (16) Barack Obama is a world class tennis player.
  (17) There are talking donkeys.
  (18) Sweden has a population of one billion people.

- The crucial question is this: What determines what the maximal consistent sentences are?

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Objections to Ersatz Modal Realism (cont.)

- Consider the following question for **LEMR**:
  - Is there a possible world where Barack Obama is a world class tennis player and yet have never touched a tennis racket?
- Intuitively, the answer should be 'no' since picking up a racket and swinging at a ball is a prerequisite for being a world class tennis player.
- The problem is that **LEMR** is going to have a hard time predicting this.
- First, there is no strict logical inconsistency between 'Barack Obama is a world class tennis player' and 'Barack Obama has never picked up a racket in his life', so it cannot be ruled out on these grounds.
- Second, if the proponent of **LEMR** instead tries to rule out this possibility by simply noting that it is impossible to be a world class tennis player without ever having picked up a racket, she is using the notion of possibility/impossibility in the very thing that was supposed to explain what 'possible' and 'impossible' are supposed to mean. In other words, this explanation begs the question.

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Objections to Ersatz Modal Realism (cont.)

- As an alternative, the proponent of **LEMR** could opt for a **poor worldmaking language**.
- The general idea is to only include in the language a basic set of names and predicates and then let the sentences of the language simply be simple predications of properties to these objects. The names and predicates are only going to make reference to fundamental properties, relations, and objects.
- So, there will be no explicit reference to properties such as 'world class tennis players' or 'have picked up a racket' since these are not fundamental properties.
- Nevertheless, if there is reference to all fundamental properties, relations, and objects, then the total of all maximal and consistent sentences should include all possible facts. Moreover, defining what it means for a sentence to be consistent is now straightforward: Simply, a sentence must contain $F(a)$ or $\neg F(a)$ for any predicate F and any object a.
- So, even though one cannot directly express things such as (16) and (17) in this language, some of these worlds are going to entail that there are talking donkeys and that Barack Obama is a world class tennis player.

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Objections to Ersatz Modal Realism (cont.)

- The main problem with this approach is that the notion of **entailment** itself is a modal notion.
- When we say that a set of sentences Γ entails a sentence *s*, this is normally explicated in terms of what is possible/not possible, namely Γ entails a sentence *s* iff the sentences in Γ **could not** be true while *s* is false.
- So, again, the proponent of **LEMR** either has to accept that the account is question-begging or instead embark on the project of giving a non-modal analysis of entailment.

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Modal Fictionalism

- The choice between **Modal Realism** and **Ersatz Modal Realism** is a choice between treating possible worlds as concrete or abstract.
- But some philosophers have argued that neither of these options are any good.
- According to these philosophers, the notion of a "possible world" is just a convenient way of speaking which ultimately have no basis in reality — either as concrete or abstract objects.
- This is the view of **Modal Fictionalists**.

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Modal Fictionalism (cont.)

- Since the **Modal Fictionalist** does not believe in possible worlds (either concrete or abstract), the notion of **possibility** cannot be defined in terms of possible worlds.
- So, instead of defining $\Box$ and $\Diamond$ in terms of quantification over possible worlds, they argue that we should instead define them as follows:
  - '$\Diamond p$' is true iff **according to the fiction that there are possible worlds**, p is true in *some* possible world.
  - '$\Box p$' is true iff **according to the fiction that there are possible worlds**, p is true in *every* possible world.
- This view avoids commitment to concrete and abstract possible worlds because these are merely a fiction. It claims to account for all the modal truths nevertheless, but whether this is correct is questionable.
- One central question that arises here is which fiction exactly is being referenced. Also, on this view, it seems to follow that any modal statement is not **literally** true, it is only true in the fiction. It's not clear that this is really satisfactory.

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Modal Conventionalism

- Finally, there is **Modal Conventionalism**. This is another analysis of modality which purports to avoid reliance on possible worlds in the theory of modality.
- According to **Modal Conventionalism**, the notions of **necessity** and **contingency** can be explained purely in terms of conventional meaning.
- For example, the sentences below are necessary truths. **Conventionalists** maintain that these are true solely in virtue of their meaning and this is what makes them necessary truths.

  (19) Triangles have three sides.
  (20) All bachelors are unmarried.

- For example, (19) is true simply in virtue of the conventional meaning of 'triangle' and (20) is true in virtue of the meaning of 'bachelor'.
- By contrast, sentences such as (21) and (22) are merely contingent, because the conventions of the language alone does not guarantee their truth.

  (21) There are pink donkeys.
  (22) There are eight planets in our solar system.

- In short, **Modal Conventionalism** gives an account of modality in terms **truth in virtue of meaning** (or **analyticity**).

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Modal Conventionalism (cont.)

- **Modal Conventionalism** was a popular view among many philosophers until American philosophers Saul Kripke and Hilary Putnam raised several objections to the view.
- Kripke and Putnam made two seminal observations:
  - There are **necessary truths** that are **a posteriori**.
    Truths that are not knowable purely by reasoning (about e.g. the conventions of the language).
  - There are **contingent truths** that are **a priori**.
    Truths that are not necessary, yet are knowable purely on the basis of reasoning (about e.g. the conventions of the language).
- Let's work through some examples.

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Modal Conventionalism (cont.)

- Consider the sentence below.

  (23) Water is H_2O.

- Imagine that a substance is found on some nearby planet that has all the external features of water; it is a clear liquid, drinkable, it flows in rivers and lakes, etc. If it was discovered that the chemical composition of this substance was not H_2O, we would simply conclude that **it is not water**.
- The chemical composition of water is H_2O and anything that does not have that chemical composition is not water.
- So, (23) is **a necessary truth**.
- However, the truth of (23) is clearly not contained in the very meaning of the words 'water' or 'H_2O'. One cannot come to know that (23) is true simply by reflecting on the meanings of these words.
- After all, the word 'water' was used for centuries before its chemical composition was discovered and we would not want to conclude that the people who used this word were linguistically incompetent. Nevertheless, it seems to be a fact that whenever a speaker used the word 'water', she was referring to H_2O.

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Modal Conventionalism (cont.)

- Consider the sentence below.

  (24) The standard meter stick is one meter long.

- The standard meter stick is an object kept in the International Bureau of Weights and Measures in France. It was the object originally used to define the length of a meter.
- For this reason, (24) is true solely in virtue of meaning. The standard meter stick is **by definition** one meter long.
- Nevertheless, that the standard meter stick is one meter long is clearly **a contingent matter**. After all, the standard meter stick (that very stick) could have been snapped in two or the tree on which it grew could have been chopped down before the stick grew to one meter. In that case, the stick would not be one meter long.
- Using the helpful language of possible worlds, since there is clearly a possible world in which the meter stick is not one meter long, the truth of (24) is not necessary.
- Consequently, reducing modal notions such as **necessity** and **contingency** to **analyticity** versus **non-analyticity** is not going to work.

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Outline

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Essentialism and Anti-Essentialism

- **Essentialism** is the view that objects themselves, independently of any way we may have of thinking of them, have **essential** properties. **Essentialism** has been defended in various forms by both Aristotle, Descartes, Locke and others.
- An **essential property** is a property that is such that if an object fails to have that property, it would seize to exist.
- However, in the 20th century, many philosophers became skeptical of the notion of **essential properties**. Quine, in particular, raised several problems for this view in part based on his general critique of the notion of **de re modality**.
- Quine's general argument is that essential properties only make sense relative to a **classification**, i.e. some way of construing the object. To say the object **in itself** has an essential property is, according to Quine, non-sensical.

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Essentialism and Anti-Essentialism (cont.)

- Consider the standard regimentation of **de re** and **de dicto** modalities in first order logic.
- Let $M(x)$ = 'x is a mathematician and let $R(x)$ = 'x is rational'.
- Let $C(x)$ = 'x is a cyclist and let $T(x)$ = 'x two-legged'.

  (25) $\forall x\big(M(x) \rightarrow \big(\Box R(x) \wedge \neg\Box T(x)\big)\big)$
  Every mathematician is necessarily rational and not necessarily two-legged.

  (26) $\forall x\big(C(x) \rightarrow \big(\Box T(x) \wedge \neg\Box R(x)\big)\big)$
  Every cyclist is necessarily two-legged and not necessarily rational.

- Now suppose that Jones is both a mathematician and a cyclist. There is nothing incoherent about this supposition. But given the above, it does not really make sense, Quine complains, to classify some of Jones' attributes as necessary and some as contigent.

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Essentialism and Anti-Essentialism (cont.)

- The problem here, according to Quine, is the **de re** interpretation of the modals (i.e. the **essentialist** assumption).
- If the modals are interpreted **de dicto** instead, there is no problem.

  (27) $\Box\forall x\big(M(x) \rightarrow R(x)\big) \wedge \neg\Box\forall x\big(M(x) \rightarrow T(x)\big)$
  Necessarily every mathematician is rational and not necessarily every mathematician is two-legged.

  (28) $\Box\forall x\big(C(x) \rightarrow T(x)\big) \wedge \neg\Box\forall x\big(C(x) \rightarrow R(x)\big)$
  Necessarily every cyclist is two-legged and not necessarily every cyclist is rational.

- These claims are unproblematic, because they do not ascribe **essential** properties to any objects, i.e. they do not attribute necessary properties to objects independent of the way the objects are described.

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Origins Essentialism

- In part due to Quine's criticism, **Essentialism** remains a highly controversial view. However, there is one particular kind of **Essentialism** that is more widely accepted. This is called **Origins Essentialism**.
- The main contention in **Origins Essentialism** is that the **origin** of any material object is essential to it.
- Kripke, who is the main proponent of this view, gives the following argument:
- Consider the Queen of England, Queen Elizabeth. Is it possible or even plausible that she could have existed had she had other parents?

> *Can we imagine a situation in which it would have happened that this very woman came out of Mr. and Mrs. Truman? They might have had a child resembling her in many properties. Perhaps in some possible world Mr. and Mrs. Truman even had a child who actually became the Queen of England and was even passed off as the child of other parents. This still would not be a situation in which this very woman whom we call 'Elizabeth II' was the child of Mr. and Mrs. Truman, or so it seems to me. It would be a situation in which there was some other woman who had many of the properties that are in fact true of Elizabeth [...] It seems to me that anything coming from a different origin would not be this object. (Kripke 1980, 112-113)*

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Next week...

Chapter 8: **Causation**

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Metaphysics

Lecture 7: Causation

Dr. Anders J. Schoubye

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Outline

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Final and Teleological Causes

- If one is interested in a complete account of the nature of our universe, simply determining what objects, properties, and events exist does not seem sufficient.
- Another intuitively central issue is what relations obtain among these entities – which are causally tied to which and what these causal connections are.
- Very few people would deny that there are such things as causes and effects and a complete account of the nature of the universe should include some kind of account of the nature of causation.

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Final and Teleological Causes (cont.)

- Aristotle distinguished between two fundamentally different kinds of causes, namely teleological/final causes and efficient causes.
- Teleological causes concern an object's or event's **telos** (its purpose). The **telos** of an object is that for which it was created; what it was made for – the reason it exists.
- For example, the teleological cause of a car is to be able to drive and the teleological cause of a pen is to be useable for writing.
- However, teleological causes are generally viewed with skepticism by contemporary metaphysicians. This is in part because current scientific theories never appeal to teleological causes nor rely on them in their theorizing.

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Efficient Causes

- An efficient cause of an object or event explains what brought that object or event into existence.
- The efficient cause of an object or event is generally assumed to be located in the past. They are the processes that brought the object or event into being.
- For example, for material objects such as a table, it would be the manufacturing process. For a human life, it would be the joining of an egg with a sperm cell, etc.
- For **events**, efficient causes are other events or actions. For example, the efficient cause of (the event of) a window shattering may be (the action of) throwing a stone.

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Interlude: The Relata of Causal Relations

- Causation is generally assumed to be a **relation** between entities, but there are different views about what kind these entities are.
- One common view is that the relata of **causation** are events. For example, what caused the event of the fire is the event of someone striking a match. Or what caused the event of the pool ball going into the corner pocket is the event of striking the ball with the cue.
- This raises another question, though, namely **what are events**?

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Interlude: The Relata of Causal Relations (cont.)

- According to Donald Davidson, events are a species of concrete particulars that involve **taking place** at **particular space-time regions**.
- According to Jaegwon Kim, events are just **exemplifications of properties by objects** at particular times t.
- So, a window breaking, Davidson would describe as a concrete particular event occurring at a specific space-time region.
- Kim would instead describe it simply as the window exemplifying a property (the property of breaking) at a particular time t.

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Interlude: The Relata of Causal Relations (cont.)

- Another view regarding the **relata of causation** is that causes are **facts** rather than events. This is Armstrong's view. Whereas events are things that happen, facts are things that **are the case**.
- Moreover, **facts** are often assumed to be more fine-grained than events: A single event may involve several corresponding facts. One way to see this is to consider all the different facts that could be used to describe one single event.
- Consider the event of the pool ball going into the corner pocket at time t:
  - It is the case that the pool ball went into the corner pocket at t.
  - It is the case that a point was scored at t.
  - It is the case that a red colored object rolled into a hole in the corner of a flat table at t.

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Hume's Empiricism

- One famous puzzle about causation was introduced by David Hume. Hume is famous mainly for his defense of **empiricism** which is the view that our knowledge and understanding of the world comes entirely from experience, i.e. according to Hume, there is no such thing as **a priori knowledge**.
- Hume's view is that all knowledge is built from (copies of) simple sense impressions. For example, we can conceive of the notion of a blue square or a red circle or a loud noise simply in virtue of having experienced things that are blue, red, square, circular, and loud at various points in time. So, these complex concepts are built up of previous sense impressions.
- Ultimately, any idea or concept that one might entertain has to be built up from previous sense impressions.
- So, it is perfectly possible to have concepts that do not correspond to anything in reality, e.g. a unicorn, but that concept is simply a complex combination of things we have already experienced, viz. previous sense impressions.
- One prima facie problem for this position is how to explain **causation**. How can we form the (abstract) idea of **a causal relation between objects**?
- Presumably, we cannot directly **perceive** causal relations between objects?

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Hume's Empiricism

- For example, suppose you observe someone drinking several beers. Shortly after, the person is stumbling around and struggling to maintain his balance. This seems like a very clear case of cause and effect — viz. a case of **causation**.
- However, while you can **perceive** the event of drinking and **perceive** the event of stumbling, you **cannot perceive** the **causal relation**. Yet, if everything we know is based on sense impressions, how could we even have the concept of a **causal relation** (between e.g. drinking and balance impairment)?
- Intuitively, one might think that there is some **necessary** connection between the event of drinking and the event of balance impairment, but there is just no obvious way in which this connection can be perceived.
- For this reason, Hume is often interpreted as maintaining that the idea of **causation as a necessary connection between events** must be rejected.
- Instead, Hume proposed that what appears to be **causation** is really just cases of **regular succession of events**, viz. events that regularly follow each other.
- In other words, according to Hume, the appearance of a causal relation is really just an observation of a regularity of certain events following other other events (e.g. the event of drinking followed by an event of balance impairment).

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Hume's Empiricism (cont.)

- Hume's conception of causation is now referred to as **the regularity theory of causation**:
  - To say that a particular event a is the cause of another event b is simply to say that events of type A are regularly followed by events of type B.
- The idea of actual causation, i.e. a necessary connection between events, is according to Hume really a matter of **expectation**. That is, after observing a certain kind of regularity, especially particularly persistent regularities, we come to **expect** certain events to follow other events.
- But, Hume maintains, this is just a confusion on our part. There really is no **necessary connection** between events.

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Outline

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Reductive Theories

- Hume's strict empiricist view is, today, viewed with skepticism.
- While some metaphysicians might agree with Hume that the notion of **necessity** should be avoided in an analysis of **causation** (simply because current theories in the natural sciences make no use of that concept), most would want to reject Hume's empiricist claim that all concepts are built from sense impressions.
- A metaphysician of this inclination might want a **reductive analysis of causation**, i.e. an analysis that explains causation in more fundamental and **non-causal** terms, but without the empiricist baggage.
- Let's consider three different types of reductive theories of causation.

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The Simple Regularity Theory

- The first theory we will consider is essentially Hume's theory, but without the empiricist background assumptions.
  - **The Simple Regularity Theory**
    An event a of type A **causes** an event b of type B **just in case** a and b actually occur and A-type events are regularly followed by B-type events.
- This counts as a reductive analysis of causation because the right hand side of the biconditional makes no mention of any causal notion.
- One immediate problem with The Simple Regularity Theory is that it seems to overgenerate causal relations.
- For example, the event of the sun rising follows regularly the day after each episode of Game of Thrones has aired on HBO. But, we would not want to conclude that the event of Game of Thrones airing on HBO **causes** the sun to rise. (you can think of other counterexamples easily).

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The Simple Regularity Theory (cont.)

- It seems clear that The Simple Regularity Theory must be supplemented somehow in order to be viable: Regularity is not sufficient. It must be more than a mere coincidence that an event regularly follows another event in order to count as an instance of causation.
- It might be tempting to say that a B-type event (that regularly follows events of type A) must be **entailed** (somehow) by an A-type event. But the question then is what notion of "entailment" is intended here.
- It cannot be logical entailment. After all, an event of throwing a rock might cause an event of a window breaking, but there is no strict logical entailment between these events. Remember, if we think of logical entailment in terms of possible worlds, then clearly there is a possible world where a rock is thrown at a window, but where it does not break.
- So, the notion of entailment has to be somewhat more strict. One option is what is called Nomic Regularity Theory.

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Nomic Regularity Theory

- The Nomic Regularity Theory says that:
  - An event a of type A causes an event b of type B just in case a and b actually occur and **the laws of nature imply that *A*-type events are regularly followed by *B*-type events**.
- This again is a regularity theory, but what is added is a nomological entailment relation.
- Again, if we think of this in terms of possible worlds, the connection between a and b events must now be such that **in all** possible worlds **where the laws of nature hold**, the connection is regular.
- This is a siginificant improvement, because it rules out problematic examples such as the ones mentioned earlier. The laws of nature do not imply that if Game of Thrones air, then the sun will rise.
- More generally it rules out cases of events that coincide coincidentally (i.e. without there being a causal link). That is, it rules out predicting that events that are merely correlated are in facts cases of causation.

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Objections to the Nomic Regularity Theory

- However, David Lewis has pointed out several problems with the **Nomic Regularity Theory**.
- The first objection is the problem of **epiphenomena**. An epiphenomenon is an event that is the result of another event but have no effects on its own.
- For example, drinking may lead to reddening and then subsequently to stumbling or impaired balance. The reddening will occur before the stumbling. However, the stumbling is not caused by the reddening. Nevertheless, the Nomic Regularity Theory will predict that it is. Because, the laws of nature will imply the following chain:

$$\text{drinking} \mapsto \text{reddening} \mapsto \text{stumbling}$$

- Since, an event of reddening will, given the laws of nature, regularly be followed by stumbling, the theory predicts that the reddening caused the stumbling.
- But, the reddening is just an epiphenomenon. It is caused by the drinking, but it does not cause anything itself.

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Objections to the Nomic Regularity Theory (cont.)

- The second objection is the problem of **preemption**. Consider the following case:

> *Suppose two naughty children, Billy and Suzy, are trying to break a window by throwing rocks at it. Billy throws his rock first, aiming carefully and throwing with enough force to break the window. But just as Billy releases the rock from his hand, Suzy throws hers in just such a way as to knock Billy's off its trajectory. Suzy's rock bounces off of Billy's into the window, thus breaking it. In this case, the obvious thing to say is that it was Suzy's throw that was a cause of the window's breaking. Billy's throw could have been a cause, but in fact it wasn't, since it was preempted from being a cause of the window's breaking by Suzy's throw. (Ney, 2014: 225)*

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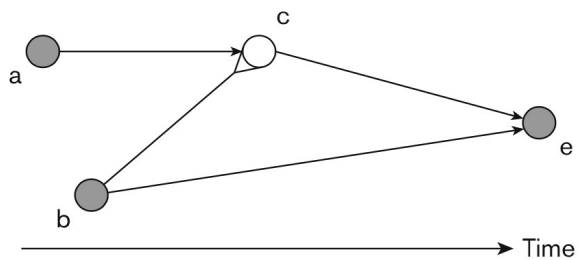
Objections to the Nomic Regularity Theory (cont.)

- Why does preemption present a problem for the Nomic Regularity Theory?



Key:

a : Billy's throw
b : Suzy's throw
c : Billy's rock staying on course to strike the window
e : Window breaking
→ : Relation of causal influence
⊣ : Relation of causal inhibition
● : An event that occurs
○ : An event that does not occur

- First, notice that Billy's throw, on its own, has what it takes to cause the window's breaking.
- Second, the window does break, and events such as Billy's are regularly followed, given the laws of nature, by windows breaking.
- So, Billy's throw counts as the cause of the window breaking.
- But, intuitively, Billy's throw is not the cause of the window's breaking.
- The problem, then, is that the Nomic Regularity Theory appears to count **preempted causes as causes**.

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The Counterfactual Theory of Causation

- In light of the problems with the Nomic Regularity Theory, Lewis proposed an alternative, namely the Counterfactual Theory of Causation.
- This analysis takes as its starting point the notion of **counterfactual dependence** between events.
- Remember, a **counterfactual** is a conditional in which it is known that the antecedent is false, e.g. (1) and (2) below.
  - (1) If kangaroos didn't have tails, they would topple over.
  - (2) If Suzy hadn't thrown her rock, the window would still have broken.
- Lewis' proposal is essentially to analyze causation in terms counterfactual dependence.

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The Counterfactual Theory of Causation (cont.)

- **Counterfactual dependence** is defined as follows:
  - An event b counterfactually depends on another event a just in case had a not occurred, then b would not have occurred either.
- Lewis' analysis of causation is then the following:
  - a causes b just in case:

    i. The events a and b actually occur, and
    ii. There is a chain of counterfactual dependence running from a to b.
- There is a chain of counterfactual dependence running from a to b iff there is some sequence of events starting with a and terminating with b such that every event in the sequence counterfactually depends on the event immediately preceding it in the sequence.
- In some cases, there will be no other events in the chain than a and b, but in other cases there may be many intervening events. In such cases, there will be no direct counterfactual dependence between a and b.
- This is important, because complicating the analysis in this way is the only way to guarantee getting the right results in e.g. preemption cases.

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The Counterfactual Theory of Causation (cont.)

- A simple counterfactual theory, i.e. one that simply says that a causes b just in case b counterfactually depends on a would get the following results:
- It would predict, correctly, that (3) is false.

  (3) If Billy hadn't thrown his rock, the window wouldn't have broken.

- This is false, because in the most similar possible world where Billy does not throw his rock, Suzy still throws her rock and breaks the window. However, it also predicts that (4) is false.

  (4) If Suzy hadn't thrown her rock, the window wouldn't have broken.

- This means that Suzy's throw is not predicted to be the cause of the window breaking (because, the breaking of the window does not counterfactually depend on Suzy's throw – it would have broken due to Billy's throw instead).

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The Counterfactual Theory of Causation (cont.)

- This is where adding **a chain of counterfactual dependence** helps.
- Notice that the following counterfactuals are all true:

  (5) If Suzy hadn't thrown her rock, then her rock wouldn't have stayed on course to strike the window.

  (6) If Suzy's rock hadn't stayed on course in that way, then the window wouldn't have broken.

- This shows that there is a chain counterfactual dependence that leads to the conclusion that Sue's throw is the cause of the window breaking.
- Specifically, the event of the window breaking counterfactually depends on the rock staying on a certain course which counterfactually depends on being thrown by Suzy.

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The Probabilistic Analysis of Causation

- The third and final reductive analysis of causation that we will consider here is the Probabilistic Analysis of Causation.
- The general idea is that **causes** are **probability raisers**. That is, *c* is the cause of event *e* just in case the occurrence of *c* raises the probability of *e*'s occurring.
- Alternatively, the probability of *e* given that *c* occurs is higher than the probability of *e* given that *c* does not occur. Formally, this is standardly expressed as follows:

$$c \text{ is a cause of } e \text{ iff } \mathbf{P}(e|c) > \mathbf{P}(e|\neg c)$$

- The probabilistic analysis has been popular in part because **probabilistic and statistical correlation** is often the concept used in place of causation in many other sciences.
- For example, in medicine, if something raises the probability of developing a disease *D*, then that thing is taken to be a cause of *D*. Think for example of the claim 'smoking causes cancer'.
- Similarly, in psychology and sociology, if something is considered a statistical significant factor, then it is generally considered a **cause**.

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The Probabilistic Analysis of Causation (cont.)

- Probabilistic theories are not without its problems though. First, it is often very difficult to assign probabilities to events. For example, suppose I'm holding a glass in my hand. What is the probability that if I let go of it, that it will fall to the ground? Assuming it is not probability 1, it is very difficult to assess how we should even begin to settle this question.
- Another problem with **defining causation in terms of probability increases** is that it makes it difficult to distinguish mere correlation from causation e.g. in cases where there is a common cause. Consider the following example.
  - If two events e_1 and e_2 are **correlated**, this just means that they are **probabilistically dependent**. In other words, if e_1 and e_2 are correlated, then it is not the case that $\mathbf{P}(e_1) = \mathbf{P}(e_1|e_2)$.
  - Let e_1 = the event of having a sore throat. Let e_2 = the event of having a runny nose. These events are often correlated since they have a common cause, namely the common cold.
  - Given this, it can be proved that $\mathbf{P}(e_1|e_2) > \mathbf{P}(e_1|\neg e_2)$.
  - Hence, a **probabilistic account of causation** ought to conclude that having a sore throat **causes** having a runny nose. But that is intuitively a mistake, since it is the common cold that causes the runny nose *and* the sore throat.

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The Probabilistic Analysis of Causation (cont.)

- Lastly, there appears to be cases where c causes an event e, but where the occurrence of c clearly seems to lower the probability of e. Lewis uses an example along the following lines.
  - Suppose you have a machine that when activated is capable of triggering an event e.
  - The machine has two settings. On the α-setting, the probability of e is raised to 99%. On the β setting, the probability of e is raised to 75%.
  - Now suppose, the machine is activated on setting α, but that you push a button to turn off setting α and turn on setting β.
  - In this case, you are clearly lowering the probability of e, but if e occurs, we would still want to maintain that the machine was the cause of e.

Outline

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Tooley's Objection

- In the previous slides, we covered three different examples of reductive theories of causation, namely regularity theories, counterfactual theories, and probabilistic theories.
- However, some philosophers think that there are problems with **any reductive theory of causation**. One such philosopher is Michael Tooley. Tooley gives the following argument against any theory that tries to explain the notion of causation in non-causal terms.
  - Consider a possible world where there are only two fundamental laws.

    L_1: For any object x, x's having property P at time t causes x to acquire either property Q or property R at t'.

    L_2: For any object x, x's having property S at time t causes x to acquire either property Q or property R at t'.
- Note that these are indeterministic laws in that they do not state what events follow **necessarily** from which others. They only make a claim about what could follow, i.e. either Q or R.

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Tooley's Objection (cont.)

- Now suppose that some object a has property P at t and then goes on to acquire Q at t'. Given this, we may now infer that it was a's having P which caused it to acquire Q.
- Similarly, suppose that some object b has property S at t and then goes on to acquire Q at t'. Given this, we may now infer that it was b's having S which caused it to acquire Q.
- The problem for reductive theories arises in the following type of situation:

TIME t	TIME t'
$P(a) \wedge S(a)$	$Q(a) \wedge R(a)$.

- The problem, in a nutshell, is how do we now determine whether it was P or S that caused a to possess Q, and similarly for R.
- As Tooley points out, the natural laws (in this case) simply **underdetermine facts about causation**. This means that any analysis that attempts to reduce causation to nomic regularities is going to be inadequate (because nomic regularities do not suffice to explain all cases of causation).

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Tooley's Objection (cont.)

- Similarly, switching to a counterfactual analysis of causation will not help, because it will simply be impossible to determine which counterfactuals are true and which are false.
- The laws might provide evidence that counterfactuals such as (7) and (8) are true:

  (7) If a had property P at t, then a would have either property Q or R at t'.

  (8) If a had property S at t, then a would have either property Q or R at t'.

- But this just will not suffice to determine what caused what, i.e. whether it was having property P or S that caused a to have property Q and similar for R.
- Tooley's conclusion is that **facts about causation are primitive in the sense that they are irreducible to more fundamental facts**. That is, causation cannot be explained in more fundamental terms.
- Tooley's view is, for this reason, often referred to as Primitivism about causation.

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Process Theories

- The last class of theories about causation that we will consider here is Process Theories.
- The general idea here is to explicate causation in terms of **physical processes**. The main proponent of this type of theory is Phil Dowe.
- Dowe's account is the following:
  - A **causal process** is a *world-line* of an object which manifests a conserved quantity.
  - A **causal interaction** is an intersection of *world-lines* which involves exchange of a conserved quantity.
  - An **exchange** is a case in which at least one incoming and at least one outgoing process manifest a change in the value of the conserved quantity.
- A 'world-line' is a term borrowed from Special Relativity: It is the path of any object through **space-time**.
- A 'conserved quantity' is a physical entity that does not change its total values over time, e.g. its value in terms of its energy.
- So, essentially, causation is a physical process that involves an 'exchange' between two objects whose world-lines intersect.

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Process Theories (cont.)

- One of the main objections to Process Theories is that there are many cases of causation that do not intuitively involve a physical process.
- One example is **omissions** as illustrated in (9).

  (9) *a*'s failure to water the plants **caused** the plants to die.

- Another example is **absences**:

  (10) *a*'s wearing her seatbelt **caused** her not to be ejected from her seat.

- None of these cases can plausibly be captured in terms of a physical process which involves the exchange of a conserved quantity.
- By contrast, these kinds of cases are straightforwardly captured by both The Regularity Theory and the Counterfactual Analysis of causation.

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Outline

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Causation and Ordinary Intuitions

- It is important to be clear about what project one is involved in when giving an account of causation.
- We can distinguish between at least two kinds of projects:
  - The Linguistic Project
    The project of constructing an analysis of the concept of **causation** that captures (and explains) ordinary intuitions about causal thought and language.
  - The Scientific Project
    The project of developing an empirically adequate account of causation that is consistent with and supplements our best scientific theories.
- Lewis is very explicit that the project he is involved in when outlining his counterfactual analysis of causation is of the linguistic kind.
- By contrast, Dowe is quite clear that he is mainly concerned with constructing a theory of causation that is consistent and supplements the natural sciences — even if this theory ends up making many counterintuitive predictions.

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The End

Best of luck at the exam.

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