

7

Time

Realism about entities from other times

Isn't it obvious both that material objects exist? If so, then *which* material objects exist? We start not by looking at whether things like chairs or tables exist but at whether or not, things like dinosaurs, Chingiz Khan and outposts on Mars exist.

These things *did* exist or *will* exist; but, as they don't *currently* exist, then they don't exist at all.

This position – that the only material objects which exist are those that presently exist – is called **presentism**. So, the presentist is an anti-realist about things or events from other times.

One alternative is **eternalism**: that objects from all of those times exist.

Of course, the eternalist doesn't believe these things exist *now*. the eternalist believes these things exist but are temporally removed from us in the same way that objects can exist even though they are spatially removed from us.

Just as many things can exist without being here, and exist even though they are spatially distant from us, the eternalist thinks, things can exist even though they're in the past or future and are separated by a gulf of time.

There are other positions besides presentism and eternalism.

For instance, there is **growing block theory**: that objects from the past and present exist, but the future entities don't.

So dinosaurs exist, as do you and I, but the outposts on Mars are excluded from the party – they don't exist, although one day they will.

Thus, the world is like a block that is growing over time, getting bigger and bigger as more future entities come into existence, and then stay in existence even when they are no longer present.

We could also imagine theories such as **Futurism**; where only the present and future entities exist.

In the ontology of time, the normal dialectic is that **presentists assume** that their position is intuitively true and leave it up to other people to convince them that they're wrong. I'll follow this format and examine arguments against presentism, with the working assumption that if presentism fails, then eternalism is true.

There are two kinds of argument that are used against presentism.

The first kind is purely metaphysical. During a discussion of this, we'll see a new **metaontological principle, truthmaking**.

The second kind of argument follows on from the discussion of contemporary physics, which apparently causes problems for presentism.

Singular propositions

Start with the purely metaphysical problems. First, introduce **singular propositions**: the propositions that are about some specific, single thing. So, the following propositions *aren't* singular: All men are mortal (X is a man and X is mortal). There is a black pigeon (X is a pigeon and X is black)

whereas the following *are* singular: Nikk Effingham is a lecturer. Barack Obama is president of the USA.

So, in the case of the first set of propositions, we're talking about things generally (e.g., *all* men), or some unspecific thing (e.g., *some* black pigeon), whereas the singular propositions are about some specific thing (e.g., myself or Barack Obama).

those propositions which feature a logical name, like *a, b, c*, etc., rather than quantifying over variables like *x, y, z*, etc. are singular propositions.

Some singular propositions are about objects from the past: Chingiz Khan once existed. Napoleon was French.

So, the argument goes, this is a dead giveaway that Chingiz Khan, Napoleon and so forth exist. One reason to believe this, would be the **Quinean theory of ontological commitment**.

propositions involving names can be converted into sentences that quantify over things by means of 'definite descriptions'.

For instance, to translate 'Chingiz Khan once existed' into its logical form, you might think you introduce a name, *a*, for Chingiz Khan and then attach it to the predicate '*_* once existed' to get: *a* once existed.

As we drop the name and replace it with a quantifier, we thereby quantify over past objects. Given the Quinean theory of ontological commitment, the value of that variable, i.e., Chingiz Khan, must exist.

So, presentism must be false and presumably eternalism is true.

some philosophers do believe that propositions are complex metaphysical entities that are built up out of constituents.

For instance, the constituents of a proposition like < Nikk Effingham is a lecturer > would be myself and, say, the property *being a lecturer*. Similarly, the proposition < Chingiz Khan once existed > is built up out of Chingiz Khan and the property *having once existed*. In that case, as < Chingiz Khan once existed > is a proposition, it follows that Chingiz Khan must exist or must the property *have once existed*).

In response to these problems, the presentist might argue that they don't need to be 'built up' out of constituents like objects and properties.

With regard to the problem stemming from Quinean ontological commitment, they might offer up some sort of paraphrase for singular propositions that doesn't require reference to the past and future entities.

Alternatively, they might give up on the Quinean theory of ontological commitment.

let's turn to a new theory for determining ontological commitment: truthmaking.

Truthmaking

Those who believe in truthmaking believe that for every true proposition there must be something that *makes* that proposition true. Those things that make propositions true are called **truthmakers**.

So, for instance, I am the truthmaker for the proposition < Nikk Effingham exists > and Barack Obama is the truthmaker for the proposition < Barack Obama exists.

It gets more complicated when we talk about propositions which don't just assert the existence of something.

For instance, < Barack Obama is the president of the USA > is a true proposition, but truthmaker theorists tend not to think that it's made true by Barack Obama. The reason for this is that Barack Obama doesn't *necessitate* the truth of the proposition – he can exist and yet that proposition can be false (for, of course, he might have lost the presidential election). And truthmaker theorists almost always say that truthmaking is a relation that holds of necessity – that if X is a truthmaker for a proposition then, no matter what, if X exists, that proposition will be true.

This principle is called **truthmaker necessitarianism**. It is meant to guarantee that once you have listed what truthmakers there are, nothing else needs to be done to determine what things are true.

So the truthmaker theorist imagines that if the metaphorical God of ontology wants to make a universe where certain things are the case, all he has to do is make the truthmakers. Once he's done that, every proposition has its truth value fixed and no more work remains to be done. So Barack Obama cannot, given that principle, be the truthmaker for the proposition about him being president, for God could have made Obama without having made him president. Instead, the truthmaker theorist says, we must commit to other entities to do the work.

Necessary entities that serve as truthmakers, are David **Armstrong's states of affairs**.

An alternative would be to use **tropes**. If a trope is peculiar to its instance – so the 'presidential trope' that Barack Obama has is non-transferable and could only ever be *his* trope, whilst all of the other presidents have their own presidential tropes – then whenever the trope exists, it must be the case that Obama is president. So, tropes could be truthmakers as well.

Demonstrating that we must commit to states of affairs or tropes to account for true propositions, is just one example of how truthmaking is deployed in deciding our ontological commitments.

Truthmaking has its roots in debunking the theory of **phenomenalism**: that there are no material objects, and there is only sensory data. Given phenomenalism, there isn't, say, a table in front of me and there only exist the sensations of a table – that's the be all and end all of the explanation.

Similar worries affect presentism.

If I say 'Chingiz Khan once existed', what makes that true?

The eternalist says that both the sentence and Chingiz Khan exist, and that the truthmaker is the state of affairs of Chingiz Khan being earlier than the sentence by hundreds of years.

The presentist, though, can't say this as Chingiz Khan doesn't exist, so there can't be a state of affairs involving him.

The truthmaker theorist's metaphor of God's creation:

God only has to create certain things in order to make everything true. But if God only made the presently existing things, that'd leave the truth of the sentence about Chingiz Khan undetermined. What presently exists could remain the same and yet it be false that Chingiz Khan existed. Maybe some scurrilous scribe in the thirteenth century wrote fabulous tales about a famous Mongolian warlord that, over time, people mistook for truth. We might end

up in exactly the same situation now, with exactly the same entities presently existing, and yet that sentence about the past would be false.

So it seems that thinking that only the presently existing entities exist riles the very core of the truthmaking enterprise.

Denying truthmaker theory

The presentist response.

the presentist might not sign up to a theory of truthmaking. They might try and argue against truthmaking theory on the grounds that it has problems of its own.

The truthmaker theorist tends to believe that *every* true proposition needs a truthmaker, and none get off the hook. It's the principle of **truthmaker maximalism**.

But some propositions prove incredibly problematic to find truthmakers for, e.g., < There are no unicorns >. This proposition is true, but it's not obvious what would be a truthmaker for it. As with (w)holes, it seems strange to think that an 'absence' exists – a 'lack of unicorns' – to make true that there are no unicorns.

Truthmaker theorists might respond by **weakening truthmaker maximalism**. Perhaps they'll say that 'negative' propositions do not need truthmakers. Only if a proposition asserts that something *is* the case do they need truthmakers; if they say what is *not* the case (e.g., that there *aren't* any unicorns), then they don't need a truthmaker.

The truthmaker theorist would, of course, have to get clear on exactly **what counts as a positive and negative proposition**.

However, if they do this, then the presentist can probably remedy their own truthmaker issues.

If it is okay for *some* propositions to lack truthmakers, the presentist might want to expand the number of propositions in that position. In the same way that only certain propositions need truthmakers, which doesn't include those about how the world is not, the presentist may say that they don't need truthmakers for how the world was or will be.

After all, generally speaking, how the world was or will be is also a way that the world isn't.

So, if we can restrict truthmaking theory in one area, to avoid problems with negative truths, the presentist may argue that we can restrict it, so we don't have any problems with temporal truths.

Alternative truthmakers

Alternatively, the presentist may embrace the truthmaker's challenge and try to find truthmakers for the past and future truths that don't require the past and future things to exist.

For instance, we might say that when Chingiz Khan died, a state of affairs came into being – the state of affairs of him being dead – and that this has hung around ever since. That state of affairs, then, makes true the proposition < Chingiz Khan once existed >.

But truthmaker theorists tend to think that these states of affairs are suspicious in some way. states of affairs shouldn't 'float free' of the things that they are states *of*.

In the same way that metaphysicians think that singular propositions about a particular thing demand that the particular thing exist, Chingiz Khan must exist in order for there to be a state of affairs about him. We might be motivated to believe this because we think that Chingiz

Khan is a constituent of the state of affairs – he makes it up in the same way that a table top makes up a table, and therefore requires the table top to exist.

Further, if we are to allow such states of affairs, we would undo all the good work that truthmaking is meant to achieve. If, when faced with propositions that were apparently true but were tricky to find truthmakers for, we simply allowed that we can introduce any old state of affairs to be its truthmaker, then truthmaking will never be able to play a serious role in deciding between ontological theories.

So, if truthmaking theory is to carry the methodological burden it is intended to shoulder – of eliminating metaphysical theories that somehow cut corners they shouldn't cut (e.g., phenomenalism) – there needs to be some way to restrict **what does or does not count as an acceptable state of affairs**.

the truthmaker theorist must find more sensible truthmakers for the past truths. One possibility might be to invoke **distributional properties** as truthmakers for past and present truths.

We could imagine distributional properties being deployed to help the presentist.

We'd first have to imagine that there could be distributional properties that didn't just tell us what an object was like across a certain area of space but throughout a certain stretch of time.

For instance, imagine a man having the property of *being a toddler and then later an older man*. That property would be a distributional property across his lifetime. *Being a toddler and then later an older man* tells us that the person who instantiates that property was, earlier in time, a toddler and is later an older man.

That property doesn't tell us exactly how the man is at every moment during his life but we can imagine distributional properties that are more detailed, and that instantiating them entails everything about the object that instantiates them.

Indeed, we can imagine the entire universe having a distributional property that is so complex that it entails everything about the universe, and all of its contents, at every moment that it exists.

The state of affairs of the universe instantiating that property can do all of the truthmaking work. For instance, the universe could instantiate a distributional property so complex that it entails how the universe was billions of years ago, as well as entailing that our time is, as it is now and so the state of affairs can necessitate all of the propositions about how the world is at the moment.

Similarly for the future. And unlike Chingiz Khan and the state of affairs of his having once existed, which exists without the Khan himself, the state of affairs of the world instantiating a certain distributional property never exists without either the property or the world; as the world *always* exists.

Distributional properties, then, might be able to play the truthmaking role, and the presentist who endorses truthmaking theory has at least one avenue he can pursue if he wants to have a theory consistent with a truthmaker's scruples.

Special relativity

A brief introduction to the special theory of relativity

When it comes to the presentism/eternalism debate, the scientific theory that is most relevant is Einstein's **special theory of relativity** (STR) which entails that simultaneity is relative to one's inertial frame of reference.

An **inertial frame of reference** is a frame of reference specifically concerned with your velocity. velocity is always relative to other things. On a train hurtling across the countryside, you will appear stationary relative to the passenger sat opposite you but in quick-moving motion relative to people stood in the fields outside.

when you are travelling at a different velocity relative to something, you are in a different inertial frame of reference. When you are stationary relative to something, you are in the same inertial frame of reference.

no matter where you are, you cannot tell whether you are 'truly' moving or whether you are 'truly' stationary.

But in the mid-nineteenth-century, a physicist called **James Clerk Maxwell** published a paper on electrodynamics that seemed, at first, to indicate the exact opposite. he proved that the speed of light was $\sim 300,000$ kilometres per second.

Interestingly, the value of c wasn't measured from a particular inertial frame, it was simply *the* velocity of light.

So, in 1887, Albert Michelson and Edward Morley conducted an experiment, the **Michelson–Morley experiment**, to find out the relative speed of light in order to calculate the absolute velocity of earth and its inhabitants.

They discovered that the speed of light from our inertial frame of reference was ... c . So, by the above logic, the earth was in the rest frame. The earth's velocity changes as it goes around the sun (since it's orbiting the sun, it is changing direction and therefore changing velocity). In the same way that my velocity relative to you will change as I accelerate and decelerate, the velocity of light should have changed as the earth orbited the sun. But this never happened!

No matter where the experiment was conducted, the speed of light was exactly the same. That seemed totally absurd. To demonstrate the absurdity, imagine the situation where you stand on the pavement watching Ms Fast driving off at 5 m/s and Mr Slow sat stationary in his car. Imagine that as Ms Fast passes Mr Slow, he slams the accelerator down. Further, imagine that Ms Fast keeps moving away from him at 5 m/s. No matter how hard Mr Slow pushes his car, Ms Fast is always advancing away that bit faster.

It's easy to see how this could happen: if Ms Fast uses her accelerator just as Mr Slow does and to exactly the same extent, she'll continue to travel at 5 m/s relative to him.

Now imagine what it looks like from *your* perspective. You'll see *both* Mr Slow and Ms Fast accelerating, faster and faster, with Ms Fast's velocity getting ever bigger, even as Mr Slow tries to catch up.

That is how we naturally think of velocity as working, but light obeys no such laws.

Bizarrely, light always travels at a constant velocity c from *everyone's* inertial frame of reference.

That's like Mr Slow speeding up, Ms Fast *still* going faster than him from his perspective, but from *your* perspective Ms Fast *doesn't* have an increasing velocity and only goes at 5 m/s throughout. That just sounds crazy!

How can Mr Slow accelerate and yet from both his perspective and your perspective, Ms Fast never changes her velocity, advancing forwards at 5 m/s from both your viewpoint and Mr Slow's? The Michelson–Morley experiment demonstrated light was just like this.

The solution was to introduce something called **Lorentz contractions**. The idea is that, if you moved faster, then, amongst other things, time appeared to slow down.

So, imagine now that Ms Fast is travelling at c . Mr Slow accelerates to $0.5c$ and follows her. From your perspective, on the pavement side, Mr Slow will have traversed 150,000 km over the course of one second, whilst Ms Fast would have traversed 300,000 km – and so should have a velocity, relative to Mr Slow, of 150,000 km/s from your frame of reference.

But imagine that time slowed down for Mr Slow because he was going so fast, such that it's now running at half the rate. So during what you think is a second, Mr Slow will see Ms Fast travel 150,000 km ahead of him.

But as time has slowed down for Mr Slow, according to his watch only half a second has elapsed. So, when Mr Slow calculates Ms Fast's velocity relative to him he calculates her velocity as ... c . For she's travelled 150,000 km in 0.5 seconds, so is travelling at 300,000 km/s!

So, if time slowed down the faster you go, it's possible for everyone to think that Ms Fast is travelling at the same velocity relative to them.

The idea is that something very similar to this goes on with objects in our universe and accounts for the bizarre phenomenon Michelson and Morley witnessed.

All of this has been observed, so we know that these Lorentz contractions take place.

For instance, some particles have a very short half-life – they decay and cease to exist very quickly. But when travelling at high speed, they decay much more slowly, as if time were slowed down from their point of view, in exact accordance with Lorentz's predictions.

Now enter Einstein. The **special theory of relativity was meant to explain why these Lorentz contractions took place**. All we had to do was make the bold move of accepting that the relation of simultaneity was relative to our inertial frame of reference.

For example, this would mean that one event being simultaneous with another isn't true for everyone and varies depending on one's inertial frame.

Einstein achieves this by redefining simultaneity.

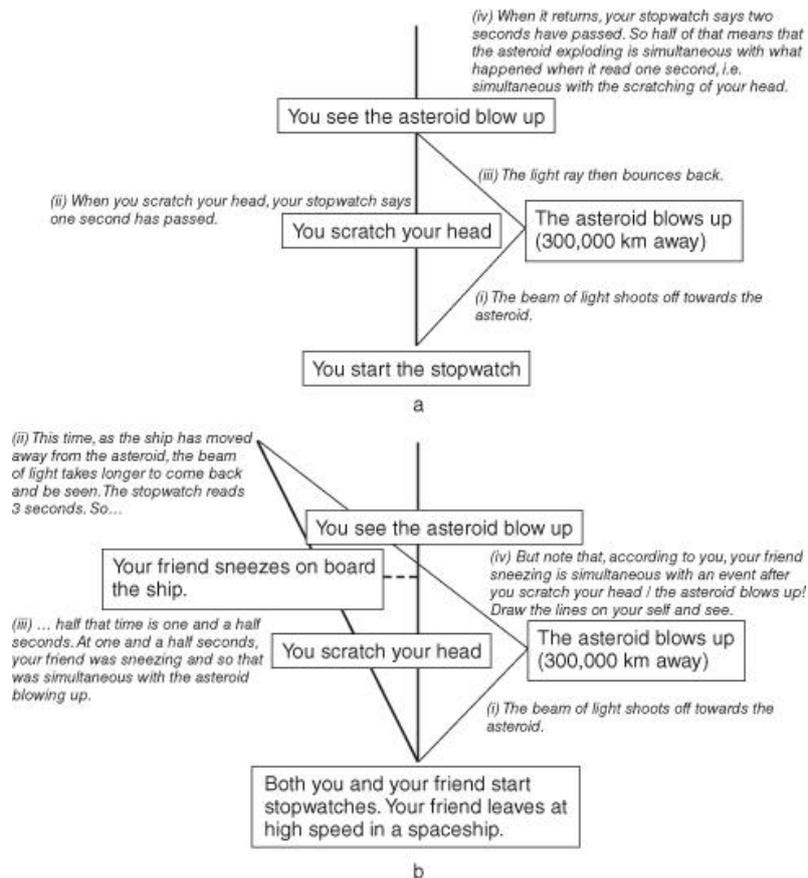
To get a grip on his definition, and how it relativizes simultaneity, imagine that we start a stopwatch when we shine a beam of light at another event, and when the beam returns we stop the stopwatch and, as the light has bounced back. Take the time elapsed on the stopwatch and call it T . The event we are now seeing took place, says Einstein, at $\frac{1}{2}T$.

For example, imagine you shine a beam of light at an asteroid blowing up over the earth, and by the time it returns two seconds have elapsed. which means that the asteroid's blowing up is 300,000 kilometres away.

Assuming, as Einstein does, that light moves at the same speed in every direction, the light beam took as long to get to the asteroid as it did to get back (which was two seconds). Einstein's definition says that the event took place half that time ago – that is, that it took place one second ago.

So, if you started the watch, scratched your head after a second and then a second later saw the asteroid blowing up, the scratching of your head was simultaneous with the asteroid blowing up. See Figure 7.1a.)

Figure 7.1 Simultaneity according to Einstein



From Einstein's definition, it follows that things in different inertial frames will register different answers as to when something is simultaneous.

this means that if something is going at a high velocity relative to you, then you'll think time is slowing down for your friend.

STR and presentism

According to presentism, only presently existing things exist. That seems only the things that are simultaneous with us exist.

But if STR is true, then what things are simultaneous with us vary depending upon our inertial frame. so what *exists* depends upon what inertial frame we are in. If you exist from my point of view, and something else exists from my point of view, it seems natural to think that the something in question also exists from your point of view i.e., that the '**exists for**' relation is **transitive**. It seems odd to think that it's true for me that both Ms Fast and Mr Slow exist but, from Mr Slow's point of view, only I exist.

Some people think that STR spells the end for presentism. Contemporary science, they say, rules out presentist theories. certainly **Einstein was an eternalist**, going as far as telling people at funerals to bear in mind that their deceased loved ones still exist, just not anywhere temporally local to them.

Presentists replies -

First, presentists might say that STR is a somewhat speculative theory, and hope for a superior scientific theory to take its place – one that doesn't require the relativity of simultaneity.

Rather, relativity appears to be inconsistent with **quantum mechanics**. Certain resolutions of this conflict, produced by contemporary physicists, involve giving up on Einstein's theory and reintroducing **absolute simultaneity**.

Second, some presentists have produced alternative theories of their own which allegedly have as much explanatory power as STR, but in which simultaneity is absolute rather than relative. Yet for things like Lorentz contractions, you'll never know exactly which events are simultaneous to each other.

This is somewhat like the **situation Newton finds himself in with absolute space**: there is a matter of fact as to whether you are in motion or not relative to unmoving absolute space, but there is no experiment that can tell you whether this is the case.

The presentist may think likewise of our world: there is a matter of fact as to whether one event is simultaneous with another but, because of Lorentz contractions, there's no experiment which we can conduct to tell us what the facts of the matter are.

The facts about simultaneity can never be proved one way or another.

But some presentists, such as **Michael Tooley**, reply that even Einstein had to make untestable assumptions. Look back at his definition of simultaneity. The event is only simultaneous with the event that took place at half the elapsed time on the stopwatch given the assumption that light travels at the same speed in every direction. But there's no way to test that assumption, and light might go at varying speeds depending upon what direction it goes in although it would always appear to be going at the same speed. So, as Einstein's theory has untestable assumptions, maybe it's not so bad that the presentist does too.

Third, the presentist might say that it is STR which is responsible for the weirdness, not presentism. STR itself has lots of weird ramifications; pointing at just another of its weird ramifications, and complaining that it's weird that what exists depends upon your inertial frame of reference, is just flogging a dead horse.

Blame Einstein and the physical theory for this counter-intuitive result – don't blame the presentist and his ontological theory!

Chapter summary

In this chapter, we have:

- introduced the different theories about time: presentism, eternalism; and briefly the growing block theory.
- introduced another theory of ontological commitment: truthmaking.
- introduced two purely metaphysical motivations for thinking that eternalism is true: issues about singular propositions and truthmakers.
- introduced the special theory of relativity and looked at how it might cause problems for the presentist.