

# Introduction: The Paradoxes of Time Travel

Antony Eagle

University of Adelaide  
<[antony.eagle@adelaide.edu.au](mailto:antony.eagle@adelaide.edu.au)>

Metaphysics » Lecture 1

# Contents

- The Nature of Metaphysics
- Method in Metaphysics
- Time Travel
- Identity for Time Travellers
- The Grandfather Paradox

# Acknowledgement of Country

*Kurna miyurna, Kurna yarta, ngai tampinhi*  
[Kurna people, Kurna country, I recognise]

I wish to acknowledge that these course materials were prepared on the traditional Country of the Kurna people of the Adelaide Plains. I recognise the past and ongoing attachment of Kurna people to this country, and respect and value the significance of this relationship for Kurna cultural and spiritual beliefs, both traditional and present in the lives of Kurna people today.

# Course Outline

- › This course will examine some central issues in metaphysics. We will examine topics in three main areas:
  1. The nature of time and its passing;
  2. Theories of change and persistence through time; and
  3. The question of free will and moral responsibility.
- › But what is metaphysics? And why these topics?

# The Nature of Metaphysics

# The Scope of Metaphysics

- › It's easy enough to **list** topics that are commonly discussed under the heading 'metaphysics': existence, being, possibility and necessity, freedom and determinism, mind and body, part and whole, constitution and composition, the nature of time and space, change and persistence over time, causation, laws, chance, properties, ....
- › But what makes these the special province of metaphysics? Surely metaphysics is not to be defined as 'the study of things on the above list'!
  - » Though van Inwagen and Sullivan come close: 'In trying to characterize metaphysics as a field, the best starting point is to consider the myriad topics traditionally assigned to it' (van Inwagen and Sullivan 2021: §1).

# Some attempted characterisations

[People] say that metaphysics is the study of “being qua being” (Aristotle, *Metaphysics* book IV). They say that it is the attempt to “get behind all appearances and describe things as they really are” (van Inwagen 1998: 11), and that it is the study of “what the world is like... as opposed to... how we think and talk about the world” (Sider, Hawthorne, and Zimmerman 2007: 1). They say that metaphysics is “inquiry into the most basic and general features of reality and our place in it (Kim and Sosa 1999: ix). They say that it is the study of “the fundamental structure of reality (Sider 2011: 1). And they say that is “about what grounds what. It is about the structure of the world. It is about what is fundamental, and what derives from it” (Schaffer 2009: 379).

(Bennett 2016: 28-29)

- › Let's take up this last idea: **fundamentality**.

# Exploring the fundamental

- › Jackson defines ‘serious metaphysics’ as the attempt to give a comprehensive account of some subject-matter - the mind, the semantic, or, most ambitiously, everything - in terms of a limited number of more or less basic notions....  
Serious metaphysics... seeks comprehension in terms of a more or less limited number of ingredients, or anyway a smaller list [of kinds of things] than we started with. (Jackson 1998: 4-5)
  - › In this sort of spirit, we might consider a first attempted definition:
- (1) Metaphysics is the study of the basic nature of the fundamental entities and properties that make up any possible reality, and the nature of the dependence of less fundamental entities on them.**

# Worries about (1)

1. Definition (1) may be too inclusive, since it fails to distinguish metaphysics from science (Bennett 2016: 29). Why isn't inquiry into the fundamental entities and properties **just** doing fundamental physics? And why think the **armchair inquiries** of metaphysicians would be effective in revealing these sorts of facts?
2. Is it also too restrictive? **Is there a fundamental level?** Maybe it's turtles all the way down! At least, this claim is conceivably true:

**Gunk** Every thing has a proper part (a part that is distinct from it).

- › (Gunk) is pretty clearly a metaphysical thesis (being about **parts**, it belongs on the list we started with).
- › But (1) entails that inquiry into the truth of (Gunk) isn't metaphysics – given the standard assumption that parts are more fundamental than wholes. So (1) is too narrow.

# Appearance versus Reality

Metaphysical investigations begin with initial appearances. For instance, one of the metaphysical issues that we [will consider] begins with the appearance that we act freely sometimes; another of our issues begins with the appearance that there are properties that many things share. ... In everyday life, these appearances are seldom questioned. In metaphysics, we investigate further. As we pursue a metaphysical topic, we seek to get beyond appearances. We consider arguments about how things really are. We seek to learn the reality of the situation. Reality may confirm initial appearances or it may undercut them. Either way, our goal is to find the ultimate reality. (Conee and Sider 2014: 233)

- (2) **Metaphysics is the study of how things really are, as opposed to how they appear.**

## (2) and inquiry more generally

- › Again, (2) doesn't distinguish metaphysics from science or other less academic areas of inquiry: aren't physicists, geologists, detectives, etc., all trying to figure out what is really going on?
- › Two options present themselves:
  1. Maybe, actually, this isn't so bad. Maybe what's distinctive about metaphysics isn't the aim, but the **techniques**: inquiry 'from the armchair'.
  2. Maybe there is a special sort of **subject matter** that metaphysicians inquire into. Note the use of 'ultimate' by Conee and Sider (2014), which suggests metaphysics might concern reality in its most general aspects. The most prominent candidate: metaphysics studies what is **possible** for reality (facts about what **must** and **could** be).
- › We can investigate these proposals in turn.

# Metaphysics individuated by methodology

- (3) **Metaphysics is the study of how things really are, as opposed to how they appear, using the techniques of rational argument and *a priori* reflection.**

Clearly, almost all (ahem, all) philosophers use *a priori* reasoning. But metaphysicians frequently use it ... to justify claims about what exists, about what objective reality is like. Not all metaphysicians, of course ... but it would be farcical to try to deny that broader uses of *a priori* reasoning are widespread in contemporary metaphysics. We make largely *a priori* arguments for and against the truth of the principle of unrestricted composition, and hence what composite objects exist. We make largely *a priori* arguments for and against the existence of nonactual possible worlds, other times, and abstract entities. And so on. But, goes the complaint, this is misusing a methodology if anything is! (Bennett 2016: 26)

# Metaphysics individuated by subject matter

- (4) **Metaphysics is the study of the ultimate extent of real possibility, as opposed to what more contingent and parochial enquiry regards as the limits of what is possible.**

Metaphysics is about what could be and what must be. Except incidentally, metaphysics is not about explanatorily ultimate aspects of reality that are actual, but need not have existed. Metaphysics is about some actual things, [but] only because whatever is necessary has got to be actual and whatever is possible might happen to be actual. This allows us to say that physics pursues the question of what the basic constitution of reality actually is, while metaphysics is about what it must be and what it could have been. (Conee and Sider 2014: 236)

# Metaphysics and Necessity

- › If facts about what is necessary and possible are themselves **necessary**, (4) looks quite appealing.
  - ›› Most metaphysical theories are ordinarily supposed to be **necessarily true if true** at all – though see Miller (2009).
  - ›› It also vindicates (3) to some extent, as it is at least somewhat plausible that the use of *a priori* reasoning is appropriate during inquiry into matters that **couldn't turn out to be otherwise**. (Compare mathematical reasoning, similar in this respect.)
- › For example: physics tells us what the trajectories of physical objects **are**. Metaphysics might tell us what the trajectories of physical objects **could be**.
  - ›› Thought experiments and consideration of possible cases will be the main tools of metaphysicians if this conception is right – and indeed we find that they are.

# Metaphysics and Essence

- › Metaphysicians thus shed some light on what physical objects, and trajectories, etc., **really are**, through identifying the possible limits on how they can be.
- › The topics of metaphysics are those where this sort of reflection on the scope and limits of their existence is particularly useful, because those features show up in all sorts of other places.
  - › So metaphysics tends to concentrate on features of great generality and wide applicability, the ‘building blocks’ of other areas of inquiry: e.g., the focus on objects, parts, causes, time, identity, etc.
- › One common idea that I don’t necessarily endorse is that this amounts to inquiry into **essences**.
  - › The essence of a kind of thing is whatever a thing **must be like** in order to be of that kind: the essence of *F*s is **what it is to be an *F***.
- › In any case, thinking of metaphysics in this way might also help resuscitate (1), if we understand what is fundamental not in terms of the most basic parts of reality, but the most basic elements of theorizing about reality.
  - › E.g., the relation of **parthood** isn’t a thing at all, and not a most basic thing; but it is a central relation in most sciences.

# Method in Metaphysics

# Appearance and Reality, revisited

- › This idea of metaphysics – inquiry into what is possible, in order to figure out the essences of things – explains part of metaphysics.
- › But our definition (2) gives a role to appearances too: how things appear needs to be **explained** and **accommodated**, not merely cast aside in our quest for ‘ultimate reality’.
- › Most metaphysicians accordingly endorse a criterion of **theory choice** in metaphysics something like this:

One metaphysical system is superior to another in scope in so far as it allows for the statement of satisfactory philosophical theories on more subjects – theories that preserve, in the face of puzzle and apparent contradiction, most of what we take ourselves to know (Loux and Zimmerman 2003: 5).

## Example: 'Touching'

The atoms that make up matter never touch each other. The closer they get, the more repulsion there is between the electrical charges on their component parts. ... This even applies when objects appear to be in contact. When you sit on a chair, you don't touch it. You float a tiny distance above, suspended by the repulsion between atoms. (Clegg 2013)

- › This is a bit of amateur metaphysics. There is a puzzle here: how do we reconcile the appearances of contact, with the physics of repulsion?
- › The argument relies on something like this account of touching – an account of **what it is** for things to touch:
  - (5) Objects touch exactly when there is no space between them.

# Touching again

- › But (5) is a pretty terrible theory.
  1. It conflicts with what we already know, namely, that things come in contact **all the time**.
  2. It actually has the consequence, independent of the physics, that only some things can touch – because space is continuously divisible, the only objects that can touch are such that one occupies an **open** region, and the other a **closed** region.
- › We ought to replace (5) with something like:
  - (6) **Objects touch exactly when the net forces between them are sufficient to prevent any further decrease of the distance between them.**
- › This is physically respectable and retains most of our ordinary beliefs about which things touch each other.
  - ›› Note that (5) is the naive view of touching, so accepting (6) doesn't retain **all** our prior beliefs.

# Metaphysical Method

- › This case demonstrates in miniature the standard **aim** and **method** in metaphysics.
  - ›› The aim is to construct a systematic theory of some target feature  $F$ , an account of what possible cases count as  $F$ s.
  - ›› The method is to choose the account that strikes the best balance between **simplicity**, logical **coherence**, and **plausibility** in light of our existing commitments (both scientific and ‘folk’).
- › This almost certainly involves some **revision** of our prior beliefs, because almost always we are theorising about some *prima facie* puzzles involving  $F$ : some conflict or tension among some of the things we believe about  $F$ s.

# Dubious Metaphysics?

- › Is this method dubious (Ladyman and Ross 2007)? It might be if (i) we don't know anything to start with, or (ii) we are bad at coming up with or describing possible cases, or (iii) poor at reasoning.
- › But in fact there is considerable evidence that we are good at these things outside of the metaphysics classroom; and that all that is going inside the metaphysics room is just the **careful and systematic** application of patterns of reasoning that are necessary and important to us outside of it:
  - ... we can do philosophy on the basis of general cognitive capacities that are in no deep way peculiarly philosophical (Williamson 2008: 178).
- › So much for this 'metametaphysics': from now, we will simply **use** this sort of abstract method to decide some first-order metaphysical issues.

# Metaphysics and meta-physics

- › One way of addressing Ladyman-style worries: draw on real physics (Ladyman 2007).
- › Given our audience and the breadth of the course, there are limitations on how effectively we can do this.
- › That said, in three topics in particular some developments in modern physics are relevant
  - ›› When we discuss **the direction of time**, we look at the thermodynamic asymmetries and their foundation in statistical mechanics.
  - ›› The topic of **relativistic persistence** is entirely focussed on the consequences for time and change of the theory of relativity.
  - ›› The question of the actual **reality of free will** turns in part on the question of determinism, where the metaphysics of quantum mechanics is of particular relevance.

# Time Travel

# Metaphysics and Time Travel

- › Lewis (1976) provides an entry point into all of the topics we'll cover in this course: time, persistence, and free will.
- › But Lewis ties these topics together in a perhaps unexpected framework: through a discussion of the paradoxes of **time travel**.
- › Today, I want to quickly go over what the problems are, and the ingredients of Lewis' solutions, and point to what we'll do over the course of the semester.
- › It's particularly appropriate: this paper is based on Lewis' **Gavin David Young lectures** at Adelaide in 1971.

# Time Travel in Fiction

- › Time travel has been a staple trope in science fiction; much of this literature is in fact internally incoherent, but there are some examples of consistent time travel stories
  - › In literature, Robert Heinlein's “—All You Zombies—” (reprinted in Rea (2009: 178–85); adapted as *Predestination*, dir. Spierig & Spierig, Australia, 2014) and ‘By His Bootstraps’, and Robert Silverberg's ‘Absolutely Inflexible’ (Rea 2009: 186–92). And on our reading list, an excellent recent example by Ted Chiang, ‘The Merchant and the Alchemist's Gate’ (2007).
  - › In film, *Los Cronocrímenes* (‘Timecrimes’, dir. Nacho Vigalondo, Spain 2007).
- › There are practical and conceptual issues involved; some information on the physics involved can be found in Arntzenius and Maudlin (2013).
- › But our focus will be on conceptual issues, in particular: whether time travel is paradoxical (Horwich 1975; Lewis 1976).

# What is Time Travel?

- › Lewis says that time travel inevitably involves a discrepancy between time and time. Any traveler departs and then arrives at his destination.... If he is a time traveler, the separation in time between departure and arrival does not equal the duration of the journey. (Lewis 1976: 145)
- › What about cases of backward time travel where I travel for an hour into the past, and it takes an hour? We need to treat duration as 'signed', or having **direction**, so the separation is +1 hour of travel, -1 hour difference between arrival and departure. (And of course we must keep the time zones constant too!)
- › This gives rise to the **first paradox of time travel**: 'How can it be that the same two events, his departure and his arrival, are separated by two unequal amounts of time?' (Lewis 1976: 145).

# Two Time Dimensions?

- › Do the two temporal gaps merely indicate two different **dimensions** of distance?
  - » You might have relatively independent reason to accept two time dimensions, if for example you think that making sense of the **passing of time** must involve making sense of the rate of its passing, rates like ‘one second per second’, and that positing **hypertime** is the right way to do that – we’ll come back to this when we discuss **the passage of time**.
- › But, Lewis points out, this won’t give us time travel – for example, one doesn’t end up in the same place you were when you supposedly travel back in time: you are no longer separated from [your childhood playmates] along one of the dimensions of time, but ... still separated from them along the other. (Lewis 1976: 145)

# Trajectories of Things Through Time and Space

- › Lewis invites us to think of the world as ‘a four-dimensional manifold of events’ (Lewis 1976: 145) – taking something like an atemporal ‘God’s-eye’ view of reality.
- › People, chairs, particles, galaxies – indeed, all objects that **persist** over time – have a **trajectory** in this four-dimensional manifold. This is something like the history of all the points of space and time that a given object has occupied. At each such time, an persisting object has a **stage**.
  - › Lewis thinks a stage is literally a part, like your arm is part of you, but let’s leave his argument for that until **later**. But everyone should be able to make sense of the idea that persisting things have stages, though they might interpret stages as parts of the *life-history* of a thing rather than parts of the thing itself.
- › **Change** is variation in (genuine) features between stages of a single persisting thing.

# The Trajectories of Time Travellers

- › Ordinary persisting objects have **boring** trajectories: they intersect any time they occupy just once; they intersect every time between their inception and demise; etc.
- › Time travellers have trajectories too, but theirs differ from the trajectories of ordinary objects by violating one or more of these features: so travellers to the past occupy **more than one** time point; instantaneous time travellers have a **discontinuous** trajectory, etc.
- › What about a person, *NoGaps* who, aged 20 in 2020, instantaneously time travels to 2030, lives normally until 2040, travels back to 2020, lives normally until 2030, then travels forward to 2040? This involves no dual occupancy, nor discontinuity, but is still time travel.

# Personal Time

- › The answer lies in **personal time**: that measure of elapsed time between stages which ‘occupies a certain [functional] role in ... the time traveller’s life’ (Lewis 1976: 146).
- › The personal time of a person is something like: **the unique way of assigning pseudo-temporal coordinates to an aggregate of momentary person stages so that it can be interpreted as a genuine person** (Lewis 1976: 149).
- › And this is Lewis’ solution to our **first paradox**: time travel involves a difference between **external time**, the real time coordinates of two events, and the personal time of a person involved in both events. The location of events in personal time ‘depends on their locations in one-dimensional external time’ (Lewis 1976: 147), so this is not a new time-dimension, no more than distance along a path is a new spatial dimension.
- › Return to *NoGaps*: their stages are jumbled up, so that even though their life fills all the time between their birth and death, it does so in the ‘wrong’ order from an external perspective; it only makes sense from the perspective of their personal time.

# Problems for Personal Time?

- › Personal time is defined functionally, with reference to ‘the common regularities with respect to external time’ (Lewis 1976: 146) in the lives of creatures like the time traveller.
  1. What if there are **too few** creatures like the time traveller, or their lives are **too chaotic** to exhibit any such regularities?
  2. What if the lives of creatures like the time traveller are **too boring**, so that it is too hard to get personal time to disagree with external time (think of a rock in interstellar space – nothing much happens to it, and pretty much any way of jumbling up its stages is like any other. So does it have more than one personal time? Or, since it’s easy to make sense of the aggregate of rock stages in terms of external time, does it not get to time travel in many standard ways?)
  3. How do we distinguish **metabolic alteration** from time travel? (Think of delayed ageing, or metabolic reversal as in Watson (1979), or the more ordinary case of time discrepancy due to acceleration in the twin ‘paradox’ (Eagle 2005).)

# Questions About Time in Lewis' Framework

- › Lewis' framework is neat; it involves figuring out whether there is time travel in some case by looking at the whole history of the case and detecting anomalous trajectories.
- › But is this the right way to think about time?
  - › It's plausible that **only present things exist**; **the past is no longer, and the future is yet to be**. But how can we square this thought with the existence of four-dimensional trajectories (Keller and Nelson 2001)?
  - › A time traveller to the distant past or future jumps away from the **moving present now** – they might say, getting out of their time machine, 'it's now 1879', but they will be wrong. How can we understand (their experience of) the passage of time?
  - › And how does this nice 4D picture square with **relativity**, which also involves both **space and time**, but in a different way?

# Identity for Time Travellers

# Identity Over Time in Time Travel Cases

A time traveler who talks to himself ... looks for all the world like two different people talking to each other.... What's true is that he, unlike the rest of us, has two different complete stages located at the same time at two different places. What reason have I, then, to regard him as one person and not two? What unites his stages, including the simultaneous ones, into a single person (Lewis 1976: 147)

- › This is a **second** paradox of time travel: what makes the time travel description in terms of an ordinary person with jumbled stages **correct**, rather than an alternative description of several extraordinary persons with no time travel?
- › Lewis' answer: the fact that the stages of a time traveller are connected by the 'same sort of mental, or mostly mental, continuity and connectedness that unites anyone else' (Lewis 1976: 148).

## Two Extraordinary Scenarios

- › Both scenarios involve discontinuous aggregates of person stages. The sceptical worry is that there is no difference between them, because there is no difference in what's happening at each point in time on either.
- › However, if the alternative description is true, the scenario involves extraordinary 'people' and is sheer **coincidence** that some earlier stages of *X* resembles the later stages of *Y*.
  - › This will be like the case of Fred and Sam (Lewis 1976: 148).
- › But in a case of genuine time travel, this is no coincidence: the features of later stages of *Y* **cause** features of the earlier stages of *X*:

The connectedness and continuity are not accidental.... they are explained by the fact that the properties of each stage depend causally on those of the stages just before in personal time, the dependence being such as tends to keep things the same (Lewis 1976: 147).

# Worries About Personal Time Addressed

- › Closer attention to the **causal processes** linking the stages together will permit us to assign a personal time to any aggregate of stages.
- › We can use the **causal ordering** to derive both that there are the right relations among stages for them to collectively constitute a given kind of thing; and to derive the ordering among stages that is the basis of personal time.
- › If the order so derived is at variance with external time, we can admit a case of time travel, even perhaps an **unexpected** one like very slow time machines, or circular time in GR. (No problem there – a philosophical account of time travel should allow us to revise our naive opinions.)
  - » Lewis himself thinks that whether a causal process exists is grounded in ‘chains of counterfactual dependence’ (Lewis 1976: 148; see also Lewis 1973) – and the truths about such claims depends on the **global patterns of non-accidental regularities between events**. (So this task is harder for him.)

# Weird Causation?

- › One thing Lewis' more complicated story about causation has got going for it is that the direction of causation depends on merely '*de facto* asymmetries of time', and is not built in to causation.
- › So the kind of **backwards causation** needed for backward personal identity, or **causal loops** needed by some time travel stories – including the story about the transmission of information about time travel (Lewis 1976: 149) – is, though very weird, consistent with Lewis' positive view.
- › We're not going to talk more about causation, even though it's a pretty central metaphysical topic. But it will come up from time to time in what follows.

# Questions about Identity and Change in Lewis' Framework

- › Again, Lewis' picture of identity is neat: a persisting person is a bunch of stages linked up by some relations of continuity and connectedness that are characteristic of the causal relations among stages of persons. (Likewise for other kinds.)
- › But that doesn't seem to be **identity** – it seems to be something rather weaker, that can hold (and, Lewis thinks, does hold) between things which are non-identical. So how can *this* be the foundation of identity over time?
- › Similarly, mere variation between stages without identity doesn't seem to give us genuine **change**.
- › And without either identity or change, how can this framework possibly address the puzzles over **persistence over time**, and **personal identity**, that have troubled philosophers since the Stoics?

# The Grandfather Paradox

# What Can Time Travellers Do?

Some might concede all this, but protest that the impossibility of time travel is revealed after all when we ask not what the time traveler *does*, but what he *could do*. Could a time traveler change the past? It seems not: the events of a past moment can no more change than numbers could. Yet it seems he would be as able as anyone to do things that would change the past if he did them. If a time traveler visiting the past both could and couldn't do something that would change it, then there cannot possibly be such a time traveler. (Lewis 1976: 149)

- › A **third** paradox of time travel. Consider duplicates Tim and Tom: both wish to kill Tim's grandfather; both have motive, means, opportunity... yet only Tom will succeed if he tries. So it seems, only Tom can kill. Yet every feature that grounds Tom's ability also holds of Tim!

# Changing the Past: No

- › Many incoherent time travel stories involve changing the past. But: past events can't change, because they are momentary and **cannot** exhibit variation (nor, therefore, change) over their one stage.
- › It also follows from the 4D framework; to change the past would involve it being true at  $t$  that  $A$ , and 'then' (in some sense later) false at  $t$  that  $A$ ; but it is not possible for contradictions to be true. So any truth about the past remains eternally true, and cannot be changed.
- › Indeed, this is true of **any time**:  
no more can anyone change the present or the future... You cannot change a present or future event from what it was originally to what it is after you change it. What you *can* do is to change the present or the future from the unactualized way they would have been without some action of yours to the way they actually are. (Lewis 1976: 150)

## Context-sensitivity of *can*

- › So Tim can't change the past – no one can. But what explains the appeal of the thought that Tim can (in virtue of motive, means, opportunity)?
- › Lewis' answer: *can* is **equivocal** – it is said in two meanings in the two premises which generate the paradox, and once we identify this, we can see that both premises can be truly said, but their conjunction cannot be truly said.
- › How? It's like these cases: I say *I am tall*; you say *I am short*. Both can be truly said; yet their **conjunction** cannot be truly said, by anyone: *I am tall and I am short* is a flat out contradiction.
- › The resolution: *I* is equivocal, **meaning different things in the mouths of different speakers**.
- › Lewis says: *can* is semantically a bit like *I* (see also Kratzer 1977; Portner 2009):  
To say that something can happen means that its happening is compossible with certain facts. *Which* facts? That is determined, but sometimes not determined well enough, by context... What I can do, relative to one set of facts, I cannot do, relative to another, more inclusive, set. (Lewis 1976: 150)

# Which Facts Are Relevant?

- › Lewis' flat-footed answer: facts about the past and present circumstances are relevant to an evaluation of ability. But
  - facts about the future of the time in question are ... not the sort of facts we count as relevant in saying what Tom can do. (Lewis 1976: 151)
- › But in the case of time travellers this simple division is not readily applicable – for facts about the external future are facts about Tim's **personal past**; and maybe these are relevant for the evaluation of Tim's abilities. At least, they can more easily seem to be relevant, hence the possibility of equivocating without noticing.
  - › This is also Lewis' diagnosis of the appeal of **fatalism** (the thesis that everything that will happen, must happen) – something we'll return to **later**.
- › Some question whether, even granting Lewis' assumptions, time travellers can kill their ancestors (Vihvelin 1996; Sider 2002).

# Questions about Ability and Action in Lewis' Framework

- › The things that time travellers are able to do, for Lewis, are just the things they can do, that it is possible for them to do.
- › One might ask: is this enough? Is the fact that, in some context of utterance, one can truly say *X can A*, **enough** for us to say that, really, *X* has the ability to *A* (Vihvelin 1996)?
  - › I can, by chance, throw a dart to hit a bullseye; but do I have the ability to hit the bullseye (Kenny 1976)?
- › And what's the connection between this stuff and **determinism** – for that's another situation in which we think certain facts about are not compatible with our doing otherwise, yet those seem to be unimpeachable facts about the **past**, together with the **laws of nature**. (Hint: are the laws of nature really just facts about the past?) And if we cannot do otherwise, do we have **free will**?

# What will Time Travellers Do?

- › We know that, even though Tim is able (in some sense) to kill his grandfather, he will fail, because it's already settled and in the past that he did fail.
- › Why will he fail? There is no general answer: maybe his gun will jam, or someone will step in the way, or he'll slip on a banana peel...
- › Is this **conspiracy of coincidences** a problem?
  - › It might be: coincidences are **unlikely**, and since backwards time travel requires them, there is a certain **practical incoherence** in backwards time travel (Sider 2002: §4).
  - › There are replies to this argument (Smith 1997; Sider 2002). Both argue that backwards time travel doesn't require the occurrence of improbable things, in different ways.

# Conclusion

- › We've looked at Lewis on time travel. It's a **package deal**.
- › But we've identified a number of troubling aspects of the package: I've raised, without answering, questions about whether his assumptions about **time**, **identity**, and **ability** are correct.
- › **Keep them in mind**: It's the goal of the rest of the semester to address these questions.

# References

# References

- Arntzenius, Frank and Tim Maudlin (2013) 'Time Travel and Modern Physics', in Edward N Zalta, ed., *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/archives/win2013/entries/time-travel-phys/>.
- Bennett, Karen (2016) 'There Is No Special Problem with Metaphysics', *Philosophical Studies* 173: 21–37. doi:10.1007/s11098-014-0439-0.
- Chiang, Ted (2007) 'The Merchant and the Alchemist's Gate', *Fantasy & Science Fiction* 113: 135–60.
- Clegg, Brian (2013) '20 Amazing Facts about the Human Body', *The Guardian*. <https://www.theguardian.com/science/2013/jan/27/20-human-body-facts-science>.
- Conee, Earl and Theodore Sider (2014) *Riddles of Existence*, 2nd edition. Oxford University Press.
- Eagle, Antony (2005) 'A Note on Dolby and Gull on Radar Time and the Twin "Paradox"', *American Journal of Physics* 73: 976–79. doi:10.1119/1.1994855.
- Horwich, Paul (1975) 'On Some Alleged Paradoxes of Time Travel', *Journal of Philosophy* 72: 432–44.
- Jackson, Frank (1998) *From Metaphysics to Ethics*. Oxford University Press.

## References (cont.)

- Keller, Simon and Michael Nelson (2001) 'Presentists Should Believe in Time Travel', *Australasian Journal of Philosophy* **79**: 333–45. doi:[10.1080/713931204](https://doi.org/10.1080/713931204).
- Kenny, Anthony (1976) 'Human Abilities and Dynamic Modalities', in J Manninen and R Tuomela, eds., *Essays on Explanation and Understanding: Studies in the Foundations of Humanities and Social Sciences*: 209–32. D. Reidel.
- Kim, Jaegwon and Ernest Sosa (1999) *Metaphysics: An Anthology*, 1st edition. Blackwell.
- Kratzer, Angelika (1977) 'What "Must" and "Can" Must and Can Mean', *Linguistics and Philosophy* **1**: 337–55. doi:[10.1007/BF00353453](https://doi.org/10.1007/BF00353453).
- Ladyman, J (2007) '[Does Physics Answer Metaphysical Questions?](#)', *Royal Institute of Philosophy Supplement* **82**: 179–201.
- Ladyman, James and Don Ross (2007) *Every Thing Must Go: Metaphysics Naturalized*. Oxford University Press.
- Lewis, David (1973) 'Causation', *Journal of Philosophy* **70**: 556–67. doi:[10.2307/2025310](https://doi.org/10.2307/2025310).
- Lewis, David (1976) '[The Paradoxes of Time Travel](#)', *American Philosophical Quarterly* **13**: 145–52.

## References (cont.)

- Loux, Michael J and Dean Zimmerman, eds. (2003) *Oxford Handbook of Metaphysics*. Oxford University Press.
- Miller, Kristie (2009) 'Defending Contingentism in Metaphysics', *Dialectica* **63**: 23–49. doi:[10.1111/j.1746-8361.2009.01181.x](https://doi.org/10.1111/j.1746-8361.2009.01181.x).
- Portner, Paul (2009) *Modality*. Oxford University Press.
- Rea, Michael C, ed. (2009) *Arguing about Metaphysics*. Routledge.
- Schaffer, Jonathan (2009) 'On What Grounds What', in David Manley, David J Chalmers and Ryan Wasserman, eds., *Metametaphysics: New Essays on the Foundations of Ontology*: 347–83. Oxford University Press.
- Sider, Theodore (2002) 'Time Travel, Coincidences and Counterfactuals', *Philosophical Studies* **110**: 115–38. doi:[10.1023/A:1020205802833](https://doi.org/10.1023/A:1020205802833).
- Sider, Theodore (2011) *Writing the Book of the World*. Oxford University Press.
- Sider, Theodore, John Hawthorne, and Dean W Zimmerman, eds. (2007) *Contemporary Debates in Metaphysics*. Blackwell.
- Smith, Nicholas J J (1997) 'Bananas Enough for Time Travel?', *British Journal for the Philosophy of Science* **48**: 363–89. doi:[10.1093/bjps/48.3.363](https://doi.org/10.1093/bjps/48.3.363).

## References (cont.)

- van Inwagen, Peter (1998) 'The Nature of Metaphysics', in S Laurence and C MacDonald, eds., *Contemporary Readings in the Foundations of Metaphysics*: 11–21. Blackwell.
- van Inwagen, Peter and Meghan Sullivan (2021) 'Metaphysics', in Edward N Zalta, ed., *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University.  
<https://plato.stanford.edu/archives/win2021/entries/metaphysics/>.
- Vihvelin, Kadri (1996) 'What Time Travelers Cannot Do', *Philosophical Studies* **81**: 315–30.  
doi:[10.1007/BF00372789](https://doi.org/10.1007/BF00372789).
- Watson, Ian (1979) 'The Very Slow Time Machine', in *The Very Slow Time Machine*: 1–31. Ace Books.
- Williamson, Timothy (2008) *The Philosophy of Philosophy*. Blackwell.