

**Phil 420: *Metaphysics*
Spring 2008**

[Handout 22]

David Lewis: *Paradox of Time Travel*

Professor JeeLoo Liu

§ Main Theses:

1. Time travel is possible under a four-dimensional space-time view.
2. The paradoxes of time travel are oddities, but not impossibilities.
3. We should regard the scattered stages of the alleged time traveler as comprising a single person.
4. We could separate personal time from external time, and we can legitimately assign to those stages and their surroundings a personal time order that disagrees sometimes with their order in external time.

* What is time travel?

___ Inevitably, it involves discrepancy between time and time. Any traveler departs and then arrives at his destination; the time elapsed from departure to arrival is the duration of the journey. But if he is a time traveler, the separation in time between departure and arrival does not equal the duration of his journey.

Q: How can it be that the same two events, his departure and his arrival, are separated by two unequal amounts of time?

Hypothesis #1: Time as a two-dimensional plane

1. There are two independent time dimensions; time is not a line but a plane. A pair of events may have two unequal separations if they are separated more in one of the time dimensions than in the other.
2. The lives of ordinary people occupy straight diagonal lines across the plane of time, sloping at a rate of exactly one hour of time₁ per hour of time₂. The life of the time traveler occupies a bent path,

Objection:

___ This account is inconsistent with the stories of time travel, because the time traveler would not meet his playmates when he revisits the days of his childhood. He would not have reached the part of the plane where they are.

Hypothesis #2: Time as one-dimensional line

[Four-Dimensionalism]:

1. The world is a four-dimensional manifold of events. Time is one dimension of the four.

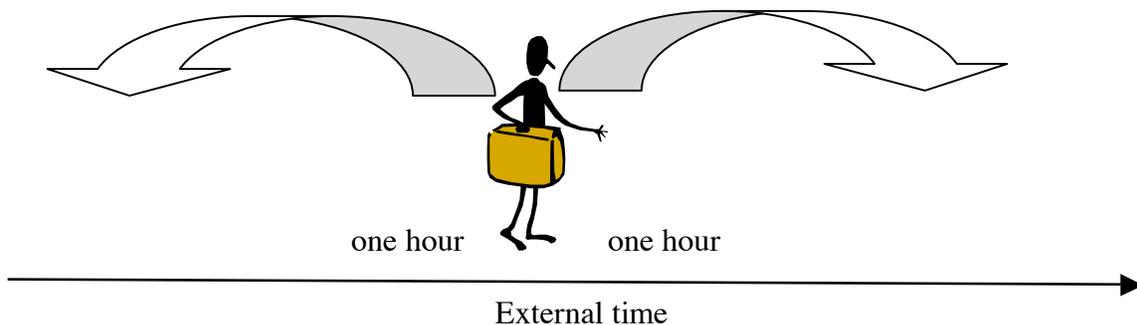
2. Enduring things are timelike streaks: wholes composed of temporal parts, or stages, located at various times and places.
3. Change is qualitative difference between different stages – different temporal parts – of some enduring thing, just as a “change” in scenery from east to west is a qualitative difference between the eastern and western spatial parts of the landscape.
4. What doesn’t have temporal parts can’t change. (e.g. numbers can’t change; nor can the events of any moment of time.)

A time traveler, is a streak through the manifold of space-time, a whole composed of stages located at various times and places. But he is not a streak like other streaks. If he travels toward the past he is a zig-zag streak, doubling back on himself. If he travels toward the future, he is a stretched-out streak. And if he travels either way instantaneously, so that there is no intermediate stages between the stage that departs and the stage that arrives and his journey has zero duration, then he is a broken streak.

*** external time versus personal time**

The personal time is measured by the time traveler’s wristwatch. His journey takes an hour of his personal time. But the arrival time is more than an hour after the departure in external time, if he travels toward the future; or the arrival is before the departure in external time, if he travels toward the past.

We may say “soon he will be in the past,” and what we mean is that a stage of him is slightly later in his personal time, but much earlier in external time, than the stage of him that is present as we say the sentence.



If you take the stages of a common person, they manifest certain regularities with respect to external time. Properties change continuously as you go along, for the most part, and in familiar ways. But if you take the stages of a time traveler, they do not manifest the common regularities with respect to external time.

*** The stage theory: A person has different stages located in time, but it is the same person who persists through time. Her personal identity is preserved.**

If a time traveler talks to his former self, it isn't quite right to say that the whole of him is in two places at once, since neither of the two stages involved in the conversation is the whole of him, or even the whole of the part of him is located at the (external) time of the conversation. What is true is that he, unlike the rest of us, has two different complete stages located at the same time at different places.

Q: Is he one person with different stages, or different person continuing existence successively?

The natural way to regard him as more than one person is to take each segment as a different person. No one of them is a time traveler, and the peculiarity of the situation comes to this: all but one of these several people vanish into thin air, all but another one appear out of thin air, and there are remarkable resemblances between one at his appearance and another at his vanishing.

Lewis's defense of the personal identity view:

___ [He is the same person with different stages because] what unites the stages of a time traveler is the same sort of mental, or mostly mental, continuity and connectedness that unites anyone else.

___ There is not too much change altogether. Plenty of traits and traces last a lifetime.

___ The connectedness and the 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, and this dependence tends to keep things the same.

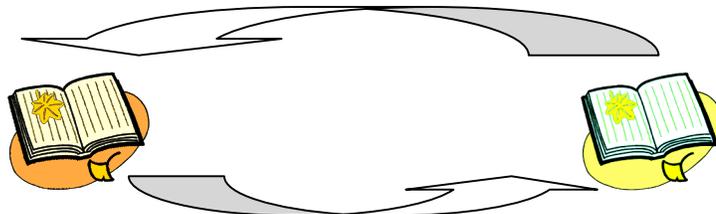
§ Time travel, causal reversal, and causal loops

1. Time travel requires personal identity – he who arrives must be the same person who departed.
2. Personal identity requires causal continuity, in which causation runs from earlier to later stages in the order of personal time.
3. But the orders of personal and external time disagree at some point, and there we have causation that runs from later to earlier stages in the order of external time.
4. Therefore, reversed causation and time travel are not excluded altogether.
5. But if there are local causal reversals, then there may also be causal loops: closed causal chains in which some of the causal links are normal in direction and others are reversed.

Examples:

(i) the way to build a time machine

(ii) the notebook



§ The Paradox of the Grandfather

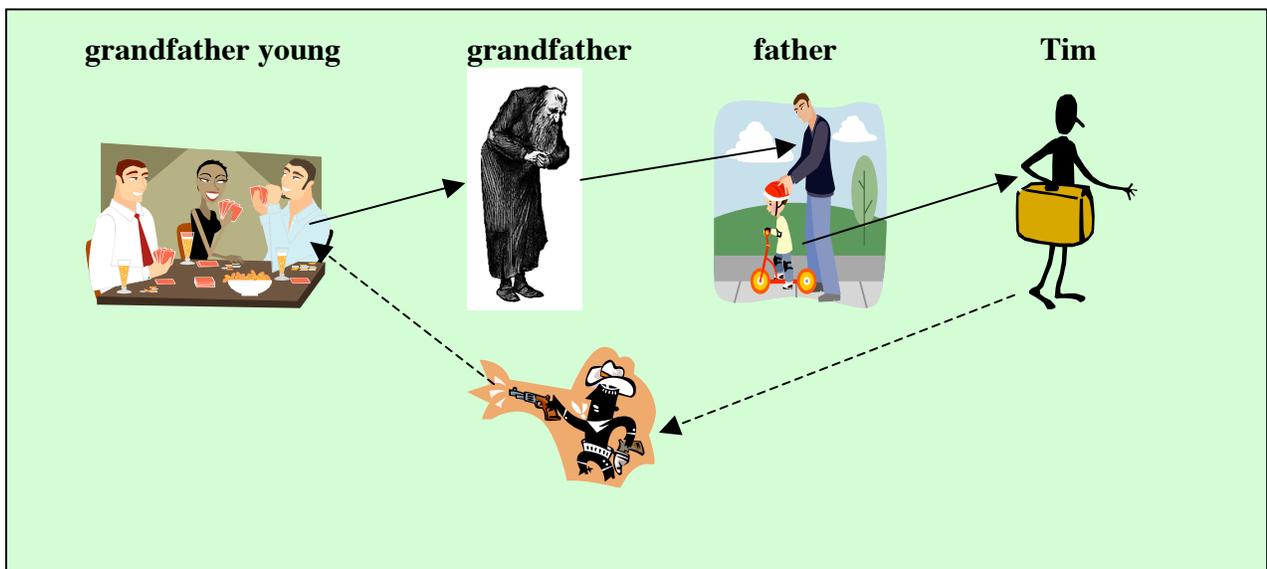
Q: Could a time traveler change the past?

It seems not: the events of the past could not change.

It seems yes: the time traveler would be 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.

* The paradox of the Grandfather:



1. By ordinary standard of ability, Tim can kill grandfather.
2. But Tim cannot kill grandfather. Grandfather lived, so to kill him would be to change the past. It is logically impossible to change the past.
3. The above is a contradiction.

*Lewis' diagnosis:

___ There is no contradiction. Both conclusions are true. They are compatible because "can" is equivocal.

[compossible]: being able to coincide with other things, consistent with

1. To say that something can happen means that its happening is *compossible with* certain facts – which facts is determined by context.
2. Whenever the context leaves it open which facts are to count as relevant, it is possible to equivocate about whether x can do A .

Tim's case:

___ Time's killing Grandfather that day in 1921 is compossible with a fairly rich set of facts: the facts about his rifle, his skill and training, Relative to these facts, Tim *can* kill Grandfather. But his killing Grandfather is not compossible with another, more inclusive set of facts. There is a simple fact that Grandfather was not killed. Also there are various other facts about Grandfather's doings after 1921 and their effects: Grandfather begat Father in 1922 and Father begat Tim in 1949. Relative to these facts, Tim cannot kill Grandfather. He can and he can't, but under different delineations of relevant facts.

You can reasonably choose the narrower delineation, and say that he can; or the wider delineation, and say that he can't. But choose. What you mustn't do is waver, say in the same breath that he both can and he can't, and then claim that this contradiction proves that time travel is impossible.

Q: What is Lewis' argument here?

1. What counts as "can" = what is compossible with a set of given facts.
2. 'Tim *can* kill Grandfather' is compossible with a set of facts A.
3. 'Tim *cannot* kill Grandfather' is compossible with another set of facts B.
4. $A \neq B$.
5. Hence, there is no contradiction involved in Tim's traveling back in time.

Q: Is this a good argument?**§ Conclusion**

If you suppose Tim to kill grandfather and hold all the rest of his story fixed, of course you get a contradiction. If you make *any* counterfactual supposition and hold all else fixed you get a contradiction. The thing to do is rather to make the counterfactual supposition and hold all else as close to fixed as you consistently can. That procedure will yield perfectly consistent answer to the question: what if Tim had not killed Grandfather? In that case, some of the story I told would not have been true. Hence it is false (according to the unrevised story) that if Tim had killed Grandfather then contradictions would have been true.