

The paradox of time travel

PHIL 20229

Jeff Speaks

January 29, 2008

1 The paradox of time travel

Consider the following story:

“You are very depressed. You are suicidally depressed. You have a gun. But you do not quite have the courage to point the gun at yourself and kill yourself in this way. If only someone else would kill you, that would be a good thing. But you can’t really ask someone to kill you. That wouldn’t be fair. You decide that if you remain this depressed and you find a time machine, you will travel back in time to just about now, and kill your earlier self. That would be good. In that way you even would get rid of the depressing time you will spend between now and when you would get into that time machine. You start to muse about the coherence of this idea, when something amazing happens. Out of nowhere you suddenly see someone coming towards you with a gun pointed at you. In fact he looks very much like you, except that he is bleeding badly from his left eye, and can barely stand up straight. You are at peace. You look straight at him, calmly. He shoots. You feel a searing pain in your left eye. Your mind is in chaos, you stagger around and accidentally enter a strange looking cubicle. You drift off into unconsciousness. After a while, you can not tell how long, you drift back into consciousness and stagger out of the cubicle. You see someone in the distance looking at you calmly and fixedly. You realize that it is your younger self. He looks straight at you. You are in terrible pain. You have to end this, you have to kill him, really kill him once and for all. You shoot him, but your eyesight is so bad that your aim is off. You do not kill him, you merely damage his left eye. He staggers off. You fall to the ground in agony, and decide to study the paradoxes of time travel more seriously.” (Arntzenius & Maudlin, <http://plato.stanford.edu/entries/time-travel-phys/>)

One thing that seems weird about this story is that it seems that you *had* to fail to kill yourself with the gunshot. Otherwise, if you had killed yourself, you would not have entered the time machine, and hence would not have shot yourself, and hence not killed yourself. But this is a contradiction; and we know that it is impossible for a contradiction to be true.

2 Time travel and the general theory of relativity

Time travel stories become genuinely paradoxical — rather than just an intriguing but ultimately incoherent — because many people believe that Einstein’s theory of general relativity implies that time travel is possible. By saying that it’s possible, they mean that it is consistent with the laws of nature that time travel really occur. We’ll say that something which is possible in this sense is ‘physically possible.’

1. The general theory of relativity is true.
 2. If the general theory of relativity is true, then time travel is physically possible.
 3. If time travel is physically possible, then visiting your previous self is physically possible.
 4. If visiting your previous self is physically possible, then killing your previous self is physically possible.
-
- C1. Killing your previous self is physically possible. (1,2,3,4)
C2. Killing your previous self is logically possible. (C1)

This is a paradox: we have some premises which look true, and a valid argument from them to a conclusion which seems clearly to be false.

3 Time travel and the existence of other times

Suppose that it is possible to travel into the past or future. One might think that this implies that the past and the future must exist — since otherwise, how could one travel there? But this seems to count against the view, which we discussed in connection with McTaggart’s argument and the special theory of relativity, that only present events exist.

Consider the following counter-argument: we’re always traveling, moment by moment, into the present; but, according to the view in question, the present does not exist. So does time travel raise any *new* problems for this view?