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The Grandfather Paradox

Bruno hates his grandfather, and not without reason. Grandfather was a gambler and a drunk, and he orchestrated a large scale fraud, which left hundreds of people in poverty. Nothing would please Bruno more than killing Grandfather. Unfortunately, Grandfather died many years ago, long before Bruno was born.

Bruno is undeterred. He builds a time machine and travels to September 13, 1937, a time before Grandfather had children, and before the fraud. Grandfather is on his morning walk. Bruno has climbed up a church steeple, and positioned himself at the belfry with a sniper's rifle. He aims the rifle with the precision of an expert gunman. Grandfather stops to tie his shoelaces. The church bells starts tolling. Noon has arrived. Bruno caresses the trigger. Grandfather stands still for a moment. A breeze ruffles some nearby leaves. Bruno prepares to shoot...

What happens next? Suppose Bruno kills Grandfather. Then Grandfather will never have children. (Assume no funny business: no rising from the dead, no frozen sperm, etc.) So Bruno's mother will never be born. So Bruno will never be born. So he won't go back in time. So he won't kill Grandfather after all. Contradiction! But if Bruno doesn't kill Grandfather, what stops him? There is Bruno on the belfry with his rifle. Killing Grandfather is his lifelong ambition. He has a clear shot...

We seem to have been left with a paradox. On the one hand, we know that Bruno won't succeed, on pain of contradiction. On the other, we're at a loss to explain what could possibly stop him.

What should we conclude from the Grandfather Paradox?

One possible conclusion is that time travel is an inherently contradictory idea, like a figure that is both a circle and a square.

I think that would be mistake. The key observation is that there are perfectly consistent ways of filling in the details in Bruno's story. Suppose, for example, that we continue the story by saying that Bruno loses his nerve at the last minute and puts down the gun. Or by saying that Bruno gets distracted by a barking dog and aims a little too far to the right. In each case, we have a consistent time travel story, and in each case we have a perfectly acceptable explanation of why Bruno's assassination attempt fails.

You might think that this misses the point. Perhaps the real problem is not to explain why the assassination attempt fails on particular versions of the story. Perhaps the real problem is to explain why it *must* fail: why it fails on *any* consistent way of filling out the details. It seems to me, however, that here there is a fairly flatfooted explanation to be given.

Let me begin with an analogy.

Suppose you are allowed to paint each of the points on a sheet of paper any color you like. Could you draw a figure that is both a circle and a square? You cannot. And there is no reason to expect an interesting explanation of *why* you cannot. Presumably all there is to be said is that no distribution of ink-blot on a page yields a figure that is both a circle and a square, and therefore that any attempt to draw such a figure will fail.

Now imagine that God makes the world in a way that is analogous to drawing a picture. She starts with a grid of spacetime points, and "draws" on the grid by deciding which physical properties to fill each spacetime point with. In some regions God "draws" positive charge; in some She "draws" mass. Could God "draw" a world in which Bruno kills Grandfather before Grandfather has children. She cannot. And, as before, there is no reason to expect an interesting explanation of *why* She cannot. Perhaps all there is to be said is that no distribution of physical properties across spacetime yields a scenario in which Bruno kills Grandfather before Grandfather has children, so any attempt to "draw" such a scenario will fail.

With this as our background, let us return to our original question: why does Bruno's assassination attempt fail on *any* consistent way of filling out the details? I see no reason to expect a more interesting explanation than the following. We have seen that there is no coherent scenario---no world God could "draw"---in which Bruno kills Grandfather before Grandfather has children. So any coherent way of filling out the details of the story must be such that the assassination attempt fails.

I do not mean to suggest that these considerations set the Grandfather Paradox to rest. But I do think they show that explaining why the Paradox is supposed to be paradoxical is not as easy as one might think. We have seen that there is no reason to think that a fully spelled-

out version of the story will fail to explain why Bruno's assassination attempt goes wrong. And we have seen that there is a (fairly uninteresting) explanation of why the assassination attempt will go wrong on any way of spelling out the details. So what is the problem supposed to be? I will use the remainder of this chapter to explore two possible answers:

- The Grandfather Paradox is problematic because it raises questions about whether the laws of physics could rule out paradoxical time travel in a principled way, but without banning it altogether.
- The Grandfather Paradox is problematic because it shows that time travel is incompatible with free will.

Video Review: The Grandfather Paradox



and he slipped on it.

Something happened.

OK, so I think we can conclude that I have not contradicted myself.

And not just that, that there's a way of extending the story,

so that I give you additional details

and still don't contradict myself.



3:43 / 3:43



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<u>sure, but traveling back in time is not funny but frozen sperm is, some irony that :) That said wha...</u>	
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<u>The mention of Hod in the discussion reminded me of the following: God is omnipotent. Can Go...</u>	
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<u>The fact that the grandson is there is immediately inconsistent. The grandson buys a ladder; wha...</u>	
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