

WHY TIME TRAVEL SHOULDN'T BE POSSIBLE AND HOW WE EASILY MISINTERPRET IT?

INTRODUCTION (TIME DILATION)

Firstly I will explain the concept of time dilation so that you understand my article better. I would like to point out that there is a concept based on Einstein's theory of **special relativity** which is known as **time dilation**. It says that if you travel at a velocity '**v**' relative to somebody else, your time will go slower than that person. For example, let us say that you are flying in a rocket. There is another person who is flying in another rocket beside you but his rocket has been built exactly similar to yours. Now this may seem very hypothetical but it isn't. The **velocity** of your rocket is relatively much faster than the velocity of the rocket in which the other person is sitting. If after some time you return back to the earth, you will find that you have aged lesser than the other person though the age difference might even be lesser than a millisecond. All this has happened because you were flying at a higher velocity than the other person. This is briefly what the concept of **time dilation** tells us. This phenomenon also takes place due to changes in gravity (known as **Gravitational Time Dilation**) but for now I would like to keep that apart because I will not be talking about that. I will frequently be coming back to **time dilation** as it an integral part of my article. You might already know what **time travel** is and what it implies but I would still like to explain it a bit in technical terms. It is based on the concept of **time dilation** and that at the speed of light the time stops for you as the speed of light in vacuum is the maximum universal speed and nothing can be faster than it or equal to it. So if you travel at the speed of light the time will stop for you and you will not age. As one can never attain the speed of light, throughout my article I will be talking of velocities relatively closer to the velocity of light in vacuum.

THE THEORY

FIRST PART

Firstly I will just be explaining some things. The concept of time travel according to our interpretation is highly relative thought it should not be. I will explain exactly what I mean by relative. Suppose there are three people namely **A**, **B** and **C**. **A** and **B** live in the year 2000 and **C** lives in the year 2050. I will myself be contradicting now by assuming that time travel is possible but it will just be for explanation. Now suppose **A** travels into the year 2050.

According to **C**, **A** will only be experiencing the present but according to **B**, **A** will be experiencing the future. Again this concept would mean that there is no single instance of time but rather there are many instances. But time is an independent and a singular quantity. So we see how the relative nature of time travel contradicts time itself by creating multiple instances of time. Additionally, the relative nature also implies that there will be infinite symmetrical parallel universes each with their own separate time. Each of the parallel universe would have a time difference of even lesser than one trillionth of a millisecond. So you can imagine how many parallel universes would be there for a difference of a mere second.

So the first contradiction is: - *To travel into the past or the future, you would require an infinite number of parallel symmetrical universes which have an infinitesimally small time difference between each other. This is practically impossible.*

Second Part

The main part starts here as I will tell you what the misinterpretation and the contradiction is. You may have seen in movies that if you travel around the earth at the speed of light, you can go into the future. Well that's not time travel and I will tell you why exactly it isn't shortly, as you continue reading.

Now suppose you are travelling in a very advanced rocket that can reach a speed up to 99% the speed of light. You travel around the earth for fifty years starting in the year 2010, at the maximum speed of the rocket and you land back safely on earth after the end of your journey. You will immediately notice that there is a huge age difference between you and your friends as you were travelling at a very high speed and your body ageing (i.e. your metabolic activities) had slowed down by a great amount due to **time dilation**. On earth it will be the year 2060 (50 years have passed since you started travelling) while your body will have aged merely by a year. The world around you will be 50 years ahead of you since you have not even aged by a year. Now you will say that this is what travelling into the future is but you can't say that and I'll tell you exactly why you can't and what is our misinterpretation. We know that **time** is an independent quantity and keeps on increasing. **Time dilation** tries to say that everyone has their own time and it is dependent upon their velocity. I would like to point out that a person can slow down, but not his time. The time will always keep moving under all circumstances. We can say that in **time dilation** all processes (chemical or physical) slow down but not the time. For clarification I will just define **future** word to word. **Future** is 'events that will or are likely to happen in the time to come' or 'time regarded as still to come.' But the earth you are

seeing has already been through those 50 years you have missed and time has already passed for those fifty years. It is not the time that is about to come. A simple hypothetical analogy would be that you somehow manage to sleep for 50 years throughout and you wake up and see the world around you. The only difference is that your body will age while you are sleeping. So no matter at what speed you travel around the earth for 50 years (or for that case any amount of time) the earth will still complete 50 revolutions around the sun while you are travelling. The only difference will be made to your age and nothing else. So what you will actually see will be nothing other than the present. Time will keep moving and will still be the same for you. If you still haven't understood what I'm trying to say, I'll give another explanation. Now imagine that you have come on earth after your 50 year journey. How will you now go back and reverse the age of all the people on the earth or for that matter even yours. You just cannot do that because time never goes back. What you could only do is reverse the body's metabolic activities which itself is an impossibility because that would mean that you can become a child from an adult. So again it's not time travel because travelling is never in one direction. If you are travelling into the future, you should be able to go back as well.

So the misinterpretation is: - **It is just the ageing of the body that slows down but not the time. Time will always keep moving and you just cannot change it as it is not under our control. We just cannot create any sort of a remote that will forward or rewind time. So travelling at a very high speed is completely different from actually seeing the future. So what you will actually see will be nothing other than the present.**

ANALOGY

I will give a brief but a powerful analogy and explain it. We know that due to high velocities, our body processes slow down. This slowdown of body processes can be brought about by several other ways. We know that at -273°C , all processes at the atomic level stop. We have the technology to preserve a living person* at very low temperatures such as -195.8°C without causing the death of the person (the science is a part of **Cryogenics**). This preservation chamber will act to slow down the person's metabolic activities and he will age very slowly. Now suppose the person is preserved for 50 years in that chamber and is taken out, he will have aged merely by a year while his friends will have aged for those complete 50 years as their metabolic rate was normal. Now can we call this also time travel because the end result is the same as discussed in the time travel earlier? No, we cannot as the time has not slowed down for the person, but he has slowed down compared to that time.

SUMMARY

I am not saying time dilation is not possible but I am saying time travel is not possible. There is a huge difference between the two. Time travel implies a lot of other things which violates practicality and many laws of physics. We have to look upon time dilation from a different perspective and not misinterpret it. The correct way to look at it is, that time does not slow down. A certain activity that takes place slows down with respect to time.

***Note that preserving living bodies of human beings is illegal but we still have the technology. Please do not try this at home.**

I hope I have succeeded in conveying my beliefs and have given substantial proof.

- Rahul Garg ©