**Is Time Travel Possible?**

***(****Quotes from the article appear in italics****)***

**(My replies will follow in bold font)**

*The Short Answer:*

*Although humans can't hop into a time machine and go back in time,*

*we do know that clocks on airplanes and satellites*

*travel at a different speed than those on Earth.*

**Clocks on airplanes and satellites**

**record the passage of time differently than clocks on Earth.**

**This phenomenom can be easily explained in a middle school science class.**

**It has nothing to do with the pseudoscientific fantasy of time travel.**

*We all travel in time! We travel one year in time between birthdays, for example. And we are all traveling in time at approximately the same speed: 1 second per second.*

**The only travelling we are doing is moving through space.**

**While we are travelling through space, time is passing.**

**Time is a concept. You cannot travel through a concept ... that is nonsensical.**

*However, when we think of the phrase "time travel," we are usually thinking of traveling faster than 1 second per second. That kind of time travel sounds like something you'd only see in movies or science fiction books.*

**That is exactly where pseudoscience and fantasy belong.**

*Could it be real? Science says yes!*

**Then you shouldn’t have any problem producing the evidence.**

**Let’s see what you have.**

*How do we know that time travel is possible?*

*More than 100 years ago, a famous scientist named Albert Einstein came up with an idea about how time works. He called it relativity. This theory says that time and space are linked together. Einstein also said our universe has a speed limit: nothing can travel faster than the speed of light (186,000 miles per second).*

**Thanks for the Appeal to Authority. Still waiting for the evidence.**

*What does this mean for time travel? Well, according to this theory, the faster you travel, the slower you experience time. Scientists have done some experiments to show that this is true.*

**You weren’t asked to provide evidence for “experiencing” time.**

**You were asked to provide evidence for “travelling through” time.**

*For example, there was an experiment that used two clocks set to the exact same time. One clock stayed on Earth, while the other flew in an airplane (going in the same direction Earth rotates).*

*After the airplane flew around the world, scientists compared the two clocks. The clock on the fast-moving airplane was slightly behind the clock on the ground. So, the clock on the airplane was traveling slightly slower in time than 1 second per second.*

**No.**

**The clock on the plane “recorded” a different time than the clock on the ground. You are confusing the recording of time with the pseudoscientific concept of travelling through time.**

*Can we use time travel in everyday life?*

**Sure ... in movies and science fiction books.**

*We can't use a time machine to travel hundreds of years into the past or future.*

**If your premise “time travel is possible” is true ... then why not?**

*That kind of time travel only happens in books and movies.*

**There is a good explanation for that ... it’s bunk.**

*But the math of time travel does affect the things we use every day.*

*For example, we use GPS satellites to help us figure out how to get to new places. (Check out our video about how GPS satellites work.) NASA scientists also use a high-accuracy version of GPS to keep track of where satellites are in space. But did you know that GPS relies on time-travel calculations to help you get around town?*

*GPS satellites orbit around Earth very quickly at about 8,700 miles (14,000 kilometers) per hour. This slows down GPS satellite clocks by a small fraction of a second (similar to the airplane example above).*

*However, the satellites are also orbiting Earth about 12,550 miles (20,200 km) above the surface. This actually speeds up GPS satellite clocks by a slighter larger fraction of a second.*

*Here's how: Einstein's theory also says that gravity curves space and time, causing the passage of time to slow down.*

**Correction: causing the “recording” of the passage of time to slow down.**

*High up where the satellites orbit, Earth's gravity is much weaker. This causes the clocks on GPS satellites to run faster than clocks on the ground.*

*The combined result is that the clocks on GPS satellites experience time at a rate slightly faster than 1 second per second.*

**Correction: “record time” ....**

*Luckily, scientists can use math to correct these differences in time.*

*If scientists didn't correct the GPS clocks, there would be big problems. GPS satellites wouldn't be able to correctly calculate their position or yours. The errors would add up to a few miles each day, which is a big deal. GPS maps might think your home is nowhere near where it actually is!*

*In Summary:*

*Yes, time travel is indeed a real thing.*

**And yet, reminiscent of church, we are all still waiting for one piece of evidence to support your assertion that time travel is possible.**

*But it's not quite what you've probably seen in the movies. Under certain conditions, it is possible to experience time passing at a different rate than 1 second per second. And there are important reasons why we need to understand this real-world form of time travel.*

**Final correction: it is possible to “record” time passing at different rates.**

**There exists no evidence that time travel is anything other than science fiction nor did anything in this presentation support your claim that time travel is possible.**

**Source**

[**https://spaceplace.nasa.gov/time-travel/en/**](https://spaceplace.nasa.gov/time-travel/en/)

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[**http://theskepticarena.com**](http://theskepticarena.com)