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YOU SURVIVE TELETRANSPORTATION

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Suppose that it was possible to teletransport. The teletransporter would destroy your old brain and body and construct an identical brain and body at a new location. Would you survive teletransportation? Many people think that teletransportation would kill you. On their view, the person that emerges from the teletransporter would be a replica of you, but it wouldn't be you. In contrast, I argue that there's no relevant difference between teletransportation and ordinary survival. So, if you survive ordinary life, then you survive teletransportation. Yet my argument may also show that we have little prudential reason to care about our survival in general.

Imagine that it's the future and scientists have recently developed teletransportation technology. This technology will record the exact state of your body and send this information to another teletransporter on Titan, a moon of Saturn. This teletransporter will create a body and brain on Titan exactly like yours out of new matter. The person who wakes up on Titan will have all of your thoughts, memories, intentions, and character traits. But your old body and brain on Earth will be painlessly destroyed. You plan to visit Titan. You'd like to see the new colony there. Thus, you face a choice. You can either fly on a spaceship to Titan or you can use the teletransporter to get there quicker. Let's call this case *Teletransporter*.

People disagree about what happens to you when you step into the transporter. Some people think that the teletransporter kills you. The person who wakes up on Titan is

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your replica, but it's not you. Other people think that teletransportation is just a highly convenient way to travel.[1] These people believe you do survive the process.

My view is that teletransportation and ordinary survival are just about the same. There's no relevant difference between teletransportation and ordinary survival. If you survive ordinary life, then you survive teletransportation. Thus, there's no reason to choose the spaceship over teletransportation. Here's why. In ordinary life, your body is destroyed and replaced all the time. We just don't notice this process because it happens slowly.

To illustrate, consider your cells. Most of your cells will be replaced during your lifetime. According to one estimate, the average age of all cells in an adult's body is around seven to ten years (Wade 2005). Some cells are much younger. For example, certain intestinal cells have an average lifespan of approximately five days. In contrast, muscle cells in the ribs might last over fifteen years (Spalding et al. 2005). About half of the cells that constitute our hearts are replaced by the time we reach fifty (Schrijver and Schrijver 2015: 15). The brain seems different. While most mammals produce new brain cells, it's unclear whether humans do. However, some scientists argue that the human brain creates about 700 new neurons every day while other neurons die off as we age (Spalding et al. 2013).

Our bodies are being replaced more rapidly on a smaller scale. The composition of our cells is changing as cells divide, replenish energy, and repair themselves. New molecules are coming in and out of cells constantly. Consider the atomic composition of our bodies. Radiochemists and biologists can use isotope indicators to measure the rate of atomic renewal of organs. George de Hevesy, the radiochemist who won the Nobel Prize for pioneering this technique, found that a significant fraction of the atoms in the skeleton of an adult rabbit were replaced during a fifty-day period. The rate of 'atomic renewal' in a rabbit's skeleton varied from 6.7 per cent to 100 per cent, depending on the

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part of the skeleton (de Hevesy 2020). The same basic result obtains for humans too. We know that all of the water in our bodies is replaced every few weeks and water makes up about 55 to 65 per cent of our bodies (Schrijver and Schrijver 2015: 16). Although it's hard to put a precise number on it, it's reasonable to guess that virtually all of the atoms in our bodies are replaced every few years. Most of our bodies are replaced much more quickly than that.

The point of this information is to underscore how ordinary survival is similar to teletransportation. The only difference is the speed with which things happen. In ordinary life, our bodies are replaced with new matter bit by bit. In Teletransportation, it happens all at once. But it's hard to see why the speed of the replacement makes any rational difference. Why would it matter whether your body is replaced all at once or over the course of a year?

Let's consider the following variation on Teletransporter. Once again, you face the choice of whether to fly to Titan on a spaceship or to teletransport there. Flying there on a spaceship will take a year. In addition, the ship's computer will place you in a comatose state until you arrive, although your metabolic functions will continue to work as normal. Alternatively, you could teletransport to Titan. But the teletransporter technology is malfunctioning, and thus it's working below capacity. The teletransporter on Earth will gradually destroy your body and transmit scans to Titan. The teletransporter will place you in a comatose state and you'll feel no pain while this happens. The teletransporter on Titan will slowly construct your body as it receives the scans from Earth. The whole process will take a year. Call this case *Slow Teletransporter*.

Most people would agree that you'll survive if you take the spaceship. You may feel less certain about whether you'll survive the teletransporter. Notice though that these options are nearly identical. On the spaceship, your metabolic functions are working. This means that your cells and the atoms that make them up are being replaced. Assume that, after a year, all of the atoms in your body will be

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replaced with new matter. Thus, whatever option you choose, your body will gradually be destroyed and replaced.

Notice also that Slow Teletransporter rules out one possible rejoinder that appeals to the continuity of consciousness. You could reasonably wonder whether there's a difference between teletransportation and ordinary survival because your consciousness is continuous in ordinary survival, while the continuity of consciousness is disrupted in Teletransporter. And you might think that the continuity of consciousness is relevant to whether you survive. But, in Slow Teletransporter, continuity of consciousness is disrupted in both options, as both the teletransporter and the spaceship will place you in a comatose state. If we accept that you'll survive the trip on the spaceship despite the disruption of consciousness, then it's unclear why anything changes if you use the teletransporter.

At this point, one might object with the following argument:

> Although you're comatose on the spaceship, you're still *capable* of consciousness. But, when the teletransporter on Earth destroys your brain, you are obviously no longer capable of consciousness. This means that you don't survive the teletransporter, as your capacity for consciousness is the thing that matters for survival.

But consider this twist on the thought experiment. Suppose that the spaceship continuously injects you with a drug that shuts down your consciousness (this is probably what general anaesthesia does). Your brain is completely incapable of producing consciousness as long as your body is metabolizing the drug. So, it's literally false that your brain is capable of producing consciousness during the trip. Once you arrive on Titan, the ship ceases the injections. You wake up. Surely, you survive the trip. Yet teletransportation and space travel appear analogous. In both

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scenarios, your brain lacked the capacity to produce consciousness. At a later point, your brain has this capacity again. You survive either way.

Here's another objection: you lack the right kind of causal connection with the person who wakes up on Titan. To survive, you need to have appropriate causal connection with your future self. As a result, the replica on Titan isn't you. What's the right kind of causal connection? Some people insist that the causal relationship between your present and future self be *normal*. And, well, teletransportation just isn't normal. It's downright abnormal. So, maybe it turns out that we don't survive teletransportation on this proposal, while we do survive ordinary living.

It's hard though to understand why the normality of the cause would matter to survival. By 'normal', people often mean 'statistically normal', which is a lack of significant deviation from the average. On average, it's true we seem to survive because our brain and bodies remain intact. The question is: why should it matter that our survival is due to a normal cause or not?

To see the puzzle, consider an analogy. Before the invention of antibiotics, the normal cause of surviving an infection was the natural responses of the immune system. Your immune system either fought it off or it didn't. If you survived, then your immune system worked. Now, take the state of affairs when antibiotics were first introduced. These antibiotics would often work to cure infections. But they weren't normal at the time. They were unusual and novel. That's clearly irrelevant though. The antibiotics worked in causing survival. It would be absurd for someone in 1915 to insist that a person didn't really survive an infection because the cause of her continued existence was antibiotics, which were unusual at the time. We might make the same claim about teletransportation. For us, teletransportation is unusual. Yet, as with antibiotics, it's unclear why that matters.

In fact, we have good reasons to challenge the proposal that *any* causal connections between your present self and

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your future self have *any* relevance to whether you survive. To illustrate the problem, let's imagine another version of Teletransporter. Once again, the transporter will create a body and brain on Titan exactly like yours out of new matter, and the scanner will destroy your old body. But, this time, something goes wrong. The teletransporter encounters a glitch while it's sending your information to Titan, and all of this information is lost. However, a mad scientist's lab occupies the building next to the teletransporter on Titan where you intended to wake up. This mad scientist is attempting to use his private teletransporter to create a new person. His teletransporter has scans of an enormous number of psychologies, brains, and bodies stored in its memory banks. He programs his teletransporter to synthesize a new person based on these materials. In a cosmically unlikely coincidence, the scientist's teletransporter creates a new person that's exactly like you at the precise instance when you were supposed to teletransport to Titan. This replica has your exact brain, body, and psychology. Call this thought experiment *Miraculous Rebirth*.

You might roll your eyes at the fantastic nature of this thought experiment. For my point to go through, though, I only need you to believe that this thought experiment is conceptually possible. And it seems to be. In Miraculous Rebirth, your body and brain are destroyed on Earth and your replica is created on Titan. These events are causally unrelated. Nothing you did caused your replication on Titan. Here's my question: did you survive Miraculous Rebirth? My suggestion is that, if you're willing to accept that you survived Teletransporter, then you should conclude that you survive Miraculous Rebirth too. Why would your causal origins matter if everything else is the same? The fact that the replica on Titan is causally unrelated to yourself on Earth seems to make little difference to whether you survive.

Even if you accept that causal relations are relevant though, the rest of my argument still stands. In the original case of Teletransportation, you're causally related to your

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future self on Titan. Your brain, body, and psychology on Titan are causally dependent your brain, body, and psychology on Earth. Your replica would never exist but for these factors. And, if causal dependence between past and future selves is necessary for your survival, then this condition may be satisfied in Teletransporter, even if it's not met in Miraculous Rebirth. Of course, it's possible that there's some 'special' extra ingredient that ensures survival and that this ingredient is lost with Teletransportation. It's just hard to see what that special ingredient could be.

Let's consider one final concern. You might object to teletransportation on the following grounds. To many people, it just seems false that you survive teletransportation. A better description of what happens is that you're killed and replaced by someone else. Sure enough, this replica has your psychology and body. But that's not good enough. There's a difference between undergoing change and being destroyed and replaced. Teletransportation involves replacement, while travelling on the spaceship merely involves change. Furthermore, we have no special reason to care about our replicas. Suppose you discover that someone is going to be tortured tomorrow. While that's of course sad, you'd probably go about your day as normal after hearing this news. Now, you discover that this person has a body and psychology extremely similar to yours. You'd probably be more alarmed, but not by much. Finally, suppose that you discover that that person will be *you*.[2] I venture to guess that you would be quite upset indeed. This thought experiment suggests that we lack the same reason to care about our replicas that we have to care about ourselves.

My response is that the distinction between 'replacement' and 'change' is an unstable one. For this reason, the distinction between you and your replica is illusionary, although it's a gripping illusion. To show this, let's return to Slow Teletransportation. Consider two versions of this case. In version 1, you decide to take the spaceship to Titan. Recall that you'll be comatose and utterly incapable of

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consciousness, but your normal metabolic functions will continue. In version 2, you opt for teletransportation. Because of a glitch, the teletransporter will only slowly scan and deconstruct your brain and body, and the teletransporter on Titan will gradually reconstruct your body as it receives the scans.

Imagine that, after six months, 70 per cent of your body has been replaced from new matter in both versions 1 and 2. In version 1, the normal process of atomic replacement is responsible for this change. In version 2, the teletransporter is responsible. Have you been merely changed or have you been replaced in either version? If you're still on the fence, you can pick any numbers you like. Are you merely changed or replaced at 31 per cent, 53 per cent, 76 per cent, or 96 per cent? Choosing any particular cut-off point seems arbitrary. In ordinary life, the concepts of change and replacement are useful for distinguishing between more noticeable differences and less noticeable differences between things over time. However, they don't describe anything qualitatively different about the underlying reality. Once you know that, say, 47 per cent of you is replaced, then you know all that there is to know. It doesn't matter whether you call this 'change' or 'replacement'. That's only a verbal difference.

You might counter:

> But, in version 2, your body is in two different places at once. One part of your body is being deconstructed in the scanner on Earth. The rest is being reconstructed in teletransporter on Titan. In contrast, your body is all in one place in version 1. This surely makes a difference to whether you survive the teletransportation.

Why though? Most of us accept that we can survive even though part of our body is separated from us. Imagine that I suffer an accident and I lose a limb, and doctors later reattach it. I survive despite the fact that my body was in

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two places at once. Notice also that we accept that certain objects survive despite the fact that they're spatially scattered. Suppose that I own a tuxedo. Some parts of the tuxedo are in my closet and other parts are at the dry cleaners. Nonetheless, my tuxedo still continues to exist.[3] I see no reason why the same couldn't be true of us.

This concludes my argument for the claim that, if you survive in ordinary life, then you survive teletransportation. Teletransportation is as good, or as bad, as ordinary survival. Let me close by reflecting on the implications of this conclusion. If you're convinced by my argument, you could come away more enthusiastic about teletransportation. If a safe form of teletransportation were invented, you may feel reassured that all will be well when you use it.

But another implication is possible. You might come away thinking that ordinary survival is not as good as we often take it to be. Many people viscerally feel that even an exact replica would simply not be them, and that they have little or no prudential reason to care about the well-being of a replica. Suppose that's right and that we lack any significant prudential reason to care about the welfare of a replica. If my argument in this article is sound, then it follows that we also lack significant prudential reason to care about our ordinary survival. It turns out that it doesn't matter that much, from a prudential perspective, whether we survive or not. I'll leave it to the reader to decide whether that's a good or a bad thing.

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Notes

[1] For the most famous defence of this view, see Parfit (1986: 199).

[2] I adapted this thought experiment from Stone (1988: 525–6).

[3] I owe this example to Huemer (2021: 12).

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