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Time—The Final Frontier

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Writing in the early years of the fifth century, St. Augustine grappled with the nature of time in his autobiographical work, *Confessions*: "What, then, is time? I know well enough what it is, provided that nobody asks me; but if I am asked what it is and try to explain, I am baffled."[1]

We can only imagine how baffled Augustine would have been had he encountered the Bajoran Prophets of *Deep Space Nine*. However difficult time is to explain, there's one feature of our experience of time that seems non-negotiable, namely, that it flows, with each present moment receding into the past. Moreover, the flow of time seems to us to move in only one direction; future moments become present, but present moments never become future. Yet here, *Star Trek* renegotiates the non-negotiable, forcing us to call some of our most deeply held beliefs into question. For the Prophets, a non-corporeal species revered by the Bajorans as their spiritual protectors and guides, time doesn't flow. This alien species has no understanding of *linear* time. They don't experience any distinction between past, present, and future—every event that occurs is as much in the *now* as any other event.

We're introduced to the Prophets in "Emissary" (*DS9*), the pilot episode of the series. While *en route* to the Denorios Belt in a runabout, Commander Benjamin Sisko and Lieutenant Jadzia Dax are sucked into a previously uncharted wormhole.

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[1] Augustine, *Confessions* (London: Penguin, 1961), p. 264.

The Prophets, who live in the wormhole, soon make contact with Sisko. They communicate with him by taking on the appearance of people from his life, like his late wife Jennifer, his son Jake, or his colleagues from Starfleet. But the Prophets have trouble making sense of Sisko and the temporal nature of his existence:

Prophet: (*appearing as Jennifer*) It is corporeal! A physical entity . . .
Sisko: You and I are very different species. It will take . . . time for us to understand one another.
Prophet: (*appearing as Jake*) What is this . . . time?

As Sisko's encounter with the Prophets continues, he tries to explain:

Sisko: It can be argued that a human is ultimately the sum of his experiences.
Prophet: (*appearing as Jake*) Experiences ... what is this?
Sisko: Memories. Events from my past, like this one.
Prophet: (*appearing as Jake*) Past?
Sisko: Things that happened before now. You have absolutely no idea what I'm talking about.
Prophet: (*appearing as Jake*) What comes before now is no different than what is now, or what is to come. It is one's existence.

Sisko sizes up the situation very quickly, realizing that the Prophets must not experience time as we do. Rather, for them, time is not linear. Even before the discovery of the Prophets living in the wormhole, *Star Trek* had flirted with the possibility of non-linear time. In "We'll Always Have Paris" (*TNG*), the *Enterprise* crew experiences a temporal distortion caused by Dr. Paul Manheim's experiments with non-linear time. Manheim, who believed that the universe consists of infinite dimensions, was working to change the linear nature of time in an effort to open up a window into a dimension other than our own. And in *Star Trek: Generations*, both Captain Kirk and Captain Picard end up in the Nexus, a distortion in the space-time continuum in which there's no linear time. As the two captains discover, time has no meaning in the Nexus, and as a result, they can experience both the past and the future whenever they like.

The idea sounds enticing. But can we really make sense of the notion of non-linear time? What would it mean to experience time as the Prophets do? Or would it be better to say that these beings don't experience time at all?[2] This chapter attempts to shed some light on these questions by examining the nature of time. To understand what time is like for the Prophets, we first need to understand what time is like for us. In this enterprise, *Star Trek* proves to be a remarkable resource.

Time's Arrow

Philosophers have often viewed time as being mysterious, especially in comparison with space. Unlike space, time seems to have a "flow" or "passage." Anticipated events in the future get closer and closer, until they become present, while events in the present seem to flow right by us, receding farther and farther into the past. Time can be aptly described using a metaphor from Spock: "time is fluid . . . like a river with currents, eddies, backwash" ("The City on the Edge of Forever," *TOS*). We couldn't describe space the same way. There's no spatial analogue to the flow of time—*here* doesn't automatically become *there* the way that *now* becomes *then*. Though we move past points in space, moments in time move past *us*.

The mystery surrounding time is deepened by the fact that it flows in only a single direction. Unlike space, time has a built-in order. One object in space isn't inherently to the right or left of another; we need a third object to serve as a reference point. From the perspective of Picard in the captain's chair, Wesley Crusher sits to the right of Data. But from the perspective of the television viewer looking in from the front of the bridge, Crusher sits to the left of Data. In contrast, two objects in time have an order independent of any reference point. We all share

[2] Similar questions also arise about God's atemporal mode of existence. For example, the medieval philosopher Boethius (around 475–526), in claiming that God exists eternally, thought of God as existing outside of time, simultaneously and completely possessing limitless life. For further discussion of the notion that eternity plays in philosophical theism, see Eleonore Stump and Norman Kretzmann, "Eternity" *Journal of Philosophy* 78 (1981), pp. 429–458.

the same perspective when we note that the *Enterprise*'s first encounter with Data's brother Lore ("Datalore," *TNG*) occurred *after* their first encounter with Q ("Encounter at Farpoint," *TNG*) but *before* their first encounter with the Borg ("Q Who?" *TNG*). This inexorable directionality of time is often referred to as time's "arrow."

These mysterious features of time have led to quite a divergence of philosophical opinion about its nature. Generally speaking, philosophers writing on time divide into three different camps. There are some who claim that time exists objectively, some who claim that time exists subjectively, and some who deny that time exists at all.

To say that something exists objectively means that it exists independently of any mind. Consider a tree on Earth. Even if humans never existed, the tree could still exist. (Whether it would still make a sound when it falls in the forest is another matter entirely.) So the claim that time is objective means that it is not mind-dependent. In contrast, something that has only subjective existence is mind-dependent. Consider Captain Pike's suffering after being captured by the Talosians, a telepathic race capable of producing powerful illusions directly in the minds of their "specimens" ("The Cage," *TOS*). At one point, Pike experiences a fire raging all around him. However, the fire doesn't have objective existence; no one other than Pike senses the fire. As an illusion projected into Pike's mind by the Talosians, it has only subjective existence.

Sir Isaac Newton (1642–1727) and Gottfried Leibniz (1646–1716) viewed time as existing objectively, though they took very different positions on what time is. Newton advocated a position known as *absolutism*. According to absolutism, time exists independently of the events that occur in time. Newton saw time as a kind of infinite container for events. As Newton claimed, "Absolute, true and mathematical time, of itself and from its own nature, flows equably without relation to anything external."[3] Leibniz, in contrast, offered a *relationist* picture of time, in which time is conceived as merely a set of relations between events. For Leibniz, time is sort of like marriage. Just as

[3] Isaac Newton, *Philosophiae Naturalis Principia Mathematica* (Berkeley: University of California Press, 1934), pp. 6–12.

a marriage is a relation between individuals, and couldn't exist without the individuals who are married, time is a relation between events, and couldn't exist without the events that are related.

Since an absolutist like Newton thinks that time is a kind of container, he might have to deal with the possibility of the container's being empty—that is, he's committed to the possibility of a temporal *vacuum*, a time in which no events whatsoever take place. There's something very intuitive about the idea of a temporal vacuum. "When time seemed to stop"—that's how Anij in *Star Trek: Insurrection* describes the notion of a perfect moment to Picard, and perhaps this is what a temporal vacuum would be like. But how could it seem to us that time has stopped? How could we even notice this? Once we think a bit about these questions, we can see why relationists such as Leibniz find the idea of a temporal vacuum incoherent.

Leibniz might ask us to suppose there were a temporal vacuum, a period of time in which nothing happens. Since a temporal vacuum is a period of time, it's natural to ask: How long did it last? How long was the period of time during which nothing took place? The problem, however, is that it appears that these questions can have no answers. The only way to measure a period of time is in terms of the changes that take place during it.[4] If nothing changes during a temporal vacuum, then in principle there's no way we can notice it. Just think: For all you know, a temporal vacuum might have occurred between the time you started reading this sentence and the time you finished reading it. There's no way for you to tell. If by chance one occurred, there would be no way to measure its duration. As the Vulcan Science Directorate would likely say, given their negative ruling on the possibility of time travel in the twenty-second century, the very idea of a temporal vacuum seems illogical.

In contrast to both Newton and Leibniz, some philosophers deny the objective existence of time. This was the position that Augustine ended up adopting. In thinking about the nature of events, Augustine noted that anything we experience is present only for a moment—as soon as it occurs, it becomes part of the

[4] Aristotle, in fact, defined time as the measure of change in his *Physics* (Oxford: Oxford University Press, 1999), Book 12.

past. This means that our sense of time, and our measurement of it, can't be based on the events themselves—they don't exist to be measured. Whenever we experience an event, however, it leaves an impression in our minds. The impression lasts even once the event has passed. Our measurement of time, then, must be a measurement of impressions in our mind. Using this reasoning, Augustine drew the conclusion that time is mind-dependent: it exists only subjectively.

Time and Again

It's not easy to settle the matter decisively between the objective and subjective conceptions of time. Some of our experiences appear to favor Augustine's side in the debate. For example, time always seems to pass more quickly when you're doing something fun, like vacationing on Risa or chancing your luck at the Dabo wheel, than when you're doing something boring or unpleasant, like going over duty rosters or having dinner with Lwaxana Troi.

We also might think that we can make better sense of the Bajoran Prophets if we accept that time exists only subjectively. Time for them can exist differently from the way it exists for us. And *Star Trek* provides many other examples in which time is depicted subjectively. In "Wink of an Eye" (*TOS*), we're introduced to the Scalosians, aliens for whom time passes much faster than it does for us, as Kirk discovers when he's "accelerated" to their temporal experience. In "The Inner Light" (*TNG*), an alien probe causes Picard to experience more than three decades of life on the planet Kataan—he gets married, has children and grandchildren, and grows old—during a period that feels like less than half an hour to the rest of the *Enterprise* crew. Finally, in "Hard Time" (*DS9*), the Argrathi tinker with Miles O'Brien's mind, implanting over twenty years of memories. For everyone else, just a few hours have gone by. But for O'Brien, it feels like he's just spent two decades locked away in an Argrathi prison. All of these occurrences suggest that the passage of time is somehow mind-dependent.

On the other hand, we can also draw lots of evidence from across the *Star Trek* series in favor of the objective conception of time. People in the twenty-third and twenty-fourth centuries have no more control over time than we do. They can't slow

down the clock, even when they really need just a few more seconds—and this suggests that time exists objectively. Think of Data urgently trying to replace the isolinear chips in the *Enterprise*'s computer banks before the ship is hit by debris from a stellar explosion ("The Naked Now," *TNG*), or Scotty desperately trying to beam Kirk off the *Constellation* before it self-destructs ("The Doomsday Machine," *TOS*). What gives situations like these their dramatic tension is the force of time passing objectively, utterly outside of our control. Even the *Enterprise*'s "miracle-working" chief engineer can't change the laws of physics when he needs thirty minutes to restart the warp engines ("The Naked Time," *TOS*).

So it looks as if *Star Trek* doesn't definitively classify time as either subjective or objective. Some philosophers, however, would say it's a mistake to classify time in either of these two ways. Rather, we should simply accept that time—or at least, time as we know it—doesn't exist at all.

Timeless

The philosopher most commonly associated with the position that time doesn't exist is J.M.E. McTaggart, who argues that we can't account for the flow of time without contradiction.[5] Thus, time must not exist. There are typically two ways that we order temporal events—first, in terms of the notions of *past*, *present*, and *future*; and second, in terms of the relations *earlier than* and *later than*. If time were to exist, then we must be able to explain it in one of these two ways; McTaggart calls them the *A-series* and *B-series*, respectively. But McTaggart denies that we can do this—time can't be explained in terms of either of these series. If he's right, then time must not exist.

How can McTaggart hold such a radically counterintuitive picture about time? To see this, we have to look at each series individually. First, note that an event's position in the A-series is constantly changing. Consider Tasha Yar's death ("Skin of Evil," *TNG*). This event still lies in the future when Yar and some of her crewmates beam down to Vagra II to rescue Deanna Troi,

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[5] J.M.E. McTaggart, "The Unreality of Time," in *The Philosophy of Time*, edited by Robin Le Poidevin and Murray MacBeath (Oxford: Oxford University Press, 1993), pp. 23–34.

whose shuttlecraft has crashed on the planet's surface. Upon their arrival, the away team has to tangle with the malicious slimelike entity Armus. When Armus directs his evil energy towards Yar, she's instantly killed—her death becomes present. By the time the crew manages to escape from Armus's forcefield and depart from the planet's orbit, the event of her death has receded into the past.

In contrast, when we consider these same three events—Yar's death, the away team's arrival on Vagra II, and the *Enterprise*'s departure—with respect to the B-series, their ordering doesn't change. The first of these events occurs later than the second but before the third. Even as time passes, this ordering never alters. Unlike the A-series, the B-series is *fixed*.

This fact about the B-series, however, means that it can't account for the passage of time. In the B-series, nothing flows; there's no change. But as McTaggart notes, it's "universally admitted that time involves change" (p. 25). How, then, could we explain time in terms of the B-series? The B-series is also unable to account for the *specialness* of the present moment, the "nowness" of it. You could know everything there was to know about the B-series, you could know the complete ordering of events, and you would still not know which event was occurring *now*. Thus, if we're going to be able to give an explanation of time, we'll have to use the A-series.

But McTaggart suggests that the A-series is also incapable of accounting for time. The problem is that the A-series requires objects to have incompatible properties, which violates the laws of logic. (And if Scotty thinks changing the laws of physics is hard, he should just try to change the laws of logic!) A basic presupposition of our thinking is that nothing can have incompatible properties. It's impossible, for example, for a Klingon to have both a smooth forehead and a ridged forehead at the same time; or for a Vulcan to simultaneously have both pointy ears and rounded ears. Of course, someone could have one pointy ear and one rounded ear—perhaps if he were a Ferengi-Vulcan hybrid?—but a single ear cannot be both pointy and rounded, at least not in the same way at the same time. Just as being rounded and being pointy are incompatible properties, so too are being past and being present, or being past and being future. Nothing can be both past and future. This, however, is required by the A-series as any given event moves from future, to present, to past. Thus, since the A-series embodies a contradiction, it can't provide us with an adequate explanation of time.

The basic form of argument that McTaggart uses against the A-series should actually be immediately familiar to any fan of *Trek*. Think of Kirk's many efforts to talk a computer to its own destruction, which he does successfully to the machine Landru in "The Return of the Archons," (*TOS*), the space probe Nomad in "The Changeling" (*TOS*), and the M-5 computer in "The Ultimate Computer" (*TOS*). Perhaps the best example of this form of argument comes in the climactic confrontation of "I, Mudd," when Kirk relies on an instance of what philosophers call the *Liar's Paradox*:

> **Kirk:** (*to the android Norman*) Everything Harry tells you is a lie. Remember that. Everything Harry tells you is a lie.
>
> **Harry Mudd:** Now listen to this carefully, Norman. I am lying.
>
> **Norman:** You say you are lying, but if everything you say is a lie, then you are telling the truth. But you cannot tell the truth, because everything you say is a lie. But . . . you lie . . . you tell the truth, but you cannot, for you lie. Illogical. Illogical.

No statement can at one and the same time be both true and false. When trying to consider this contradictory state of affairs that Kirk and Mudd have suggested, Norman becomes completely incapacitated.[6] Confronted by McTaggart's argument against time, we too may feel completely incapacitated—even if our ears are not literally smoking. How on earth could time be unreal?

Past Tense

It should come as no surprise that most philosophers have been extremely reluctant to accept McTaggart's conclusion that time doesn't exist. Some philosophers attempt to shore up the idea of the A-series by showing that it doesn't contain the contradiction McTaggart supposes. Roughly speaking, they argue that we

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[6] For further discussion of Kirk's mastery of the destructive paradox, see Chapter 18 in this volume.

must take grammatical tense seriously. Events aren't past, present, and future at the same time; rather, an event currently occurring *was* once future, now *is* present, and soon *will be* past. Sisko appears to defend the A-series, and the importance of grammatical tense, when conversing with the Prophets:

> **Prophet:** (*appearing as Jennifer*) She [Sisko's late wife Jennifer] is part of your existence.
> **Sisko:** She is part of my past. She's no longer alive.
> **Prophet:** (*appearing as Jennifer*) But she is part of your existence.
> **Sisko:** She *was* a most important part of my existence, but I lost her some time ago.

It's only by understanding the importance of tense that the Prophets will be able to understand what Sisko is telling them.

Defending the A-series often goes along with adopting a view called *presentism*, which claims that only the present exists. At the present moment, the television premiere of *Star Trek: The Original Series* lies over forty years in the past. Thus, for the presentist, it doesn't exist. The presentist can thus dissolve the threat of an A-series contradiction. Since events that aren't present don't exist, no event ever has the incompatible properties of being both present and past, or both present and future.

There's a lot to like about presentism, but there are also many problems with it. Here's one big one. Once we deny the reality of the past we can no longer make sense of any statements about past happenings. We would all agree that *Star Trek* premiered on September 8th, 1966. But if the past doesn't exist, what could possibly make that claim true? What could distinguish it from the false claim that *Star Trek* premiered on October 5th, 1966?

For us trekkies (even those of us who don't wear our Starfleet uniforms to the office), there's an even bigger problem with presentism: It makes time travel impossible. If only the present exists, then how could the *Enterprise* visit the year 1969 and be mistaken for a UFO ("Tomorrow is Yesterday," *TOS*)? How could Picard travel back and forth between past and future, one moment reliving the *Enterprise*'s first mission in the year 2364 and the next experiencing life as a retired old man tending to his vineyards in the year 2395 ("All Good Things," *TNG*)? And how could Sisko, Dax, and others members of the twenty-fourth-century Deep Space Nine crew be on Deep Space Station K-7 for the great tribble infestation of 2268 ("Trials and Tribble-ations," *DS9*)?

There's another option for answering McTaggart, though it too has its problems. Rather than attempting to bolster the A-series, we might attempt to rethink the B-series instead. McTaggart had claimed that the B-series can't accommodate certain fundamental temporal truths, like the fact that some events occurred in the past and that others will occur in the future. In response, one could claim that anything that appears to make reference to the A-series's notions of past, present, and future can be easily reformulated in terms of the B-series. For example, when Picard says that the *Enterprise*'s mission to Farpoint occurred in the past, all he means is that the Farpoint mission is earlier than the time at which he's speaking.

What's the main problem for B-theorists? They have to accept that time doesn't really pass. Since we sense the passage of time, this must just be a result of the way that we perceive the world. Though a B-theorist sees *time* as objectively real, she views the *passage* of time as existing only subjectively. This goes along with the fact that B-theorists usually reject presentism and adopt a view called *eternalism* instead. For an eternalist, the past and future are just as real as the present. In fact, for the eternalist, our entire timeline always exists. Eternalists think of reality as a sort of four-dimensional "cake," where time is just one of the "layers."

But eternalism seems to commit us to a kind of *fatalism*.[7] If the future already exists, and if it has always existed and will always exist in just that way, then it looks as if we have no power to change it. Data gives us a perfect illustration of what it means to embrace eternalism in "Time's Arrow, Part I" (*TNG*). His severed head is discovered in a cavern beneath San Francisco, buried there since the early nineteenth century. While

[7] For a discussion of the relation between eternalism and free will in the context of *Star Wars*, see Jason T. Eberl, "'You Cannot Escape Your Destiny' (Or Can You?): Freedom and Predestination in the Skywalker Family," in *Star Wars and Philosophy*, edited by Kevin S. Decker and Jason T. Eberl (Chicago: Open Court, 2005), pp. 3–15.

some of his shipmates get emotional about this discovery, Data takes the news in his usual impassive fashion:

Data: . . . it seems clear that my life is to end in the late nineteenth century.
Riker: Not if we can help it.
Data: There is no way anyone can prevent it, sir. At some future date, I will be transported back to nineteenth-century Earth, where I will die. It has occurred. It will occur.[8]

Later in the same episode, Data reminds Picard that one can't "cheat fate."

Tomorrow Is Yesterday

For those of us who aren't androids, eternalism may be a bit harder to swallow. But if we're going to believe in the existence of entities like the Bajoran Prophets—beings who can "see" the future—it looks like we might have to buy it.[9] Kira Nerys helps us (and Sisko) see why. In "Destiny" (*DS9*), a team of Cardassian scientists is scheduled to come to Deep Space Nine to help set up a subspace relay through the wormhole. A Bajoran holy man, Vedek Yarka, comes to Sisko, pleading with him not to let this plan proceed, since an ancient prophecy predicts that the mission will have disastrous consequences. Later, as Sisko is grappling with his decision on whether to let the project proceed, Kira tries to convince him that the vedek is right:

Sisko: I'm a Starfleet officer, and I have a mission to accomplish. If I call it off, it has to be for some concrete reason, something solid, something *Starfleet.*
Kira: All right, how about this? The Prophets . . . the aliens who live in the wormhole, as you call them, exist outside of linear time. They know the past, present and future.
Sisko: Agreed.

[8] It's interesting that we see this expression of eternalism in an episode entitled "Time's Arrow," since the adoption of eternalism requires us to reject the claim that time has an arrow.
[9] For the non-Bajorans among us, belief in God (who, according to classical philosophical theism, exists atemporally) would also commit one to eternalism.

Kira: It seems perfectly reasonable that they could've communicated their knowledge of the future to a Bajoran named Trakor. He wrote that knowledge down in the form of a prophecy and now, three thousand years later, we are seeing those events unfold. To me, that reasoning sounds concrete, solid. I'd even call it "Starfleet."

The picture given to us by eternalism helps us to understand the way the Prophets experience the world—events simply *are*, but they don't flow into one another. Given their non-linear perspective, much of the way that we experience the world is inconceivable to them. In some ways, this might be a plus. For example, we learn in "Emissary" (*DS9*) that the Prophets can't understand *loss.* Since the past for them is no different from the present, nothing is ever lost to them. Sisko has a hard time explaining to the Prophets what it means to experience a loss:

Prophet: (*appearing as Jennifer*) Lost? What is this?
Sisko: In a linear existence, we can't go back to the past to get something we left behind, so . . . it's lost.
Prophet: (*appearing as Jennifer*) It is inconceivable that any species could exist in such a manner. You are deceiving us.
Sisko: No. This is this truth. This day, this . . . this park . . . it was almost fifteen years ago, far in the past. It was a day that was very important to me—a day that shaped every day that followed. That is the essence of a linear existence. Each day affects the next.

Most of us probably wouldn't mind being unable to experience the loss of a loved one; missing out on this isn't really missing out at all. But having a non-linear existence comes with some downsides as well. The Prophets can't boldly go where no one has gone before—the notion of "before" is meaningless to them. They can't live long and prosper—the notion of living "long" is also meaningless to them.[10]

[10] These claims are based on the supposition that if the Prophets have a non-linear existence, then they exist outside of time. Strictly speaking, however, beings like the Prophets might exist in time, yet lack the capacity to understand the passage of time.

We might also wish sometimes that we could escape from time; we might chafe against the constraints of our linear existence. But, as the ever-wise Picard tells us, it would be a mistake to view time as our enemy. Time isn't a predator, stalking us all our lives. Rather, "time is a companion who goes with us on the journey, reminds us to cherish every moment, because they'll never come again" (*Star Trek: Generations*).[11]

[11] Thanks to Kevin Decker and Jason Eberl for comments on previous versions of this paper. Thanks also to Gabriel Rocklin for starting me on my *DS9* obsession, and to Frank Menetrez for (among many other things) introducing me to the wonders of all things *Trek*.

16

"Your Big Chance to Get Away from It All": Life, Death, and Immortality

THEODORE SCHICK

The history of philosophy is replete with different views of what makes you *you*. Lela, one of Dax's former incarnations, embraces one of these views when she asks, "What is a person but a sum of their memories?" ("Facets," *DS9*).[1] She suggests that what makes you the person you are is the memories you have, and nothing more. Yet one of Dax's best friends, Dr. Julian Bashir, seems to disagree. In "Life Support" (*DS9*) he refuses to replace more than half of Vedek Bareil's brain with a positronic matrix, claiming, "If I remove the rest of his brain and replace it with a machine, he may look like Bareil, he may even talk like Bareil, but he won't be Bareil." For Bashir, who you are apparently depends on the stuff out of which you are made. Change enough of that stuff, and you cease to exist.

This is bad news for those who look forward to a disembodied existence in the afterlife because disembodied spirits don't have physical brains. So if your identity is tied to a physical object, you can't exist if that object doesn't exist. Bashir's view is also bad news for those who hope to achieve eternal life by downloading the contents of their brains into a computer. Unless that computer is composed of neurons like those in your brain, any person resulting from such a download would, at best, be a copy of you. It wouldn't be the "real" you because it doesn't have your brain.

[1] Commander Sisko makes a similar claim in "Emissary" (*DS9*).