BADGER: Dude, you are tripping! I’m not dead! I’m on the Starship Enterprise mackin’ on Yeoman Rand while the Andorian with the disruptor is back on Talos IV or whatever.

SKINNY PETE: What do you think all those sparkles and shit are? Transporters are breaking you apart, man, down to your molecules and bones. They’re making a copy. That dude who comes out on the other side—he’s not you; he’s a color Xerox.

BADGER: So you’re telling me every time Kirk went into the transporter he was killing himself? So over the whole series there’s like a 147 Kirks?

SKINNY PETE: At least! Dude, yo, why do you think McCoy never likes to beam nowhere? Cuz he’s a doctor, bitch! Look it up; it’s science.

—Breaking Bad, “Blood Money”

You probably think you’re human. Most people do. But if you’re convinced of that, you shouldn’t get anywhere near a transporter. The reason is simple: it would shred you to bits, just as Skinny Pete says. You wouldn’t volunteer to be shredded to bits by more conventional means (axes, meat grinders, battleths)—at least not if you’re into survival. Yet that’s precisely what a transporter is supposed to do. So if you’re into survival, you shouldn’t set foot in a transporter.
There are two ways you could resist this conclusion. First, you could give up on believing you’re human. You could claim that you’re a different kind of being, one capable of surviving the transporter process. Second, you could give up on survival. You could claim that the convenience of using transporters outweighs the importance of whether you or any other human survives the process. But before considering these responses, it’s worth asking whether transporters are possible in the first place.

“I Canne Change the Laws of Physics!”

There are good reasons to think Star Trek transporters are impossible. Consider another device—a simpler prototype of a Star Trek transporter: a matter-energy-matter (MEM) converter (Figure 14.1). The MEM converter works in three stages. First, it scans an object and records the positions and states of all of the fundamental physical particles that compose it. Second, the converter disintegrates the object. Third, it assembles an exact replica of the object by repositioning fundamental physical particles according to the record it created during its original scan.

There’s reason to think that MEM converters are impossible—namely, the uncertainty principle, an implication of quantum theory originally formulated by the physicist Werner Heisenberg (1901-1976). According to this principle, the properties of quantum particles come in pairs, such as their position and momentum. The more we know about one property of a pair, the less we know about the other; so, the more we know about the position of a quantum particle, the less we know about its momentum and vice versa. For the MEM converter to do its job, it would have to create an exact physical replica of the object inside it. That means it would have to record accurately the properties of all the particles that compose the object. But the uncertainty principle implies that the machine can’t do this—not even for a single particle. The more accurate the converter’s information about a particle’s position, the less accurate its information about that particle’s momentum. The MEM converter could thus never get enough accurate information to generate a physical replica.

What’s true of the MEM converter is also true of the transporter, since both seem to involve the same kinds of processes. Since the MEM converter is impossible, it follows that the Star Trek transporter is impossible as well. Of course, the engineers who designed the Star Trek transporter knew about the uncertainty principle and built the device with a “Heisenberg compensator.” But this just pushes the problem back since “compensating” for quantum-level uncertainty is itself something that seems impossible in principle.

“Suppose They Went Nowhere?”

Even if transporters were possible, you still shouldn’t want to step into one. Would you let yourself be shot by a Varon-T disruptor that tears your body apart molecule by molecule? If you’re into survival, then the answer is surely no. Yet, despite the evident lack of pain, this is precisely what the transporter does to you. Of course, the transporter is different in that it doesn’t disintegrate the quantum-level bits that compose you, but converts them to energy, transmits them somewhere, and then puts them back together. But what makes you think that the reassembled bits would compose you and not merely an exact replica of you? You might say, “Well, it’s the same bits, and if it’s the same bits, then it must be the same person composed of those bits!” The problem is, you can’t really believe that.

Here’s why: suppose that you’re currently composed of a finite number of bits, call them $p_1, p_2, p_3, \ldots, p_n$. Suppose now that you die, and through natural decomposition those bits get scattered throughout the biosphere. Suppose, moreover, that due to a number of chance occurrences over the next 300 years, those bits come to compose some non-human animal, such as a dog or a tribble. There’s nothing impossible
about that. The basic physical bits that compose you are no different from the basic physical bits that compose dogs and tribbles—and trees and rocks and tables, for that matter. If, in the past, \( p_1, p_2, p_3, \ldots, p_n \) came to compose you as you are now, they could certainly come to compose a dog or a tribble or some other kind of thing later on. Do you really think that later thing would be you? Having the same component bits doesn’t imply that the same individual is composed of those bits.

“Remember …”

But maybe you think a person can survive being decomposed into bits even if a human can’t. What?!! That’s right: maybe you think that persons, like you and I, can survive being broken down into bits because we’re not humans. Humans are complex physical systems, members of the primate species Homo sapiens. They can’t survive extensive decomposition. But maybe you and I are not humans, not members of an animal species, not physical beings at all. This is what substance dualists claim.⁶

According to substance dualists, we have no physical properties or parts. The human you see in the mirror when you fix your hair, put on makeup, or shave isn’t really you—when Deanna Troi and Kira Nerys see their faces reflected with the respective guises of a Romulan and a Cardassian, it’s merely their bodies that have been altered, but Deanna and Kira are still the same persons.⁷ You might be connected to the human you see in the mirror in some way. You might take a keen interest in what it does and how it’s affected by things. You might even treat it as if it’s really you; but, according to substance dualists, it isn’t. Persons are instead purely mental beings. You have mental states such as thoughts, feelings, and perceptions, but according to substance dualists, none of those states are essentially embodied in the physical parts of humans. In fact, it’s possible for you to exist without any physical parts at all—a pure mental spirit.

Vulcans seem to be substance dualists. They think that they’re nonphysical beings that are merely connected to their bodies. At the end of The Wrath of Khan, Spock exposes himself to lethal radiation levels in order to save the Enterprise. Before doing so, he places his katra—his “living spirit”—within McCoy. Later, in The Search for Spock, Sarek tells Kirk that the katra is Spock himself: “Only his body was in death,” Sarek says. “He entrusted you with his very essence, with everything that was not of the body…. It is the Vulcan way when the body’s end is near.” When Spock’s body is regenerated on the planet Genesis, Kirk sets out to return Spock—his katra—to that body. If Sarek is right, then Vulcans are not physical beings. A Vulcan’s essence is “not of the body.” A Vulcan is instead a nonphysical person who’s connected to a Vulcan body, and who could be connected to other bodies—just as Spock connected himself to McCoy.

If Vulcans are nonphysical beings, then it’s possible for them to use transporters safely, since they’re not affected by what happens to a Vulcan body when it enters a transporter. Suppose that Spock is initially connected to Vulcan Body₁. When Vulcan Body₁ steps into the transporter, it gets disintegrated, and the transporter generates an exact replica, Vulcan Body₂. Since Spock, a nonphysical being, is unaffected by the disintegration process, he can be reconnected to Vulcan Body₂. So, even if a Vulcan’s body gets energized to bits, the Vulcan person—the nonphysical being—remains intact.

What is true of Vulcans could also be true of us: perhaps we too are nonphysical beings who are merely connected to human bodies. The human you see in the mirror isn’t really you; you don’t really have hair, eyes, or other physical parts; you don’t really have a physical location; you can’t really get chopped, blown up, or energized to bits. If that’s the case, then you could survive a transporter.

Substance dualism, though, has a number of troubling implications. If we persons are nonphysical beings, how are we able to interact with bodies? Physical interaction requires spatial location. When one billiard ball strikes another, that striking happens at a specific location where the surface of one ball impacts the surface of the other. But if you’re a nonphysical being, you have no location. How then are you able to interact with a body? Even if we could account for mental—physical interaction, what accounts for each person interacting with only one particular body? If Kirk and Spock are both transported simultaneously, why is it that Kirk interacts at the end of the process with Human Body₂, while Spock interacts with Vulcan Body₂? If we are nonphysical beings, there’s no reason to think that any of us are necessarily tied to only our current bodies. It shouldn’t require the elaborate alien technology on Camus II for Janice Lester to take control of Kirk’s body in “Turnabout Intruder” (TOS).

Furthermore, if substance dualism is true, many of our moral intuitions are blown out the airlock. Why is killing a human so bad? If substance dualism is true, then humans aren’t persons; so in killing a
human, you’re not killing a person, but merely destroying his or her body. It might be more like an act of vandalism—destroying some- one’s property. Likewise, think about what happens to the 
katra of the young Spock who’s been regenerated on Genesis—yes, his mind is simple, but he has one nonetheless, as evidenced by his suffering pon farr. Is it destroyed when Spock’s 
katra is restored to it? If so, then isn’t the Vulcan priestess T’Lar committing murder by destroying the 
katra of the young regenerated Spock?8

“I’m a Doctor, Not a Soul!”

Maybe you can’t bring yourself to believe substance dualism. Maybe you’re convinced that you’re basically a physical being. Are there any views that claim that you’re a physical being but deny that you’re human? “What Are Little Girls Made Of?” (TOS) suggests one of them. Kirk is held captive on Exo III by the famous scientist
Roger Korby, who’s creating experimental androids. Korby creates an
android replica of Kirk. The android, he says, is “only a machine,”
but it didn’t have to be. “By continuing the process,” Korby tells
Kirk, “I could’ve transferred you, your very consciousness into that
android—your soul, if you wish, all of you.”99 There’s a metaphysical
view that makes sense out of Korby’s basic idea, one known as
constitutionalism.10

Constitutionalism claims that you and I are constituted by humans.
To say that X is constituted by Y implies at least two things about X
and Y: first, X and Y share all the same parts; and, second, X and Y are
different things. Imagine that you shape a lump of clay into a statue
of Kahless the Unforgettable. There’s no part of the statue that isn’t
part of the lump, and there’s no part of the lump that isn’t also part
of the statue. Yet, despite having all the same parts, constitutionalists say,
the statue and the lump are different things because they have different
properties. The lump, for instance, existed before the statue did; and, unlike the statue, it can survive being squashed. A thing can’t be dif-
ferent from itself, and because the statue and lump have different prop-
erties, constitutionalists conclude that they must be different things.

According to constitutionalists, the same is true of you and the
human you see in the mirror. You and that human have all the same
parts—all the same limbs, digits, internal organs, and so on. Yet you
and that human are different things, say constitutionalists, because
you and that human have different properties. Unlike that human, for

instance, you could survive the complete replacement of your body
parts with robotic parts.

Imagine that we begin the process of replacing your human, biological
parts with robotic parts—like what the Borg do to Captain Picard
in “The Best of Both Worlds” (TNG). Imagine, however, that instead
of leaving some of the original human parts behind, we replace all of
them. Every one of your original human parts is replaced by a robotic
part. According to constitutionalists, it’s possible for you to survive
such a process and become a robot. Even if your brain were replaced
by an artificial positronic implant, many constitutionalists reason that
so long as the implant copied your brain’s neural processes, it would
also copy your mental states—in particular, your first-person perspec-
tive of yourself and the world around you. And, they say, so long as
that first-person perspective exists, you’d continue to exist. When, in
“Life Support” (DS9), Dr. Bashir replaces half of Vedek Bareil’s cere-
brum, Bareil feels somewhat different, but his mental states appear to
be largely intact. Although Bashir doesn’t believe Bareil could survive
complete replacement of his cerebrum—telling Kira, “He may look
like Bareil. He may even talk like Bareil. But he won’t be Bareil”—
this may only reflect technological limitations that could be overcome
in the future. It isn’t possible, however, for the human you currently
share your parts with to become a robot. That human is essentially a
biological being; it can’t become a nonbiological being like a robot.
Hence, you can survive different kinds of changes than that human
can. A thing can’t differ from itself, so you and that human must be
different things. Constitutionalists conclude that human isn’t you; it
merely constitutes you.

Suppose you’re a constitutionalist. What can you say about transpor-
tors? You can say that initially you are constituted by Human1.
When Human1 steps into the transporter, it is disintegrated and
replaced by Human2. Since Human2 is an exact replica of Human1,
you’re now constituted by Human2. What ensures that Human2 con-
stitutes you and not a mere replica of you? According to constitu-
tionalists, you’re essentially a mental being. Moreover, what makes
you the unique individual you are is that you have the mental states
you do, and those mental states are determined by the configuration
of your physical parts. Since Human2 has the same configuration
of physical parts as Human1, it must give rise to the same kinds of
mental states. And since Human1 and Human2 give rise to the same kinds
of mental states, Human1 must constitute you after the transport just
as Human1 constituted you before it.
Would the Real Riker Please Beam Up?

Constitutionalism is an exciting theory that is the basis for many *Star Trek* episodes. But it faces the *fission problem*, which Commander Riker experiences firsthand in “Second Chances” (TNG). Eight years earlier, while serving as a lieutenant aboard the *U.S.S. Potemkin*, Riker was part of an away team sent to Nervala IV. When beaming back to the ship, the transporter beam was split by an atmospheric distortion field, and two replicas of Riker materialized: one aboard the *Potemkin*, the other on the planet’s surface. Here’s the problem: according to constitutionalists, an individual’s mental states make him or her the unique individual that he or she is. But at the moment they materialized, both replicas of Riker were physically indistinguishable. On the constitutionalist view, that means they must be mentally indistinguishable as well: other than having distinct first-person perspectives, they must have exactly the same mental states. Which of them, therefore, is the real Riker?

There are four options: (a) the replica on the planet is the real one, (b) the replica on the ship is, (c) both of the replicas are, or (d) neither of them is. Commander LaForge endorses option (c). “Both were materialized from complete patterns,” he says, so both are real. But this view can’t be right. One thing can’t be identical to two things. Moreover, the replica on the ship and the one on the planet have different locations and are constituted by different humans. Upon materializing, each has its own unique first-person perspective continuous with that of the original Riker, and each immediately begins accumulating distinct sets of memories over the next eight years. A thing can’t differ from itself, so the replica on the ship and the one on the planet cannot both be Will Riker. Option (d) must be rejected since the whole idea is to give an account of how you could survive the transport process, and (d) implies that Riker doesn’t survive it. That means constitutionalists must endorse either (a) or (b): only one of the two replicas can be the real Riker.

Since the replica on the ship and the replica on the planet are mentally indistinguishable, there seems to be no principled reason to choose one over the other as the real Riker. If an individual’s mental states make him or her the unique individual that he or she is, and both replicas have mental states that have perfect continuity with Riker’s at the moment he tells the *Potemkin*, “Energize,” then they’re both equally good candidates for being the real Riker. It seems, then, that constitutionalists have no choice but simply to pick one or the other arbitrarily. But in philosophy, being arbitrary just isn’t cool.

“What’s So Damn Troublesome about Not Having Died?”

Whether because of the fission problem or for some other reason, constitutionalism might not appeal to you. Maybe you’re convinced that you’re really human after all. Must you then avoid transporters? Only if you think *survival* requires *identity*. One way of resolving the fission problem without being arbitrary is to claim that both Rikers are equally “survivors” of the original Riker, though neither is *strictly identical* with him.12 If survival is just as good as identity, then even if the human who comes out of the transporter isn’t really the human who went in—your child, your spouse, your best friend—the replica is still indistinguishable from that human, and you could treat that replica in the same way you would’ve treated the original. The replica would be mentally continuous with the original—continuous enough to count as his or her “survivor.”

One problem with this response is that it appears to be incompatible with *love*, for *love is particular*. When you love a person, the object of your love isn’t the characteristics the person has, but the person himself or herself. Someone’s kindness, sense of humor, intelligence, and other characteristics might be lovable too; but loving a person’s characteristics is different from loving the person himself or herself. Other people might have the same characteristics as your beloved, and yet you might not love them. While Commander Riker is “flattered … sort of” by Troi’s burgeoning romance with Lieutenant Riker and she admits finding it hard to separate her feelings for the two of them, Troi doesn’t love Lieutenant Riker just because he has Riker’s characteristics. If love is particular in this way, then it would be no comfort knowing that your loved ones had been annihilated and replaced by replicas that had all the same characteristics, for however lovable those characteristics might be, you’d still be deprived of the real objects of your love: the individuals themselves.

*Star Trek* transporters thus confront you with three options: (1) you give up thinking that you’re a human, (2) you give up valuing individual identity and love, or else (3) you take a shuttlecraft or other means of transportation, and be thankful that transporters are probably impossible anyway.
Notes

3. Diehard fans of transporters might argue that even if transporters are physically impossible, they aren’t metaphysically impossible. If the laws of nature were different, and the uncertainty principle didn’t obtain, then in such a world transporters would be possible. This argument assumes that it’s possible for the laws of nature to be different from what they are in fact. But if properties are powers to produce certain effects, then it’s impossible for the laws of nature to be different from what they are in fact. In that case, transporters aren’t just physically impossible—they’re metaphysically impossible. They can no sooner exist than married bachelors or square circles can.
6. Substance dualism has a venerable history dating back to Plato (427–347 BCE), who defended a version of it in The Phaedo. It was defended in late antiquity and the Middle Ages by Neoplatonists, and in the early modern era by René Descartes (1596–1650) in his Meditations on First Philosophy. The latter work was the inspiration for contemporary versions of substance dualism such as the one defended by Richard Swinburne in The Evolution of the Soul (New York: Oxford University Press, 1986) and in Mind, Brain, and Free Will (New York: Oxford University Press, 2013). For a discussion of Swinburne’s views, see my “Swinburne on Substances, Properties, and Structures,” European Journal for Philosophy of Religion 6 (2014): 17–28.
7. See “Face of the Enemy” (TNG) and “Second Skin” (DS9).
8. There are many technical philosophical objections to substance dualism. I discuss them, as well as a variety of competing theories, in my Philosophy of Mind: A Comprehensive Introduction (Malden, MA: Wiley-Blackwell, 2011).
9. Similarly, Dr. Ira Graves transferred his consciousness into Data’s body in “The Schizoid Man” (TNG). Data’s creator, Dr. Noonien Soong, also survived by using the Exo III technology to transfer himself into an android body; David Mack, Star Trek: The Next Generation—Cold Equations: The Persistence of Memory (New York: Pocket Books, 2012), ch. 7.
11. An astute reader may think that Riker would have survived the transport process if it had gone normally; he doesn’t survive in this case only because he’s split in two. This response falters, however, since it assumes that Riker would survive a normal transport process in which his pattern is replicated only once; but, as LaForge notes, both Rikers were produced out of “complete patterns.” How could a double success be a failure in which Riker doesn’t survive?