

What if absolutely everything is conscious?

Story by Sigal Samuel

7/8/2024

VOX.com

• 5mo • 19 min read

If you're feeling brave, sit and look — and I mean really look — at a plant on your windowsill as it bends toward the light. It seems simple, but stare at it long enough and you may find yourself doubting everything you thought you knew about your own mind.

Because sooner or later you'll ask yourself: Why, exactly, is that plant stretching toward the sun?

Sure, you can look it up and find out there's a thing called phototropism, which involves cells in a plant elongating to chase the sun. But that's not really much of an answer. The question was: *Why* does the plant do that? Is its movement just a mechanistic response with no feeling behind it? Or does the plant *want* that delicious, warm light?

To [many kids](#), it's obvious: The plant wants the light! Yet as adults, at least in the West, we're supposed to be embarrassed by that kind of language. Modern science warns us against anthropomorphizing — and not just when it comes to plants. Until a few decades ago, [scientists also insisted on viewing animals](#) as mechanistic bundles of instinct (even though any pet owner would find that absurd). They've gradually [changed their minds](#) about mammals, birds, and certain [brainy species](#) like octopuses, while continuing to believe that species with simpler nervous systems (or no nervous system at all) are not intelligent. They're not even conscious.

Well, panpsychism begs to differ.

From the Greek words *pan* (all) and *psyche* (soul), panpsychism is the view, held by many peoples around the world since antiquity, that consciousness resides in everything at least to some degree — that it's a fundamental and ubiquitous feature of the physical universe. Animals have it, plants have it, and even single cells have it. That doesn't mean your chair is conscious — but, according to some panpsychists, the atoms inside it might be. How exactly that could work is a philosophical puzzle (more on that soon).

As you can imagine, scientists have spent the past century mocking this idea. Fair enough — it does sound wacky at first. And yet, this theory of consciousness, though still controversial, is now enjoying a resurgence as mounting scientific evidence suggests that you don't need a complex brain to feel, remember, learn, or think. In fact, you may not need a brain at all.

Once upon a time, tons of people believed in panpsychism. What happened?

If you're tempted to dismiss panpsychists as weirdos, consider the fact that most people probably believed in panpsychism, or something like it, for most of human history.

"We're the weirdos!" Joanna Leidenhag, a professor of philosophy and theology at the University of Leeds, told me.

In Western philosophy, [panpsychism goes all the way back to the Ancient Greeks](#), where philosophers like Thales, Heraclitus, and Plato espoused some version of it. And from Hindus in India to followers of Shintoism in Japan to the Indigenous peoples of America, many people believed — and still believe — that animals, plants, and other elements of the natural world are conscious.

Of course, they wouldn't have used the word "consciousness," which was only coined in the 17th century. But whether you say that a creature has "soul" or "mind" or "consciousness," you're expressing the basic idea that it's got a perspective on the world — that there's something it feels like to be that creature.

There's a lot of conceptual overlap here with animism, anthropologists' (historically derogatory) term for a belief system that says everything is alive or imbued with spirit. In fact, if you think that being alive and being conscious always go together, then animism and panpsychism are basically identical. Many people today don't believe this, but some do.

In the West, the growing dominance of monotheistic religion put a damper on panpsychism for centuries. But it began to spring up again during the Renaissance. Accepting the 16th-century astronomer Copernicus's radical new idea that Earth doesn't occupy a privileged position at the center of the universe, philosophers like Giordano Bruno figured humans don't occupy a privileged position, either. If we humans have a soul, he reasoned, then "there is nothing that does not possess a soul."

The Catholic Church hated Bruno's ideas so much that it burned him at the stake. And soon enough, a much churchier view — Cartesian dualism — emerged. The 17th-century French philosopher René Descartes split mind from matter, arguing that they are totally distinct: Only humans have mind. Animals, plants, and all the rest are just mindless mechanisms — blobs of matter that God created for us humans to use.

In the Enlightenment era, panpsychist thinkers like Spinoza, Leibniz, and Diderot challenged Descartes' dualism. It proved hard to dislodge. Ironically, some of its sticking power may have come from a contemporary of Descartes whom the Church abhorred: the astronomer [Galileo Galilei](#). He argued that in order to make science objective, we should bracket out anything that smacks of mysterious spiritual stuff. That laid the foundation for modern science, where matter and mind were walled off from each other.

By the 19th century, many scientists fully embraced materialism, also known as physicalism. They said they didn't see any evidence for immaterial stuff like a mind or soul, and — taking Galileo's

view to an extreme — they argued that the only real thing was the thing they could observe objectively: matter.

That, however, produced its own problem.

How panpsychism gets around the “hard problem” of consciousness

The big problem for materialists is what contemporary philosopher David Chalmers dubbed [the “hard problem” of consciousness](#). In a nutshell, the problem is this: You’re conscious. But if you’re just made of non-conscious matter, why and how exactly could consciousness arise from that?

As the influential philosopher Galen Strawson [puts it](#): “You can make chalk from cheese, or water from wine, because if you go down to the subatomic level they are both the same stuff, but you can’t make experience from something wholly non-experiential.”

Neuroscientists have tried to figure out how inert matter could ever give rise to consciousness. Although they’ve identified correlations between certain brain states and certain subjective feelings, [they still don’t have a proper theory](#) about how or why consciousness arises.

And this is where panpsychism really shines. Its central explanatory virtue is that it lets you bypass the hard problem of consciousness altogether.

That’s because the panpsychist starts out with the right ingredients. If you believe that consciousness resides, however minimally, in matter’s tiniest building blocks — atoms, electrons, quarks — then it’s much easier to explain how sophisticated forms of consciousness can eventually arise in, say, humans. It’s basically a story about scaling: As matter scales up into more complex creatures, the degree of consciousness shoots up, too.

This fits very well with the theory of evolution, which says that creatures gradually became more complex as they evolved — not that there was some magical “aha!” moment when mind suddenly appeared on the scene. After Darwin published *The Origin of Species*, philosophers increasingly accepted the idea that something doesn’t emerge from nothing, and that idea is a major reason why super-influential, hard-nosed British logicians like Alfred North Whitehead and Bertrand Russell eventually came to embrace panpsychism. As Whitehead said, there are “no arbitrary breaks” in nature.

In [a landmark 2006 paper](#), Strawson took this idea and ran with it, making a radical argument: Materialism, he said, actually *entails* panpsychism. We can break down the argument into six simple steps:

1. Consciousness is real. (We know that from our own experience.)
2. Everything is physical. (There’s no evidence that immaterial stuff exists.)
3. Therefore, consciousness is physical.
4. There’s no “radical emergence” in nature. (We don’t get something from nothing.)
5. Consciousness emerging from totally non-conscious stuff would be radical emergence.
6. Therefore, all stuff must have some consciousness baked into it.

Strawson's [conclusion](#) is as logical as it is surprising: "Any realistic — any truly serious — materialist must be a panpsychist."

Plenty of materialists disagree. For example, neuroscientist Anil Seth told me he doesn't buy the argument because he's not convinced that nature never makes leaps; he thinks it's entirely plausible that consciousness can emerge from unconscious matter if that matter is arranged in a complex enough way — in, say, a brain.

"You can still get some property emerging from things that don't have that property — in nature, we see this all the time!" Seth told me. He gave the mother of all examples: the origin of life itself. "I mean, at some point there was nothing alive and now we have living things!"

Yet panpsychists like Strawson say that doesn't actually prove Seth's point. They're [not claiming there's no emergence in nature](#). They're claiming there's no *radical* emergence — no cases where a new property pops up that can't be explained with reference to the properties of its parts. To say that "at some point there was nothing alive" assumes that there's a sharp break between living and nonliving stuff. But zoom in enough, and the biochemistry that makes up life is really just physics. Cells, after all, are made of atoms.

Seth acknowledges that he can't disprove panpsychism. He also acknowledges that materialism, in the form of modern neuroscience, hasn't yet figured out how exactly consciousness could emerge from cells. But give the field more time and he suspects that it could get there, he said: "the hard problem will seem less hard over time, and may dissolve and disappear altogether."

Since neuroscience labs haven't cracked the puzzle yet, some scientists are trying a different approach — and new experimental evidence that may support panpsychism is coming to light.

Why is panpsychism becoming more popular now? Check out these incredible science experiments.

Michael Levin, a professor of biology at Tufts University, is as empirical as empiricists come. He doesn't believe we should just be armchair philosophizing about consciousness. "Just having *feelings* about this stuff is ridiculous at this point," he told me. "You have to do experiments."

And it's his experiments that have led him to believe in panpsychism.

One thing Levin has studied is slime mold. The gooey single-celled organism, which looks like dog vomit, can sometimes be found oozing over a forest floor. Even when it grows to be meters across, it's always just a single cell. It's got no brain or nervous system. And yet Levin has found that it [can reliably make smart decisions](#).

Place a slime mold at one end of a maze and a yummy treat, like oat flakes, at the other end. You can watch as the slime mold branches off to suss out all the different possible routes to the oat flakes. It'll then pull away from the less promising paths, choosing instead to squish itself down [the shortest path through the maze](#).

In 2010, researchers from Japan and the UK arranged little heaps of oat flakes in a layout that resembles the population centers of Tokyo. Then they let a slime mold loose. Lo and behold, the

single-celled organism cut the most efficient route to each pile of treats, effectively [recreating the map of the Tokyo subway system](#).

You may be thinking that the slime mold is just acting off pre-programmed reflexes, not choosing or learning anything. A French researcher, Audrey Dussutour, [proved otherwise](#). She put slime mold at one end of a bridge and yummy oatmeal at the other. But she lined the bridge with caffeine, which slime mold hates. At first, the slime mold refused to cross the bridge for several hours. Hungry, it finally braved the caffeine so it could get the oatmeal. Over time, the slime mold stopped avoiding the hated substance. Dussutour showed that the organism had learned something: caffeine wasn't so scary, after all.

The obvious question here is: How is any of this happening without a brain?!

Hold on, because it gets even weirder. Consider Levin's experiments with planaria, the humble flatworm. It's got a teeny-tiny brain, but that's not so important, [a fact Levin proved by... decapitating it](#).

First, Levin trained these worms to get over their fear of light by dribbling a delicious liver snack into an illuminated section of their petri dishes. The worms, which normally prefer to hang out in the dark, learned to venture into the illuminated section of the dishes for these treats. Presumably, this learning took place in the brain. But then Levin cut off the worms' heads.

Planaria have an amazing ability to regenerate their body parts, so within two weeks, they grew brand-new heads. And when Levin tested their willingness to venture into the middle of their dishes, he found them surprisingly willing. They somehow remembered the liver treats of yore. But how could they remember that if their brains had been cut off?

All these findings suggest that modern science may have made a big mistake in assuming that cognition is all about the brain. Brain cells, known as neurons, are actually not that special. A key feature of these cells — the ability to send and receive electrical signals — is shared with other cells in your body. And it's this sensing and communicating via electricity that, Levin suspects, makes basic cognition possible.

We've known about bioelectricity for centuries, as you might recall from high school biology: send a jolt through a frog and its leg will twitch, right? But Levin is demonstrating that it plays a much bigger role than anyone realized. He suspects that organisms store all kinds of information not just in their cells, but in the patterns of electrical currents passing between the cells. The specific pattern would convey information to other cells.

And what about plants? After all, we know that plant cells use electrical signaling, too. And over the past decade, scientific experiments have shown that they do a whole lot more than seeking out certain outcomes — like sunlight — and avoiding others. They [remember and learn from experience](#), a fact the ecologist Monica Gagliano established with the help of *Mimosa pudica*, a plant known for defensively folding in its leaves in response to physical stimuli. Gagliano dropped these plants from a height onto a foam base and, as expected, the leaves curled up at the shock.

But after being dropped several times, the plants learned that the drops were pretty harmless, so they kept their leaves open during future drops — even a month later.

Plants have many other tricks up their leaves: they [keep track of how long it's been since bees last visited](#), they [send out biochemical distress signals to other plants](#), and they [appear to lose consciousness](#) when sedated with anesthesia.

Levin thinks networks of electrical signals may be making such things possible: storing memories, learning, solving problems creatively — in short, cognition.

“We know that things that don’t have brains have cognitive capacities,” Levin said. “Frankly, I don’t understand how it took this long for this view to really come back.” Given what evolution tells us about the gradual development of mind, “there’s no getting away from the fact that cognition exists widely and long before brains and nerves appear.”

In case you’re wondering why Levin prefers to speak about cognition, not consciousness: The former is about functional abilities we can observe from our third-person perspective. The latter is about what it feels like to be a creature from that creature’s own perspective — so it’s hard, if not impossible, to get at experimentally. Nevertheless, Levin told me, “If I had to put dollars down right now, I do think that consciousness is very ubiquitous and primary, and I think it does go along with cognition.”

“All life is sense-making”

Of course, not everyone is ready to bet on panpsychism. For scientists and philosophers who believe consciousness resides in more than just humans and animals but are not convinced it resides in atoms, there’s a kind of in-between position: biopsychism. That’s the view that all living organisms — and only living organisms — are conscious.

Some scientists are busily amassing evidence that could support that view. Aware that anything with “psychism” in its name will probably be branded as woo-woo, they use terms like “[minimal intelligence](#)” or “[basal cognition](#).” Their goal is to investigate signs of cognition at the base of the tree of life — in organisms that have very simple nervous systems or lack them altogether because they appeared early in the story of evolution.

Some of these researchers [note](#) that attributing consciousness to, say, plants gels nicely with a theory of consciousness that’s becoming increasingly popular in the scientific community: integrated information theory, which says that consciousness is basically equivalent to integrated information. “Integration” happens when different elements in a system communicate with each other, whether that’s neurons communicating in a brain, or something else. The more integrated information there is in a system, the greater the degree of consciousness it’s got. If the cells in a plant are sharing and integrating information through bioelectricity, maybe it’s not that big of a leap to think the plant has some minimal degree of consciousness.

[Evan Thompson](#), a professor of philosophy at the University of British Columbia, argued in his 2007 book [Mind in Life](#) that only humans and animals with nervous systems make the cut. But he later [changed his mind](#). After all, he reasoned, any living thing has to make sense of its environment, pursue its goals, and solve problems in order to survive. Whether you’re a tiger or a

fern, a slime mold or a bacterium, you need to find a way to get food, reproduce, and adapt when faced with hostile conditions. By its very nature, living seems to be a process of cognition.

“All life is sense-making,” Thompson told me. “The reason I think we can assume that it’s basic to all life is that it’s actually much harder to make sense of the idea that a system that produces itself metabolically can have directed, oriented behavior without some kind of motivation or drive that involves affect.”

In other words, what does it even mean to say that a living being is pursuing goals but doesn’t want anything?

The downside for biopsychism, though, is that it’s still stuck with the “hard problem” of consciousness, since it reinforces the idea that there’s a sharp break between conscious and nonconscious or between living and nonliving stuff. And so, philosophers like Strawson and scientists like Levin think we need to go further, all the way to panpsychism.

I asked Levin what he thinks is going on inside a plant when it bends toward the light: Is it just acting mechanically, or does it *want* the light? “All these dichotomies are false dichotomies,” he replied. “What most people say is, ‘Oh, that’s just a mechanical system following the laws of physics.’ Well, what do you think *you* are?”

Okay, but how could an atom be conscious?

Debates about theories of consciousness are kind of like a party game. The central question is: How low can you go? Are you willing to ascribe consciousness to animals? Plants? Cells? Atoms? Subatomic particles?

Even if you believe that all living things have some degree of consciousness, you might have trouble with the idea that an atom or an electron is conscious. It’s hard to understand what that could possibly look like.

Panpsychist thinkers are quick to explain that they’re not suggesting these particles have complex forms of consciousness, like decision-making or meta-cognition (“I want X, and I know that I want X”). They’re envisioning something way more basic. Remember that to have consciousness is just to have a perspective on the world, a feeling of what it’s like to be you.

“For an electron, there’s no meta-cognition, no decision-making,” Leidenhag said. “But when it encounters another electron with another negative charge, it repels.” For any particle, she suggests, “there’s something that it’s like for it to be attracted or repelled.” This attraction or repulsion is a minimal sense of wanting or not wanting.

“Cognition that’s really, really simple looks like physics to us,” Levin told me. For example, we typically assume a key feature of cognition is intentionality or freedom — being able to choose your own path, as opposed to proceeding down a preprogrammed path. Well, physics tells us that even elementary particles have that, in the simplest possible form: [quantum indeterminacy](#) (the idea that the physical facts of the universe seem to be indeterminate on the subatomic level).

In fact, if you ask Levin the classic question — How low can you go? Is there anything in the world that's *not* somewhere on the spectrum of cognition? — he'll tell you: "I don't believe there is a zero in our world."

He's happy to acknowledge that the level of indeterminacy in an elementary particle is a "very stupid-low level of freedom," but it's not nothing. And that's all the panpsychist needs in order to explain consciousness as a simple story of scaling. Once upon a time, there was a little particle that was a little bit conscious. It got together with more particles, and they formed a cell that was a little bit more conscious. It got together with more cells, and they formed an animal that was even more conscious...

The biggest challenge to panpsychism: the combination problem

But wait a second. There's a problem for the panpsychist here. If the tiniest particles have conscious experiences, how exactly do they combine to produce a more complex thing with its own conscious experience? What's more, how do we explain things like tables or chairs? Panpsychists generally do not argue that those things are conscious subjects — but how do we explain why they aren't, while the collection of atoms known as a human is?

This is known as the "combination problem," and it's typically seen as the biggest challenge to panpsychism. Any panpsychist owes you an explanation of why they think the littlest bits are conscious, and humans are conscious, but the table is not.

Our old friend Giordano Bruno anticipated this way back in the 16th century. He argued that even though the tiniest "corpuscles" inside a table are conscious, they do not produce a unified conscious subject when they come together in the form of an inorganic object. "I say, then, that the table is not animated as a table, nor are the clothes as clothes," he wrote, but "in all things there is spirit, and there is not the least corpuscle that does not contain within itself some portion that may animate it."

Panpsychists like Leidenhag make the same move today. "I think it follows our intuitions to say that a table isn't conscious because the parts are not interacting together — there's no real unity going on with a table," she told me. "Whereas with a plant, there really is clear unity."

In other words, a plant is a goal-directed system with unity of purpose. Its parts are all working together as a team to perform the essential processes that keep the system running. That's very different from a table, where particles are squished together but are not collaborating.

That sounded to me like Leidenhag was saying that the table is not conscious because it's not alive. So I asked her if she thinks that aliveness and consciousness are one and the same.

"What I would say is aliveness is one name for the process by which conscious parts unify to form new conscious wholes," she replied. "So I could say that a single electron is not alive, but it is conscious. And when it is part of a living system, it creates a bigger consciousness."

Leidenhag acknowledges that she can't prove an electron is conscious — or that panpsychism is right about consciousness. But, she told me, "I think it's the most plausible of a bunch of implausible views about consciousness."

Strawson said the same thing. “It’s the least worst view,” he laughed.

Here’s the really funny thing: Panpsychists and materialists will both concede that they can’t disprove the other camp’s view, because we don’t have definitive evidence either way. Yet both believe their own view is the simplest and likeliest explanation — the most “parsimonious,” as Strawson and Seth each told me.

Panpsychism has the advantage of letting us sidestep the hard problem. But materialism has an advantage, too: no combination problem. So, does one come out ahead?

The difference between them may be more methodological than anything else. Materialism restricts itself to what it can establish empirically, testable detail by testable detail, with the hope of groping its way toward a broad theoretical framework. Panpsychism has historically let itself dream big, starting out with the broad theory and hoping to fill in the details later. What’s exciting is that scientists like Levin are now combining the methodology of materialism with the theory of panpsychism, seeing how they might fit together. These scientists are digging right underneath the wall that was erected in the 17th century — the one that split matter from mind. Where that will lead is anyone’s guess.

What are the ethical implications? Does panpsychism mean I can’t eat anything?

A few years ago, I was chatting about panpsychism with a friend. I mentioned that I don’t know if the theory is true, but I hope it is. When my friend asked why, I said simply, “So many little buddies everywhere!”

To me, panpsychism offered an enchanted view of the world. I suspected that if it were the prevailing view, people might be less likely to feel lonely or to destroy nature, because they’d see kin everywhere.

But my friend had a totally different reaction. He was horrified by the idea of panpsychism. “Think of how much suffering there could be in the world!” he said.

His reaction points to the big ethical question looming over panpsychism: If it’s right, then how the hell are we supposed to live? If everything is conscious, then can we not eat anything?

For one thing, panpsychism doesn’t argue that everything is *equally* conscious. Different things are conscious to different degrees, so we might feel different levels of moral obligation to them.

“It has made me a more committed vegetarian because it’s just made me more sensitive to the consciousness of other creatures. It forces you to think about your moral reasoning,” Leidenhag told me. But, she added, “I don’t think that it makes it impossible for you to go about your life consuming things.”

While the consciousness of a given creature may matter a lot, morally speaking, lots of other things matter, too. Consider our relationship to the creature: Have we made it dependent on us by domesticating it, or does it live in the wild? Has it had the chance to live a full life? Is it fundamentally hostile to us? Bedbugs may have some degree of consciousness, but that doesn’t mean you’re a moral monster if you call an exterminator. Your own ability to survive and thrive is

also part of the moral calculus. It's probably inevitable that sometimes the interests of different conscious beings are going to be in tension with each other, or flat-out incompatible; when that happens, [we have to make choices](#) as best we can.

And what about some advanced artificial intelligence we may invent in the future? Could it become as conscious as a biological creature, despite being made of silicon? To a panpsychist, who believes there's nothing about mind that requires organic matter — it's in inorganic matter, too — the answer is yes.

"I think it's nuts that people think that only the magic meanderings of evolution can somehow create minds," Levin said. "In principle, there's no reason why AI couldn't be conscious."

In that case, how should we think about our obligations to the vast spectrum of conscious beings that exist and might one day exist amongst us? Do we need to [expand our moral circle](#) — the imaginary boundary we draw around those we consider worthy of moral consideration?

"You could say the new Golden Rule is: Be nice to goal-directed systems," Levin said. "It's actually not that different from 'treat thy neighbor as thyself.' To the extent that that creature cares about what happens to it, you should care about what happens to it. Try to scale your compassion appropriately."