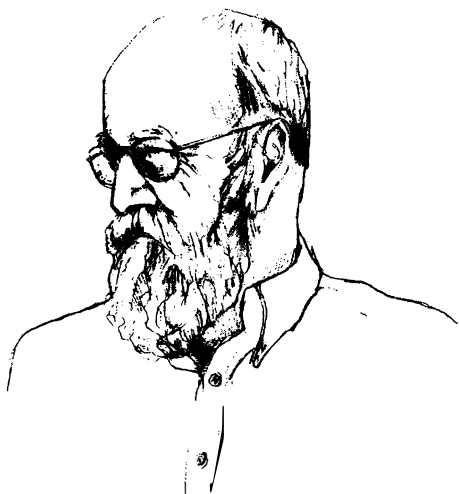


## No One Is Boss



### *Interview with Daniel Dennett*

Cells do not know who you are, nor do they care.

—DANIEL DENNETT

Chimpanzees and humans are the only animals able to recognize themselves in a mirror. They may be the only ones to possess consciousness of their own. Dolphins, not fish but mammals, may also. But where and when in the history of evolution does personal consciousness appear? When we try to describe consciousness, do we illustrate the soul? We seem closer than ever to discerning at least self-consciousness, thanks to the impressive team of scientists that includes Richard Dawkins, Francis Crick, James Watson, Edward O. Wilson, and Steven Pinker, directed by Daniel Dennett from the Center for Cognitive Studies at Tufts University near Boston.

We had better understand the fierce debate of those who question the dual nature of humans. Both factions seem to have irrefutable views, formulated with an elegance and clarity rarely found in scientific prose. It is a profoundly ambiguous debate. The most reductionist scientists, like Dennett, reserve space for consciousness, while the staunchest defenders of the power of the mind, such as Deepak Chopra, see science, not religion, as the preferred mode to understand nature.

The commotion stirred by the denial of the existence of the soul by the scientific community is not surprising. The outcry raised by antireductionists was generated by their profound fear of existence without free will. French physicist and mathematician Pierre-Simon Laplace summarized with clarity the essence of determinism. As flies are dazzled by light, humans debate, unaware of determinism at times. So often discomfort leads to loud rejection of the concept of a universe undefined.

**Eduardo Punset:** So this machine, which is our body, has no spirit?

**Daniel Dennett:** Exactly, it does not have any spirit.

**E.P.** Nor soul.

**Da.D.** There may be a soul. As far as a spirit is concerned, let us take stock of the human body, and what do we find? Several billions of different cells, living cells, neurons—cells of every type, in other words. But none of the cells know who you are, nor do they care. But in some way, you join the team of trillions of cells, rather fascist cells, which, like slaves, expel intruders as bees do in a hive, and they do not care for democracy, Barcelona, or Boston. Our cells are unfamiliar with all of this, and yet, here are two great teams of cells, your team and mine, that know a lot of things of which they are not aware. Therefore, it is natural to think that the only explanation is that, in addition to all this tissue, there is a spirit in the body, and that a soul does exist.

**E.P.** It is what people believe.

**Da.D.** It is a very powerful idea, but it is wrong. A spirit cannot exist in a machine.

**E.P.** Dan, if there is no soul in the machine body, then what governs it?

**Da.D.** Let me illustrate it using a fable. In a country there reigned a king, and without the king the nation did not exist. But then democracy was invented. Something similar happened in biology, even though biology invented democracy first. No part of you is the king, there are only factions, political parties, and groups that compete for control of your brain.

But what sort of groups are they? They are groups of activities, they are not cells but rather information models that compete for control of your body, and because competition is dynamic and fluid, there is always someone at the controls, someone in the office.

E.P. Even though they have not been officially elected, right?

Da.D. Exactly, there are no official elections, but the brain has an opposition process that allows one issue after another to surface, to go forward and take over the situation. While we talk, we are a collection of ideas, projects, hopes, and plans that we might put aside at the end of the day, and a different me will take over the controls. All the projects are linked by memory. There is no one spirit, but rather a succession of temporary controllers.

E.P. What does consciousness mean? What I mean is, how did it all start? How can we explain it? How can we know what exists in this machine?

Da.D. To my knowledge, the key to understanding consciousness is to ask the evolutionist's question: why? Consciousness exists so that we may anticipate the future and have foresight in order to plan and project a better course in life. In a human that has a background of language, science, and culture, there is a great deal of information being exchanged. We can predict eclipses that are not expected for another few centuries, imagine distant galaxies, and think of a past we never lived. Consciousness is the power of the brain to represent things that do not occur in the present, strictly speaking, but rather in the past and future. Our consciousness is that power, it is the physical world's capacity to represent itself.

E.P. And what genes will carry the information from one brain to another?

Da.D. We call them memes.

E.P. Memes?

Da.D. Yes, I use Richard Dawkins's term, who says that memes are like genes; they are the units that transmit and replicate culture.

E.P. Like traditional genes, right? Are you suggesting that for memes, or cultural genes, to exist, there has to be a capacity for communication among different brains that did not exist before?

Da.D. True, language is very important, but it is not the only way. There is also a type of cultural transmission in other species. For example, consider the methods used to build nests or dig burrows. It has been discovered that chimpanzees have a way of catching termites with a stick, which involves using a sponge to take out water from the trunk to drink. It is a minor form of cultural transmission compared with that of humans, but it is still there.

E.P. Do you mean that it is not simply a different grade, but that it is completely different?

Da.D. In biology, you always start with a different grade of complexity, which increases from there. Therefore, for us culture is not a question of thousands but of millions, and not only grades. It is a million times greater than that of the chimpanzees. For example, were we to grow up in a desert island without the influence of human culture, we would not be that different from a chimpanzee. Who would invent arithmetic, language, cooking, or agriculture? These skills, abilities that are so distinctly human, have been acquired through cultural transmission, and that is what composes our mind. If you think about human beings, you realize that their minds are not just in their brain, but also in the library, in computers, in friends, and in all the tools used to think, acquired throughout their lives. If you take away these tools from a person, you make them quite vulnerable.

E.P. Going back to my own obsessions, Dan. Who looks after the brain, assuming that someone looks after it?

Da.D. It is an idea that is a little scary. The brain has ten billion or perhaps one hundred billion neurons, and that is not all. Not one neuron is aware of who you are, nor does it care. They are too stupid for that. Therefore, it requires a democracy; neurons work in teams and they compete among themselves without being overseen by anyone, because nobody can oversee them. The theory that the consciousness or conscience (as you know consciousness is the same word as conscience in Spanish) has a supreme master is simply wrong.

E.P. It would be like walking into a factory devoid of people.

Da.D. Exactly, like an automated factory; full of machinery, but empty of personnel. There are parts of the brain that do act as agents responsible for following up other parts, and therefore are like civil servants, but without consciousness.

E.P. They cannot think—

Da.D. No, it is you that generate thought, not the parts from which you are made.

E.P. Therefore, if someone wanted to investigate powers of the brain which are unknown, invisible, and intangible, we should have to tell them they are wasting their time.

Da.D. We do not even understand the most elemental abilities of the brain, in fact, such as its ability for multiplication, walking, or telling the difference between a cat and a cup. These questions may be difficult to answer, but I

do not believe the idea that the mind has mysterious powers helps. I believe, however, that with time we will be able to explain the functions of the brain in normal biological terms.

**E.P.** If we observe the universe and we try to gain knowledge, where do our senses come from? Does anything exist beyond our own physical perceptions? How do we attribute meaning to anything? No matter how much we progress, we *still* have not attained what Newton said: "I would like to know the mechanisms by which a visual perception of the universe is transformed into the glory of colors." Remember? Dan, we do not understand something as basic as that yet; it reminds me of the vain search for the precursor molecule of the first cell.

**Da.D.** In the first place, bear in mind that we are the only species that poses those sorts of questions. Cats and dogs do not sit around meditating on the meaning of life, nor do they ponder their position in the world. Their states have meaning because they have been given a sense for the history of evolution from where they emerged, and their own experience. A dog knows that a certain visual situation means danger, such as if a man once hit it with a stick and the dog then recognizes the man. This is where its sense comes from. The dog's brain is designed to be able to extract this sense from memory and apply it to certain situations. Our brains function in the same way, but because we have the ability of language, we can reflect over events and construct layers of meaning upon the sense derived from our biological makeup.

**E.P.** Are you then saying that there is no such thing as extraordinary perception, no extrasensory perception, nothing beyond the neurons and atoms?

**Da.D.** Yes, it does exist, but it does a marvelous job of hiding, because there is no actual evidence.

**E.P.** Therefore the brain has no prodigious capacity.

**Da.D.** The capacities of the brain are prodigious. A child that learns a foreign language, or goes to school, is showing the prodigious capacity of the brain, which has not yet been fully understood.

**E.P.** Then what do you think of people who believe they have identified supposedly occult powers such as thought transmission or time travel? I know it must seem preposterous to you—

**Da.D.** People who claim such things probably believe them, but it is not true. Pablo Picasso once said, "I do not search, I find." This "I find" is a great explanation of what is an alert genius, even though I do not think it is true. Picasso was indeed a genius. His discoveries, however, were not miracles,

but the fruit of much research previously carried out by him, and going back to our sphere, natural selection.

E.P. What role does intuition play then? Einstein said that, as a last resort, discoveries were born from a great intuition.

Da.D. That is true, but what is intuition? When we get a brilliant idea and we say we came to it through intuition, in reality we acknowledge we do not know how we came to get that idea. In other words, we say it occurred in the brain, through the workings of our neurons, competing among each other, suggesting ideas. Some people's brains are better than others' in generating new ideas, probably as a result of their acquired thinking habits. In fact, they teach themselves to think differently, but there is nothing extraordinary in that.

E.P. Therefore, are you saying it is an exercise of the will?

Da.D. It is like a magic trick. If we see a magician perform a magic trick on stage, at first we think it is extraordinary, impossible, and magic. Later, when we understand how it was done, we say it was nothing more than trickery. Science is proving that something similar occurs in the brain, which can perform dramatic tricks.

E.P. Including intuition—

Da.D. Definitely, including intuition.

E.P. What can be said about consciousness? You are a highly renowned expert, and you have reflected long on the idea of consciousness, even though they accuse you of being a reductionist. Have there been any new discoveries in this field since we last saw each other a couple of years ago?

Da.D. I think we have made great progress where consciousness is concerned. We are dividing it into its constitutional parts. With that, we are gradually unearthing the idea that consciousness is a grand and mysterious thing, while we realize that it consists of all these parts and that there are grades of consciousness. If we examine bacteria, we would say that they have no consciousness whatsoever, that one bacterium is merely a small robot. Brain cells are identical of course, because they are also small robots. If we observe a tree, we can believe that it is not conscious. But it is alive; it may not have a consciousness, but it is sensitive: it distinguishes the world around it and measures whether it is too cold or hot, if it has enough water or wind.

E.P. Or sunlight—

Da.D. Yes. It feels the lack of sunshine and turns toward the sun. It is a type of consciousness, a certain sensibility. Many people believe that you cannot

use this sensibility as a basis to explain the sensibility of a tree to sunlight, or the response of the rod and cone cells of our retina to light or to build a theory of consciousness. Why not? Because when all is said and done, the lens or film of a camera are also sensitive.

E.P. But neither lenses nor films have consciousness. . . .

Da.D. But our retina itself has no consciousness either, and yet on the basis of its sensibility, it reacts when faced with light-dark differences. This consciousness is constructed.

E.P. Some biologists ask themselves whether bacteria possess consciousness. It is amazing to see bacteria move as they follow magnetic currents, as though they were conscious.

Da.D. In fact, the speed of movement is very important. When David Attenborough produced this marvelous television series on the secret life of plants, called *The Private Life of Plants*, he shot wonderful sequences that showed how the growth of plants accelerated during the filming. It showed how the vines grew, twisted, and strangled trees—

E.P. Consciously?

Da.D. It looked as though the plants were conscious. But the effect is produced simply as a result of the time of the reaction. If we were to slow down a human to the rate of the growth of a tree, he would be very drawn out. You would think that this person was not in the least conscious, like a robot. We say that robots are not conscious, because robots look stupid, saying things like "I-AM-A-RO-BOT." But robots like C3PO and R2D2 from *Star Wars* seemed conscious, because they moved correctly at the same pace we do.

E.P. Speaking of velocity, light travels faster than sound, but apparently the brain processes visual images much more slowly than auditory perception, so at a distance of ten meters, for example, sound and visual image reach the brain at the same time. I would like to ask you two questions: First, is that simultaneousness absolutely necessary for the brain to interpret what is happening? And secondly, seeing as there is no boss in the factory which is the body, is there a point where this light, this entrance of visual image, and sound meet?

Da.D. There is more than one point where signals meet. There are many, and it happens at different times. We need to understand that there is no place in the brain where the arrival of signal matters. There is no place where the stimuli act to concur "now that we are all here, we have crossed the finish line and here we are at the place of consciousness. There might be two

points, ten, or two thousand. And in one part of the brain, light information arrives before sound information stimuli for the same event. In another part the stimuli arrive in a different order. The brain may be able to organize, to reorder, to process all the stimuli; but it can be tricked. No official office space represents "Here is consciousness; the buck stops here." Therefore, the question about what process took place first in the conscious perception, light or sound, is a poorly asked question that has no answer.

E.P. What happens when the brain tells your toe to wiggle while it tells your eyes to look at a painting in the room? The distance between the brain and the toe is greater than the distance between the brain and the eyes, therefore the timing could be off. How does the brain manage to make them coincide?

Da.D. The brain has had a lot of time, all the time of evolution, to find a solution to this "stimulus" problem. And it found it. When the brain initiates behavior by sending motor signals it also sets time expectations. Certain results are expected after some given time. If you send a letter from, let us say, Boston, to someone in California, you do not expect a reply the next day, but you do by the end of the week. The brain can be tricked by signals that arrive too quickly, and thus create an abnormal experience for the brain, because of its own internal expectations of time. In the end, the only way to confuse the brain with regard to simultaneity or lack thereof is by contradicting and canceling its own expectations. As long as events do happen as the brain expects them to happen, everything is fine.



# MIND, LIFE, --- AND --- UNIVERSE

*Conversations with  
Great Scientists of Our Time*

EDITED BY  
Lynn Margulis *and* Eduardo Punset



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