

THE EMBODIED SELF

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I first met Pat Williams about twenty years ago. The Ford Foundation had given me a grant to set up a faculty seminar on human identity. I had proposed to test the novel idea that senior faculty at a place like ours might benefit from a serious discussion of the differences among us, but only provided that those differences were allowed to be discussed freely and openly.

Toward that end I had proposed to bring together colleagues who would leave me and other white, or male, or Jewish, or science-trained, or straight participants in the minority, so that the conversation might not be constrained by the most common presumptions about whom an “ordinary” professor is likely to be.

To keep us all from simply staring at each other I proposed that the seminar would meet each time to discuss a piece of fiction close to the heart of any one of us. I do not recall the book Pat picked, nor the one I picked, but I feel with absolutely no loss of intensity now as I reflect on it, the astonishment I felt to be argued with, taken seriously, gently mocked, and deeply understood by her.

Pat changed my way of seeing myself, her, and everyone else since then.

So now I wish to address a question raised by my experience then, in the reflective context of this celebration of Pat’s professorship, my fifty-first anniversary of life with my wife, the artist, Amy Pollack, and my two decades since that seminar as a teacher and scientist versed in molecular biology, neurobiology, and evolution, as well as the notions of my own religion.

The question is this: have we a “self” that is in any way separable from the body?

I will begin with the answer from science: the “mind-body” issue is over. Of all those mental states that the human organism experiences through a lifetime, the ones furthest from current molecular analysis are those that we experience as our imagining of what is going on in another person’s mind.

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From such imaginings emerges our unique ability to imagine things that cannot be in nature, but that live in our minds with full reality. And from this class of mental states—the class that will one day be reduced to gene-expression circuitry but for now we may call free will and imagination—comes that great misconception of philosophy, the mind-body separation.

There is no mind outside of the body; there is only the body with its embodied mind. That has been a conclusion from the work of students of evolution, neurobiology, and gene regulation for some time now.

To say that science knows something like this from its ability to cast questions as disprovable hypotheses, and then show that such an idea is resistant to disproof, would be the next step for me if this were a science paper.

But this essay is in honor of Pat and of her capacity to articulate inner experience, so I would like to shift the ground, and instead tell a story about myself.

Here is my case-study report:

On October 5, 2012, my mind was elsewhere as I slipped on a stair and, in falling, broke my right ankle in two places.

On October 10, 2012, I was home, after visits to three hospitals in two states, and two operations to my ankle.

In November 2012, after four weeks in a solid plaster cast, I was given a removable boot and could see my grotesquely swollen, stitched up foot for the first time since the accident.

At the end of 2012, I was liberated from my wheelchair and my boot, and began again to walk about, first with a walker, then a cane, then, with apparent ease, but great anxiety, on my own. In those eight weeks I was wholly dependent on my wife, Amy, and the friends who came to visit us and help her.

In those eight weeks, who was I? By phone and email, I was the same guy, cancelling appointments by the dozen to be sure, but still there for an email or a call. I missed out on the election, and though I watched Sandy's ability to take out New Jersey's electricity from my wheelchair in our lit and warm apartment, I was aware that to be in a wheelchair

on the sixth floor of an apartment house at a time when large parts of Manhattan had lost electricity and there were no buses and no subways, was to find myself wrapped in many layers of isolation.

That's the external timeline of who I was. But internally, it was not that way. I was never "me with a bum ankle," or "me in a wheelchair," or "me but not walking for now"—I was always just "me." This was quite a shock to me when I realized it. It was the shock of the embodied self: whatever is the body, is the self.

I was quite unable to read Oliver Sacks' *A Leg to Stand On*¹ because he described himself as autonomous and separated from his injured foot in a way I could not understand. I was in fact unable even to find words or images that allowed me to apply the notion of walking to myself when I was not able to walk. To my wife and others this sounded like despair—as if I were saying, "I will never walk," when in fact I was trying to say, "What do you mean, walk? What is 'walk'?"

Equally shocking and unexpected, this sense of myself as entire without any notion of walking lingered only for about a week after I began to hobble about on a boot with a walker, and stopped within days of walking without a walker or a boot. "Wheelchair, what wheelchair?" We put it in storage in our basement, along with the walker. And so it is for me today.

I was and remain myself: I walk, though not with the same carefree inattentiveness I had that evening of October 4, 2012. I am now in constant conversation with my healing ankle, trying to understand its needs and limitations, as I press it to get back on its feet, so to speak.

I have not experienced any separation of my mind from my body: I was always just me, and remain so. Yet to the outside, and even to myself on reflection, my body has changed remarkably in just the past few months. I make sense of these experiences by imagining that my embodied mind is embedded in a series of bodily states, and that I have the capacity to go from one "still photo" sense of my self to the next.

I think of this as an experience as deceptive and subtle as the sense of movement one gets when attending a movie. The movie is made of still photos, but they reach the neural circuitry of the eye and brain so fast, one upon the next, that their images are merged into a sense of fluid change.

1 OLIVER SACKS, *A LEG TO STAND ON* (1984).

To describe is not to explain. How can identity be so intimately physical that it suffers no subjective change even during a period of such helplessness? The answer from science comes back: "So, what else did you expect?" The embodied mind is not an exception to the way evolution has constructed all living, mortal things since life began four billion years ago, but an example: our minds are an expression of human gene regulation, albeit a novel one in nature insofar as it has awareness of itself.

As a function emerging from pathways of changing gene expression in the brain, the mind is the function of a tissue of the body no different in kind from the functions of other tissues that emerge as a result of differential gene expression under the control of circuits of regulatory DNA.

Other examples that come to mind are the rebalancing of sugar levels in the blood by the liver, the incubating of a culture of microbes for digestion of food by the large intestine, and, of course, the ambulating by a leg with a fully functioning ankle. In their molecular substantiation, our minds are more complex but no different in kind from the environment-sensitive regulation of genes in a bacterium that allow it to live on whatever nutrients happen to be at its surface.

In the particular case of the three billion letters that make up the text of human DNA—the kind each of us here carry, with differences among us not much greater than one in a thousand letters on average—more than ninety-eight percent of each version of the human genomic text is given over to the creation of differing circuits of gene regulation within different cells. Each may activate or deactivate the production of a particular protein in response to outside events; only two percent of the genome or less is given over to encoding the proteins themselves.

Moreover, these proteins—the bricks of which our bodies are built—are all but identical in us and in chimps. The great divide between chimps and us lies in a small number of changes in our DNA that were drawn from the pool of mutation by natural selection in only the last seven million years.

These novelties in our genomes are changes in regulatory DNA sequences that had remained the same for hundreds of millions of years, since the time of the last ancestor of chimps and chickens. As a result of this novelty in human DNA and human gene regulation, our brains develop so slowly that their cells continue to undergo a few cycles of division even after we are born.

We understand the construction of any tissue of the body from descendants of a fertilized egg as an expression of cycles of gene regulation. The arc of a lifetime of self-awareness is also an expression of such cycles of gene expression, with the twist that the inputs of embryonic development are signals from other cells, while the inputs of the mind's development are from other minds as well.

In this way and in early months of human life, a mind emerges from the gene-regulation circuitry of a human brain. As that circuitry wires itself up in response to signals from the outside, it responds to the sounds, smells, and feelings of other humans, in particular the one who holds us and looks in our eyes in the earliest days of our life.

With time, that circuitry of gene regulation acquires the capacity to refer a new experience of the body to the past through memory, to the present through language and social interaction, and to the future through imagination.

The central role of social interaction is why identical twins do not have identical trajectories through life, nor identical memories, experiences, and imaginations: their brains, like all human brains, wire up and constantly rewire differently in response to different social interactions.

Here is how my distant scientific ancestor, the Nobelist Rita Levi-Montalcini, put the point in her autobiography, to explain why she knew she was smarter at ninety than she had been at twenty:

It is imperfection—not perfection—that is the end result of the program written into that formidably complex engine that is the human brain, and of the influences exerted upon us by the environment and whoever takes care of us during the long years of our physical, psychological and intellectual development.²

And so, finally, I conclude from the data we have so far that the mind is embodied, and that because it is the product of shared experience with other people's minds, each of us carries in our embodied minds—in memory—a portion of the self of all those people with whom we have interacted.

² Benedict Carey, *Dr. Rita Levi-Montalcini, Nobel Winner, Dies at 103*, N.Y. TIMES, Dec. 31, 2012, <http://www.nytimes.com/2012/12/31/science/dr-rita-levi-montalcini-a-revolutionary-in-the-study-of-the-brain-dies-at-103.html>.

There we have the beginning of an embodied ethics. This notion comes to us with great force when we contemplate the life and work of Patricia Williams. Here are the first ramifications of the idea of an “Embodied Ethic,” each an example of a lesson taught and learned in conversations with Pat:

- There can be no reification of an ideal “Self” without the reification of an ideal, perfect body. And once we allow our imaginations free rein in that biologically impossible direction, racism and eugenics will meet us at the next stop for sure.
- What we call “disabilities” are not reductions in the completeness of a Self. As I wheeled myself to my window and watched people walking in the park I did not think of myself as like them, but nor did I think of myself as less than them.
- Aging and mortality are aspects of the Self that we use our imaginations to defend against, but when we do, we are really arguing with ourselves, not changing the biology. We may hold onto one of the frames of our movie, but we cannot slow the projector. The Self changes as the body changes, and so alas, the Self for the most part dies when the body dies.
- For the most part, but not entirely: all those aspects of one’s Self that reside in the memories of those who live on are as much parts of one’s Self as are the memories of others that are lost on one’s death.
- Finally, therefore, there can be no Professor who does not profess, and to profess means to allow one’s mind to be shared with other minds in a reciprocal fashion. When I think of how Pat Williams teaches, and of how I teach, I am appalled to imagine our shared profession taken over by a web-variant that would put our disembodied images in front of any number of people we will never meet, and tell them they are getting an education from watching and listening to our images, though in fact all human contact between us and them will have been lost.

Coda

In 1999, I established the Center for the Study of Science and Religion at Columbia, with Pat as an advisor. Soon after, she and I established a University Seminar on the subject of Slavery and Memory. This Seminar still meets, and this paper was first presented in draft form at a meeting of the Seminar in late 2012. Thanks, Pat.

University Seminar on Human Diversity, 1996–1997



Standing (l–r): Kendall Thomas, Judith Shapiro, Arthur Samuelson, Carole Vance, Darcy Kelley, Robert Ferguson, Lynn Paltrow, Angela Diaz, Robert Pollack, Robert O’Meally

Seated (l–r): Priscilla Wald, Mary Gordon, Patricia Williams, Wendy Chavkin, Joan Bertine, William Sage, The Honorable Henry H. Kennedy, Jr.