Who Is in Charge?

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Let's face it. We have to wonder whether the totally deterministic view of life mandates us to believe that we are all simply along for the ride. Since everything is determined by prior states of the physical world, does that not mean that although we may think we are “freely” making our life’s decisions, we are not? Albert Einstein believed that we are not, Francis Crick believed that we are not, and so did Baruch Spinoza. So why should we not believe the same, along with some of the scores of interpretive caveats that even proponents of determinism attach to it? We could, perhaps, but the notion grates on most of us as being somewhere between preposterous and downright depressing. With determinism, where are human worth, value, and responsibility?

Lucretius did not like the idea, the Stoics did not like the idea, and in more recent times, David Hume and Thomas Hobbes recast it into something called soft determinism, or compatibilism. This is the original “have your cake and eat it too” proposition that consumes most modern philosophical thought: It holds that determinism and free will can coexist. William James thought compatibilism was a dodge and complained about it. The need to have it both ways, however, is heartfelt: For life to go on with some sense of dignity, it seems that we must have free will.

Many of us who have turned our thoughts to this subject after spending our lives in bioscience—and, particularly, in neuroscience—see the problem from a different perspective. The extensive and rich philosophical discussions of the issue are challenging, and the intricate arguments feel arcane to me. Arcane, because I am a child of the twentieth century, and all of us have the advantage that science has learned more about the nature of life in the last 60 years than was ever known before in human history. Our predecessors were handicapped by their lack of this newly gained biological knowledge. I doubt that there is one great philosopher—and there have been thousands over the past two millennia—who would not exchange his or her knowledge base for that of a modern bioscientist. So I can think of no more exciting inquiry than to examine the issues of determinism, free will, and responsibility from the vantage point of this level of modern-world knowledge and see where it takes us.

From today’s vantage point, it is all about the brain—what it does and does not do. First, how is that thing built and connected, and how does it work? Is it a bowl of mush shaped by its environment, like a wheelbarrow full of wet concrete being poured into a form? Or does the brain arrive on the scene preformed, to some extent, and then await experience to place the final touches on its maturing form? More importantly, does it matter how it is built, for the purposes of this discussion?

It does matter. We are born with an intricate brain slowly developing under genetic control, with refinements being made under the influence of epigenetic factors and activity-dependent learning. It displays structured—not random—complexity, with automatic processing, with particular skill sets, with constraints, and with a capacity to generalize. All of these traits evolved through natural selection and provide the foundation for a myriad of cognitive abilities that are separated and represented in different parts of the brain. These parts feature distinct but interrelated neural networks and systems. In short, the brain has distributed systems running simultaneously and in parallel. It has multiple control systems, not just one. Our personal narrative comes from this brain, not from outside forces compelling it.

This overall neural architecture has been unearthed at many levels of examination. Whereas developmental neurobiologists have revealed how the brain gets built, cognitive neuroscientists have studied the brain in maturity and usually when it is damaged. My colleagues and I used those insights to confirm that there are modularized, and frequently localized, processes in the functioning, fully developed brain. Classic studies on neurological patients by Broca and others led to the idea that brain injury can lead to the loss of specific cognitive abilities, and this has been the backbone of behavioral neurology. Split-brain research—studies of patients who had undergone epilepsy surgery in which the two halves of the brain were separated—complemented this work. It showed what happened when one processing system was disconnected from others, even though it was still present and functioning. And what did happen? It just went on functioning, outside the realm of awareness of the other systems. The right brain was able to go about its business normally while the left brain did not have the slightest idea what the right brain was doing—and vice versa.

Still, this emerging knowledge of how the brain is organized was hard to square with ordinary experience. People feel integrated—whole and purposeful, not modularized and multiple. How can our sense of being singular and responsible come from a neural architecture like ours?

The interpreter of experience

Years ago, we unearthed a special capacity, a module in the left hemisphere that we called the interpreter. Studies of split-brain patients demonstrated that