

# Brief review of: Stanislas Dehaene: *Consciousness and the Brain* (2014)

by Scott Harrison  
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This is really an excellent book, and a truly important one. For anyone seriously interested in the topic of consciousness, or the spheres of cognitive psychology or the philosophy of mind, it should be considered mandatory reading. Of the 140 or so books our science book club has read, this is for me certainly one of the very most important and essential.

I do have a few criticisms of the book, some very minor or secondary and one of them fairly important which I will get to below. Despite this I was tempted to give the book a rating of 10 (on our scale of 0-10), but somewhat reluctantly I'll just give it a 9.

I was very impressed by the sophistication of the book and its refusal to fall into the usual ruts. For example, in discussing self-consciousness among animals it did not focus on the rather superficial matter of whether an animal can pass the “mirror test” (recognize itself in a mirror) [see pp. 23-24].

More fundamentally, this book wins my highest praise as a solidly philosophical [materialist](#) book, which rejects (at least by implication) not only idealist nonsense about souls and disembodied minds, but also any attempts to “compromise” by allowing any sort of [dualism](#). It even refutes and dismisses the current nonsense about [“qualia”](#), hopefully one of the last attempts to smuggle a dualistic outlook into the philosophy of mind.

There is a marvelous discussion of what some individuals have described as an [“out of body experience”](#) on pp. 44-45 of the book, where the neurological basis for this bizarre internal subjective experience is explained from a scientific materialist standpoint. This particular discussion is so good that to my mind it would have been worth reading this whole book for it even if there was nothing else of importance there (which, however, there certainly is).

The basic theory of consciousness put forward in this book is that consciousness is a process of brain-wide information sharing, or a matter of activating a “global neuronal workspace” with the things we become immediately conscious of.

At first this theory seemed a little abstract, but as the book went on it gradually got more and more plausible. Many theories that finally explain old puzzles do take a little getting used to. We need to reorient our thinking and approach things from an angle we are not originally familiar with.

I was somewhat uneasy about this theory as I read through much of the book for two reasons: *First*, we materialists have always known that consciousness arises *somehow* from neural activity. But in what way does it help explain *how* this happens by pointing to precisely *where* it happens in the brain—even if

we point to some special area which other parts of the brain have access to (the global workspace)? Thus it originally seemed to me that Dehaene was evading the difficult point of *how* consciousness arises by talking only about *where* it arises. However, by the time I finished the book I no longer had this objection. Somehow things had clicked into place, and the theory of a global workspace does now seem to me to explain *how* immediate consciousness can arise.

My *second* reason for uneasiness remains unresolved, however. Although I now accept Dehaene's theory of consciousness with regard to what I am calling *immediate consciousness*, i.e., the thing that we are at one particular time conscious of in our minds, this is not the only sense of 'consciousness' that we have to concern ourselves with. Indeed, from a philosophical perspective I don't even think it is the most important sense of the word. And I think it is a serious defect of the book (and perhaps of neuropsychological consciousness research in general) that it seems not to recognize this fact and at least have a short discussion about it. (As my friend Kirby Wiese pointed out, Dehaene is well aware that there are senses of the word 'consciousness' other than the one he settles on [see pp. 8-9]. But in my view Dehaene is still making a mistake by talking about *only* that one sense of the term. It leads to the impression that his theory of consciousness is incomplete or unsatisfying.)

Suppose I ask someone who said something silly about the Middle East: "Are you conscious of the fact that there is a horrible, multi-sided civil war going on in Syria right now?" Am I asking the person if that is what was in their immediate consciousness at the time I asked the question, or what was in their mind at that very moment? Not at all. I am asking them about their general knowledge, not what they are immediately thinking about.

You can be conscious of the facts that you are a human being and living on the planet earth during the 21<sup>st</sup> century even when you are not thinking about any of these things, because "consciousness" in this more general sense just refers to your general knowledge, not your immediate thoughts.

Now this might seem to be a trivial and even totally irrelevant observation—that the word 'consciousness' can be (and often is) used in this other more general sense. However, the fact is that we are most often far more concerned about someone's general, persistent knowledge than we are about what they are thinking about at some particular moment.

Moreover, the answer to the question about *what consciousness is* can seem very unsatisfactory if the questioner is asking about *general knowledge* and the responder is providing an answer about *immediate consciousness* (or vice versa).

I think that this difficulty can be brought out very well with respect to the issue of *self-consciousness*. From the point of view of Dehaene's theory, self-consciousness is just the immediate consciousness of yourself (or aspects of yourself—such as a current pain in your left arm) that have entered your global neuronal workspace. No big deal, really! But then why does even Dehaene say that there seem to be some mysteries or puzzles about self-consciousness? [See chapter 7 where he briefly discusses this as part of the "future of consciousness" studies: "Can we solve the riddle of self-consciousness?"]

Well, let me get right to my own solution to this problem (which, like most things I think I know, I have probably actually learned from others). In my view, “consciousness” in this wider, more general sense is just having an internal (mental) model of the world. If your mental model of the [“external world”](#) includes the country of Syria and some knowledge about the current state of affairs there, then you can reply “yes” when asked if you are conscious of the horrible war taking place there right now. And “self-consciousness”, in this general sense, just means also having an internal (mental) model of yourself as a person (with your various characteristics and attributes) as part of your internal model of the world.

Self-consciousness in this everyday sense is simply a matter of having an internal mental model of your own attributes and characteristics which together go to constitute you as a person in your own mind. (Though, as with your internal model of the world, your internal self-model is not going to be 100% complete or accurate. We may believe ourselves to be smarter or more handsome than we really are, for example! And we will not be able to fully understand in every minute detail and in every situation *exactly* why we behave as we do, because some of the causative factors are outside of what we are normally in a position to add to our internal self-model.)

I maintain that given these *two* conceptions of “self-consciousness”, Dehaene’s explanation of referents for your own person or your own attributes entering into your global neuronal workspace to be part of your *immediate consciousness*, AND/OR having an internal self-model, there are no further basic mysteries about what “self-consciousness” is whatsoever!

The only thing I can even think to add here is that our internal self-model (as with our more general internal model of the world) is itself probably made up only of remembered bits of information of which we were *once immediately conscious of*. If it is true that our consciousness, in the wider sense of our general knowledge, is made up virtually entirely of *some* of the items of information that were once in our immediate consciousness, then this does tie the two senses of the term together rather nicely.

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One smaller objection I had to the book was with regard to the genuine analogies between the brain and computers which I have long defended. On this topic Dehaene initially stated that:

“Don’t get me wrong—I do *not* intend to revive the cliché of the brain as a classical computer. With its massively parallel, self-modifiable organization, capable of computing over entire probability distributions rather than discrete symbols, the human brain departs radically from contemporary computers. Neuroscience, indeed, has long rejected the computer metaphor.” [p. 106]

There is *a lot* which is wrong here, even if this really is a very minor thing in the book as a whole. First of all, when we philosophically-minded people talk about “computers” we do *not* just mean present-day computers; we mean computing devices of which present-day mainframes, PCs, smart phones, etc. are only the crude beginnings. Secondly, even present-day computers are indeed *self-modifiable*; that is the whole role of software—to allow quick and easy changes in the overall *physical structure* of the computing device from one moment to the next. (Moreover, it is fairly easy to write self-modifying

computer *software*, though computer instructors strongly discourage this type of programming because it is hard to understand and debug.) It continues to amaze me that even very sophisticated people do not seem to understand what the actual role of software is in computers! (I talk about this and a number of the other reasons why the brain-mind/hardware-software analogy is so useful in my old essay on this topic.)<sup>1</sup>

Dehaene's implication that even present-day digital computers cannot deal with "entire probability distributions" is simply wrong. Indeed, I would think that the way the brain itself deals with such problems is essentially digitally (though likely usually in parallel).

The genuine difference between our current computers as sequential machines and the brain as massively parallel is true and important, though even this is not as *theoretically* important as Dehaene seems to imply. First of all a universal Turing machine, even though it is by definition sequential, can in theory model *any* parallel computing process! (The only problems are in the likely greatly increased difficulties in programming the potentially ultra-complex sequential program and the tremendous increase in the overall time required to complete the equivalent sequential computation.) Secondly, even our current sequential computers can quite successfully model neural networks and parallel computing processes. And, very curiously indeed, Dehaene seems to forget his comments here when he reports later on that he himself, along with Jean-Pierre Changeux, has actually done this! [See his section on "Simulating a Conscious Ignition", pp. 180-190.]

Well, I could go on carping about Dehaene's initial "slander" (!) of computers, but I really don't want to make too big an issue of this. At most this is only a very minor defect in the book. And towards the end of the book (p. 259ff.), Dehaene himself has a pretty good discussion about why artificial computer consciousness is possible and will probably be developed at some point.

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The final thing I wish to mention is just a sort of off-the-wall idea that occurred to me as I neared the end of the book (and I guess it is not really part of the book review). This is the possible analogies we might expect to find between the way the brain is organized and the way that other "complex systems" might be expected to be best organized.

The human brain, after all, is the most intelligent device we currently know of. My own view is that this will not always be the case; i.e., that even if there are not already much more intelligent entities in the universe than human beings (a very strong probability approaching a certainty, I would say, which it would be incredibly arrogant to reject out of hand!), we humans will ourselves very likely build machines which are *more intelligent than ourselves* sometime in the not too distant future. But leaving that possibility/probability aside, the fact remains that even the human brain, even having grown willy-nilly as it has through millions of years of blind evolution, is nevertheless something that might well serve as a general model for other complex artificial devices and institutions.

The specific example I was thinking of is an optimum economic system which might well be constructed in part on the basis of an analogy to the human brain. There are many conceivable aspects to this, but here is just one:

There would seem to be needed an appropriate blend of centralism and decentralism. (A dialectical interpenetration of the two is the way we Marxists would put it.) In the brain there are all these separate areas which perform specialized and unconscious tasks—such as recognizing a face, recognizing phonemes and phoneme clusters that constitute morphemes, recalling someone’s name, etc., etc. This is the “society of mind” as Marvin Minsky put it back in 1986. This sounds simply like decentralization. But there are also the centralizing areas of the brain, such as the specific area where immediate consciousness becomes possible (because of the connections of that area of the prefrontal cortex with the rest of the brain). And, as Dehaene argues quite convincingly, the development of consciousness in this way is a huge evolutionary advantage. In other words, the ability to have a central conscious focus and higher executive supervision of the whole organism is as important as having the decentralized agencies which actually do most of the work done in the brain.

When we look at the way economies have been organized in the world so far, both under capitalism and under “[socialism](#)” (correctly so called, or not!), we do always see a blend of centralism and decentralism. But rarely is it close to the right blend, or a situation in which the two are properly coordinated. Under capitalism there is way too much decentralism. This was even truer in the pre-monopoly (actually pre-oligopoly) era, but is still true today despite the partial merger of the state with the corporate economy. Any capitalist market system (even distorted ones such as actually exist in the real world) inherently involves too much decentralization, just as it inherently leads to overproduction crises.<sup>2</sup> On the other hand, in the Soviet Union in its last decades there was way too much centralism (in what *they* called “socialism”, what the “West” called “communism”, and what was actually [state capitalism](#)). Even though the Soviets began introducing elements of market capitalism this only served to undermine their centralized *conscious* control of the economy and not at all to improve the overall situation.

The most appropriate balance and interpenetration of centralism and decentralism will probably have to be worked out through practical experience in future socialist and then communist societies. But my hunch is that studying how the brain balances centralism and decentralism, *and coordinates the two*, might be very helpful in coming up with ideas and even concrete proposals in this regard.

Well, enough with these off-topic musings, which should perhaps be further explored elsewhere.



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<sup>1</sup> “On the Analogy between Mind/Brain and Software/Hardware”, 1992, online at: <http://www.massline.org/Philosophy/ScottH/mindsoft.htm>

<sup>2</sup> For a partial explanation of this see my work-in-progress, *An Introductory Explanation of Capitalist Economic Crises*, at: <http://www.massline.org/PolitEcon/crises/index.htm>