Out of Our Brains

The Stone is a forum for contemporary philosophers on issues both timely and timeless.

Where is my mind?

The question — memorably posed by rock band the Pixies in their 1988 song — is one that, perhaps surprisingly, divides many of us working in the areas of philosophy of mind and cognitive science. Look at the science columns of your daily newspapers and you could be forgiven for thinking that there is no case to answer. We are all familiar with the colorful "brain blob" pictures that show just where activity (indirectly measured by blood oxygenation level) is concentrated as we attempt to solve different kinds of puzzles: blobs here for thinking of nouns, there for thinking of verbs, over there for solving ethical puzzles of a certain class, and so on, ad blobum. (In fact, the brain blob picture has seemingly been raised to the status of visual art form of late with the publication of a book of high-octane brain images.)

There is no limit, it seems, to the different tasks that elicit subtly, and sometimes not so subtly, different patterns of neural activation. Surely then, all the thinking must be going on in the brain? That, after all, is where the lights are.

But then again, maybe not. We've all heard the story of the drunk searching for his dropped keys under the lone streetlamp at night. When asked why he is looking there, when they could surely be anywhere on the street, he replies, "Because that's where the light is." Could it be the same with the blobs?

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Is it possible that, sometimes at least, some of the activity that enables us to be the thinking, knowing, agents that we are occurs outside the brain?

The idea sounds outlandish at first. So let's take a familiar kind of case as a first illustration. Most of us gesture (some of us more wildly than others) when we talk. For many years, it was assumed that this bodily action served at best some expressive purpose, perhaps one of emphasis or illustration. Psychologists and linguists such as Susan Goldin-Meadow and David McNeill have lately questioned this assumption, suspecting that the bodily motions may themselves be playing some kind of active role in our thought process. In experiments where the active use of gesture is inhibited, subjects show decreased performance on various kinds of mental tasks. Now whatever is going on in these cases, the brain is obviously deeply implicated! No one thinks that the physical handwavings are all by themselves the repositories of thoughts or reasoning. But it may be that they are contributing to the thinking and reasoning, perhaps by lessening or otherwise altering the tasks that the brain must perform, and thus helping us to move our own thinking along.

Hiroko Masuike for The New York Times"Brain Cloud (2010)" on display at the Metropolitan Museum of Art in New York as part of a show by John Baldessari.

It is noteworthy, for example, that the use of spontaneous gesture increases when we are actively thinking a problem through, rather than simply rehearsing a known solution. There may be more to so-called "handwaving" than meets the eye.

This kind of idea is currently being explored by a wave of scientists and philosophers working in the areas known as "embodied cognition" and "the extended mind." Uniting these fields is the thought that evolution and learning don't give a jot what resources are used to solve a problem. There is no more reason, from the perspective of evolution or learning, to favor the use of a brain-only cognitive strategy than there is to favor the use of canny (but messy, complex, hard-to-understand) combinations of brain, body and world. Brains play a major role, of course. They are the locus of great plasticity and processing power, and will be the key to almost any form of cognitive success. But spare a thought for the many resources whose task-related bursts of activity take place elsewhere, not just in the physical motions of our hands and arms while reasoning, or in the muscles of the dancer or the sports star, but even outside the biological body — in the iPhones, Blackberries, laptops and organizers which transform and extend the reach of bare biological processing in so many ways. These blobs of less-celebrated activity may sometimes be best seen, myself and others have argued, as bio-external elements in an extended cognitive process: one that now criss-crosses the conventional boundaries of skin and skull.

One way to see this is to ask yourself how you would categorize the same work were it found to occur "in the head" as part of the neural processing of, say, an alien species. If you'd then have no hesitation in counting the activity as genuine (though non-conscious)

cognitive activity, then perhaps it is only some kind of bio-envelope prejudice that stops you counting the same work, when reliably performed outside the head, as a genuine element in your own mental processing?

Another way to approach the idea is by comparison with the use of prosthetic limbs. After a while, a good prosthetic limb functions not as a mere tool but as a non-biological bodily part. Increasingly, the form and structure of such limbs is geared to specific functions (consider the carbon-fiber running blades of the Olympic and Paralympic athlete Oscar Pistorius) and does not replicate the full form and structure of the original biological template. As our information-processing technologies improve and become better and better adapted to fit the niche provided by the biological brain, they become more like cognitive prosthetics: non-biological circuits that come to function as parts of the material underpinnings of minds like ours.

Many people I speak to are perfectly happy with the idea that an implanted piece of non-biological equipment, interfaced to the brain by some kind of directly wired connection, would count (assuming all went well) as providing material support for some of their own cognitive processing. Just as we embrace cochlear implants as genuine but non-biological elements in a sensory circuit, so we might embrace "silicon neurons" performing complex operations as elements in some future form of cognitive repair. But when the emphasis shifts from repair to extension, and from implants with wired interfacing to "explants" with wire-free communication, intuitions sometimes shift. That shift, I want to argue, is unjustified. If we can repair a cognitive function by the use of non-biological circuitry, then we can extend and alter cognitive functions that way too. And if a wired interface is acceptable, then, at least in principle, a wire-free interface (such as links your brain to your notepad, Blackberry or iPhone) must be acceptable too. What counts is the flow and alteration of information, not the medium through which it moves.

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Perhaps we are moved simply by the thought that these devices (like prosthetic limbs) are detachable from the rest of the person? Ibn Sina Avicenna, a Persian philosopher-scientist who lived between 980 and 1037 A.D, wrote in the seventh volume of his epic "De Anima (Liber de anima seu sextus de naturalibus)" that "These bodily members are, as it were, no more than garments; which, because they have been attached to us for a long time, we think are us, or parts of us [and] the cause of this is the long period of adherence: we are accustomed to remove clothes and to throw them down, which we are entirely unaccustomed to do with our bodily members" (translation by R. Martin). Much the same is true, I want to say, of our own cognitive circuitry.

The fact that there is a stable biological core that we do not "remove and throw down" blinds us to the fact that minds, like bodies, are collections of parts whose deepest unity

consists not in contingent matters of undetachability but in the way they (the parts) function together as effective wholes. When information flows, some of the most important unities may emerge in integrated processing regimes that weave together activity in brain, body, and world.

Such an idea is not new. Versions can be found in the work of James, Heidegger, Bateson, Merleau-Ponty, Dennett, and many others. But we seem to be entering an age in which cognitive prosthetics (which have always been around in one form or another) are displaying a kind of Cambrian explosion of new and potent forms. As the forms proliferate, and some become more entrenched, we might do well to pause and reflect on their nature and status. At the very least, minds like ours are the products not of neural processing alone but of the complex and iterated interplay between brains, bodies, and the many designer environments in which we increasingly live and work.

Please don't get me wrong. Some of my best friends are neuroscientists and neuro-imagers (as it happens, my partner is a neuro-imager, so brain blobs are part of our daily diet). The brain is a fantastic beast, more than worthy of the massive investments we make to study it. But we — the human beings with versatile bodies living in a complex, increasingly technologized, and heavily self-structured, world — are more fantastic still. Really understanding the mind, if the theorists of embodied and extended cognition are right, will require a lot more than just understanding the brain. Or as the Pixies put it:

Where is my mind?
Way out in the water, see it swimming

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