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Review of Books

A GREEK TRAVESTY
Should the classics be more contemporary?

THE FEELING OF WHAT HAPPENS: Body, Emotion and the Making of Consciousness
Antonio Damasio
William Heinemann
$49:95 hb, 396pp

INNER VISION: An Exploration of Art and the Brain
Semir Zeki
Oxford University Press
$69.95 hb, 236pp

DREAMING SOULS: Sleep, Dreams and the Evolution of the Conscious Mind
Owen Flanagan
Oxford University Press
$45 hb, 224pp

SCIENCE

Mind your emotions

The non-conscious part of the brain has a far greater hold over our actions than previously thought, says **Allan Snyder**

LIGHT-HEADED: *Couple with their Heads Full of Clouds*, 1936 by Salvador Dalí. Oil on panel. 92.5 x 69.5cm

FROM SALVADOR DALÍ 1904-1989 BY ROBERT DESCHARNES / GILLES NÉRET (BENEDICT TASCHEN)

I AM UTTERLY FASCINATED BY the awesome power of the nonconscious mind. What is remarkable about the *non*conscious mind is the fact that nonconscious processing propels most of our important decision making. Possibly nothing we do, no action we take, and no feeling we have, is purely conscious.

Three excellent new books give enormous insight into the nonconscious without deliberately intending to do so. The first is concerned with emotions, feelings and consciousness, the second with how artists unintentionally mimic the tricks adopted by our brain in order to make sense of our visual world, while the third questions why we dream and what if anything dreams mean.

Now it is curious that our most penetrating insights about the functioning of normal minds come from the study of abnormal minds. Such richly rewarding insights will already be known to readers of Oliver Sacks in his masterpieces *The Man Who Mistook his Wife for a Hat* and *An Anthropologist on Mars*. Following in this tradition, the neurologist Antonio Damasio now shares his case book accounts to examine the interplay of feelings, emotions and consciousness in his new book, *The Feeling of What Happens*.

To better appreciate the novelty of Damasio's contribution, it helps to set the stage with some background perspective. Our brain learns about the world through our senses. So, if the brain interprets its sensory inputs as a sign of danger or of a potential mate, then it signals to the body (which includes the brain) in order to better confront the particular situation. The resulting changes in the body are read by others as our emotional response and experienced by ourselves as feelings.

This oversimplification of the argument raises some fundamental questions. Paramount among these is why should we be conscious of our emotions in the first place when often being aware of these emotions seems only to lead to a sense of being troubled or confused which in turn seems to impair or slow down our actions.

Just recall how men often become tongue-tied at the first sight of a beautiful woman, rather than projecting the eloquence and confidence that they had wished. And, how often do our emotions seem to reign supreme over our logic? Like being romantically attracted to someone who is clearly all wrong from any rational viewpoint. This conflict has inspired romantic literature throughout time.

So, where is the survival value in a strategy that wires us up so intimately with our emotions? Here lies Damasio's major contribution. His research shows surprisingly that emotion is integral to our process of reasoning and decision making. This profound discovery is derived from individuals who were perfectly rational before they had suffered specific neurological damage. The damage caused them to lose part of their emotional make up but they preserved their ability to tackle abstract problems logically.

So far so good, but here is the rub. The intimate, more personal and social decisions of these brain-damaged individuals become irrational, especially those decisions involving risk and conflict. We apparently need our emotions for decision making. Mr Spock of Star Trek fame is a mythical construct as far as humans go. We can't survive by being purely rational.

But the story is even more fascinating when you dig deeper. Because we are often unaware of the precise incident that triggers our emotions, it is our nonconscious mind that apparently plays the decision making role in those matters that are crucial to our well-being. Our nonconscious mind seems to have dictatorial powers about what is 'best' for our survival.

And, we learn about what is 'best' for us through our emotional state. It is our emotional state that alerts us to those things of fundamental importance to our nonconscious mind. Now, when you think about it, this is a rather extraordinary fact. Who's in charge here? Can it really be true that the nonconscious mind has it's own agenda? As Damasio says, the brain knows more than the conscious mind reveals. This is how we work, this is how we are wired up, but I leave to later to discuss why such a strategy might have evolved.

Damasio reached his important conclusions from observing David, a patient who could not learn. David couldn't even remember a face of a person whom he had just met. Yet curiously he had definite preferences for individuals without his knowing why. These preferences were obviously not based on any conscious visual recognition. David had none, but rather only some sort of unconscious emotional recognition. Nothing in David's conscious mind gave him a clue for his strong preferences which were just an instinct derived from his emotions.

Damasio also elevates the supreme importance of the body by arguing that our mind learns through our body in a non-trivial way. For example, the physical manifestation of fear, such as accelerated heart beat, actually contributes to the feeling of fear rather than being a mere by-product of fear. Consciousness, he then

argues, is concerned with our own sense of self because our brain has to monitor every facet of our body. This he believes explains one crucial part of consciousness – the part that gives us ownership of the 'movie' that continually plays in our brain. How our brain constructs the movie is the 'hard problem'.

So, in summary, Damasio goes far to explain what consciousness, emotions and feelings do for us and what goes wrong without them. This is a major contribution. But I seriously wonder if we will ever know the reasons why we have evolved self-consciousness as a design strategy in the first place.

From a purely theoretical viewpoint, self-consciousness does not appear especially advantageous. Even constrained within our present human design, many of our major decisions are strongly influenced by nonconscious processing. We are not aware of how we form our thoughts or how we articulate them. We are not aware of the mechanisms of vision, touch or hearing. Much of our expertise is executed nonconsciously, and everyone knows what is meant by "let me sleep on it". For that matter, is anything we do purely conscious?

Our brain performs operations of which we are completely unaware and by mechanisms which are largely unknown by us to arrive at our final judgements. So why ever be conscious? Nonconscious processing appears to be the real engine room of the mind, the real executive in charge. It deserves to be the focus of scientific scrutiny. We might be in for some genuine surprises if we had a better understanding of the mechanisms and the intent of the nonconscious mind.

But how best to execute such an investigation? Following on Damasio's suggestion that self consciousness is derived from knowing our bodies, it seems that we should now explore the minds of those who do not know their bodies. This group may well have greater access to their nonconscious mind.

For example, I have recently been made aware that certain children, under four years old, who have quadriplegic cerebral palsy display extraordinary skills in reading, mathematics and time telling with little or no apparent training. Is this because they can tap nonconscious processing? And, what about Steven Hawkins who said that as his disability worsened, he began seeing the world in new ways, ways which opened his mind to new discoveries?

My path for exploring nonconscious processing has been through the abnormal minds of savants, especially autistic savants. These are rare individuals who, although severely brain damaged, display extraordinary skills - often in areas traditionally believed to be the preserve of gifted intellect. And, crucial to our discussion, they do so initially without any training. The skill comes from within. Savants can somehow peer into the inner workings of the brain. This explains how a severely mentally retarded three-year-old can draw like Leonado Di Vinci and without any training. Her skill is a form of mimicry. We all could have the extraordinary skills of savants if only we could access our nonconscious processing.

Let's probe this more deeply. Have you ever wondered why we can't draw, say natural scenes - at least not without training? This is really astonishing. Our brains obviously possess all the necessary visual information required to draw, but, we are apparently unable to access it for the purpose of drawing.

For example, our brain performs the calculations necessary to label three-dimensional objects from a two dimensional retinal image. Yet the difficulties of drawing even a sphere are legion. We are simply not aware of how our brain performs operations like deriving shape from shading or perspective from the gradient of texture.

But when you think about it, why should we be conscious of such things? It is the object label or symbolic identification that is of ultimate importance to us and not the actual attributes processed by the brain to formulate the label. In short, we care only about identifying the big picture and not the parts that make it up. So this is reason enough for not being conscious of the mechanisms for vision. And, by analogy, reason enough for not being self-conscious of how we perform so many other crucial skills like speaking and thinking.

But, returning to vision, if we could be conscious of how we see, we would find that our brain employs the same strategies as artists, like interpreting shape from shading and perspective from gradient. And furthermore, our brain, like the artist, is not a passive photographer of the visual world. It must make assumptions about what is important and discard the rest. In other words, both artists and our nonconscious brain seek out and exploit the constancies in the world.

Horace Barlow and I were so struck by this realisation some years ago that we published a paper in the journal *Nature* entitled 'Human Vision Reveals the Artist's touch'. Now, an acclaimed visual neurobiologist, Semir Zeki, has also taken up this theme, lifting it to lofty heights in his fascinating new book, *Inner Vision - an exploration of art and the brain*.

In fact, Zeki sees most painters as neurologists: 'They are those who have experimented upon and, without even realising it, understood something about the organisation of visual brain'. In other words, artists through trial and error, have learned the same tricks or more scientifically, the same algorithms evolved by our nonconscious brain for extracting the quintessential attributes of the natural visual world.

Painters, according to Zeki, "experiment by reworking a painting until it achieves a desirable effect which is the same thing as saying it pleases their brains". But, I wonder about this idea. Is a work of art pleasing because it resonates with neurobiological mechanisms, or more because it resonates with products of our mind such as our past experiences?

The act of seeing, like an artist's painting, is an active process of imposing one's assumptions about what is important. We can only look at this world through the filter of what we already know. In part, this explains why a great artistic work can be one which evokes our past experience. But this poses a challenge to the artist because it requires distilling the essence of multiple possibilities into a single image.

Like Damasio, Zeki also draws on the experiences of individuals with abnormal minds. He recalls one patient who had extreme difficulty in seeing objects. Remarkably, this patient could draw objects with accuracy, but couldn't recognise them upon completion. He could see the individual details which make up objects, but he could not make sense of the whole. This is also highly reminiscent of some autistic artists.

Zeki's book is a delight for its unconventionality as well as for its non-didactic foray into art history, psychology, photography and visual neurobiology. He is especially powerful in describing colour vision for which his pioneering research is fiercely original.

The area of nonconscious processing which is best known and most actively researched concerns our brain's ability to interpret visual images. How else might we learn about the nonconscious mind? What about through our dreams? Freud believed that dreams are "the royal road to the unconscious mind." He conceived of dreams as the release of unconscious, repressed, and socially unaccepted wishes. Freud singled out the importance of symbolism, especially within a sexual context.

Owen Flanagan, in his *Dreaming Souls* disagrees with Freud. His somewhat philosophical critique on theories of dreaming questions the evolutionary purpose of dreams. His conclusion is that while sleep has a clear biological function and adaptive value, dreams are merely side effects, 'free videos' irrelevant from an evolutionary point of view. 'And despite the anecdotal hype to the contrary, dreams rarely yield directly to creativity in the arts, music, mathematics, science or philosophy. It is hard to see what fitness-enhancing function dreams might serve'. 'Dreaming came along a free rider on a system designed to think and to sleep'.

Even so, Flanagan does believe that dreams are self-expressive, but only in that our conscious minds impose coherent meaning on a disparate parade of facts. This certainly rings true to me especially if, as Flanagan says, we are only conscious of dreams at the state of awakening.

The current beliefs of my colleagues about dreams reveals that the most prevalent everyday understanding of them is that the brain prioritises the information intake of the day. By being conscious of dreams, we are merely randomly intruding on the job of secretarial filing. Opening one file gives a glimpse of the past mixed with the present. Upon completion of filing, the slate is then clear for the next day.

But my colleagues also cling to Freud's original idea that dreams have an intrinsic meaning as well. This is primarily because of recurring dreams like mine - a dream which eventually vanished upon completing my doctorate. In this dream my high school discovers that I should not have graduated because I had failed an elementary algebra examination. I was paralysed with fear in the dream about taking the make up exam. And this fear is all the more peculiar because I had already completed every graduate mathematical physics course at Harvard. Now, I had always presumed the dream to be due to some unconscious insecurity about my abilities in mathematics or possibly about my ability to complete a doctorate.

But, I have subsequently learned that a number of truly gifted mathematicians have had the very same dream, which like me, vanished upon receiving their PhD. As Bob Dylan's song goes: "Some time ago a crazy dream came to me… It was a bad dream. … Well now time's passed and now it seems everybody's having them dreams."

If Flanagan is right about dreams being a free rider on a system designed to think and sleep then why should the same conceptual dream be so universal among individuals from diverse backgrounds? And why should that dream cease at the very same moment in one's career? The explanation looks more complex. Still I find Flanagan's thesis compelling, especially knowing how intrinsic it is for us to impose meaning on seemingly disparate facts.

So, is there a common thread that binds these three books, or am I forcing a link between seemingly disparate elements? I believe each book does offer a valuable exploration into the nonconscious mind. Emotions display overpowering evidence that nonconscious processes are steering the ship. Artists through trial and error hit upon nonconscious mechanisms of visual neurobiology, and dreams, if only by our imposed interpretations, reveal our subterranean concerns.

Now, if you could read only one of these three commendable books, which should it be? I would suggest Zeki if for no other reason than for his refreshing originality. Zeki says things that we have not heard before, however controversial they may be. Everyone has read about consciousness, feelings, emotions and dreams, whereas I know of nothing else relating neurobiological mechanisms to artistic techniques and appreciation. But, of course, those with the luxury of time should feast on all three books.

Flanagan thinks dreams are merely side effects, 'free videos'

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