

Our Conscious Mind Could Be an Electromagnetic Field

Excerpts from The Daily University Science News

There is some evidence emerging that our thoughts may be made up of the distributed kind of electromagnetic field that permeates space and carries the broadcast signal to the TV or radio. Professor Johnjoe McFadden from the School of Biomedical and Life Sciences at the University of Surrey in the UK believes our conscious mind could be an electromagnetic field manifestation.

“The theory solves many previously intractable problems of consciousness and could have profound implications for our concepts of mind, free will, spirituality, the design of artificial intelligence, and even life and death,” he said.

Most people consider "mind" to be all the conscious things that we are aware of. But much, if not most, mental activity goes on without awareness. Actions such as walking, changing gear in your car or peddling a bicycle can become as automatic as breathing. The biggest puzzle in neuroscience is how the brain activity that we're aware of (consciousness) differs from the brain activity driving all of those unconscious actions.

When we see an object, signals from our retina travel along nerves as waves of electrically charged ions. When they reach the nerve terminus, the signal jumps to the next nerve via chemical neurotransmitters. The receiving nerve decides whether or not it will fire, based on the number of firing votes it receives from its upstream nerves. In this way, electrical signals are processed in our brain before being transmitted to our body. But where, in all this movement of ions and chemicals, is consciousness? Scientists can find no region or structure in the brain that specializes in conscious thinking. Consciousness remains a mystery.

“Consciousness is what makes us 'human,' Professor McFadden said.

“Language, creativity, emotions, spirituality, logical deduction, mental arithmetic, our sense of fairness, truth, ethics, are all inconceivable without consciousness.” But what’s it made of?

One of the fundamental questions of consciousness, known as the binding problem, can be explained by looking at a tree. Most people, when asked how many leaves they see, will answer "thousands." But neurobiology tells us that the information (all the leaves) is dissected and scattered among millions of widely separated neurons. Scientists are trying to explain where in the brain all those leaves are stuck together to form the conscious impression of a whole tree. How does our brain bind information to generate consciousness?

What Professor McFadden realized was that every time a nerve fires, the electrical activity sends a signal to the brain's electromagnetic (EM) field. But unlike solitary nerve signals, information that reaches the brain's EM field is

automatically bound together with all the other signals in the brain. The brain's EM field does the binding that is characteristic of consciousness. What Professor McFadden and, independently, the New Zealand-based neurobiologist Sue Pockett, have proposed is that the brain's EM field **is** consciousness.

The brain's electromagnetic field is not just an information sink; it can influence our actions, pushing some neurons towards firing and others away from firing. This influence, Professor McFadden proposes, is the physical manifestation of our conscious will.

The theory explains many of the peculiar features of consciousness, such as its involvement in the learning process.

Anyone learning to drive a car will have experienced how the first (very conscious) attempts are transformed through constant practice into automatic actions.

The neural networks driving those first uncertain attempts are precisely where we would expect to find nerves in the undecided state when a small nudge from the brain's EM field can topple them towards or away from firing. The field will "fine tune" the neural pathway towards the desired goal.

But neurons are connected so that when they fire together, they wire together, to form stronger connections. After practice, the influence of the field will become dispensable. The activity will be learnt and may thereafter be performed unconsciously.

One of the objections to an electromagnetic field theory of consciousness is, if our minds are electromagnetic, then why don't we pass out when we walk under an electrical cable or any other source of external electromagnetic fields? The answer is that our skin, skull and cerebrospinal fluid shield us from external electric fields.

"The conscious electromagnetic information field is, at present, still a theory. But if true, there are many fascinating implications for the concept of free will, the nature of creativity or spirituality, consciousness in animals and even the significance of life and death.

"The theory explains why conscious actions feel so different from unconscious ones - it is because they plug into the vast pool of information held in the brain's electromagnetic field," Professor McFadden concluded.

The University of Surrey is one of the UK's leading professional, scientific and technological universities with a world class research profile and a reputation for excellence in teaching and research.

(Reference: The paper "Synchronous firing and its influence on the brain's electromagnetic field: evidence for an electromagnetic field theory of consciousness" by Johnjoe McFadden is published in the *Journal of Consciousness Studies*, along with a commentary by Dr. Susan Pockett.) 16-May-2002