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SCIENCE AND SOCIETY

BRIDGING THE 'TWO CULTURES': SCIENCE AND ART

Mark Lythgoe is a neurophysiologist at the Institute of Child Health, University of London, specialising in the use of fMRI to investigate and brain function, and developing possible therapies for children suffering stroke. He currently runs the RCS Unit of Biophysics experimental MRI facility, researching the effects of hypothermia on brain metabolism and cell death, and developing novel gene therapies for the treatment of stroke. During his 'spare time', Mark is an avid communicator of science, making regular contributions to this scene, and is particularly interested in portraying science through the arts. With colleague Tom Pollak, Mark describes here a debate last year that examined the similarities between these two cultures.



At last year's Cheltenham Festival of Science, the scientific method was pitted against others for the 'the best idea in science ever'. The



event was staged as a debate between Peter Atkins, Professor of Chemistry at the University of Oxford, and Peter Tallack, a former editor at *Nature* and editor of *The Science Book*. Atkins's choices were evolution by natural selection, the expanding universe and the second law of thermodynamics (1), whereas Tallack plumped for the scientific method, the atomic hypothesis, and the equivalence of the mind and the brain (2).

Tallack claimed that, of all the ideas presented, the one that trumped them all was the scientific method: the process of observation, hypothesis formation and hypothesis testing which allows us access to the world 'out there' and its many hidden secrets. None of the others, he claimed, would have been verifiable without it. I, too, believe that the scientific method is the best of the lot, but unfortunately the audience gave that accolade to natural selection. Although I'm sure the lay public had a good grasp of the importance of the scientific method, I'm also sure natural selection came out on top because there are more popular science books on evolution than on any other topic – quite apart from the fact that Darwin holds a special place in the hearts and minds of the British public.

It is easy to forget that we weren't born with an intuitive understanding of this idea of the scientific method, and that it took several centuries for science itself to refine and properly appreciate it. It is this rigorous method that allows scientists to pose questions and resolve them in a way that critics, philosophers and historians cannot. Tallack suggests that this is why science, more than any other mode of knowledge –

'Great art constitutes an open investigation into the human condition: into experience, memory and love – subjects that are also common to scientific study.'

literary criticism, art, religion – yields durable, verifiable and reliable insights into the nature of things. 'It gets us somewhere' he says.

Tallack concluded by saying 'science is the most successful research strategy ever devised, the whole thing having taken only about 400 years, I see no reason why it won't continue to explain the world, in all aspects and at every level.'

During the question time, I suggested that the importance of understanding our scientific limitations, rather than simply extolling the virtues of the scientific approach, is the greatest, if least appreciated, notion in science today. It is this belief that I want to expand upon.

Some time ago I took a colleague, who was having a few problems with his relationship, to a lecture on the neural correlates of romantic love, professing that he would find love in science even if he couldn't find it at home (3). During the lecture, the foci of the fMRI activity of those who were deeply in love, were revealed. I stood up to ask the speaker, 'Now that you have localised love in the brain, how has this personally informed you of what is love?'. Of course, science hadn't helped, nor could it help, and maybe science will never help to answer such questions.

The limitations of language have always been too apparent to me. As a child, I was lucky enough to suffer from synaesthesia – I was able to taste shapes. Even though the scientific method can describe in some detail why this happens, I can never explain to you the taste of the sharp pointed corners of a cube or a right-angled triangle.

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Cognitive neuroscience, perhaps more than other scientific disciplines, is aware of the implicit limitations of its particular scientific methods vis a vis helping us understand our experiences 'from the inside'. Any philosophically informed cognitive neuroscientist can tell you that Frank Jackson's Mary, the expert colour scientist raised in a black and white world (who knows 'all the physical facts'), will never know what it is like to see red. Similarly, science can describe the various functions of the brain associated with emotions such as fear or love, yet we are no closer to sharing them. I can't help feeling that Nietzsche was on the right lines when he suggested that science describes the world in wondrous detail and complexity, yet disappointingly without ever really explaining anything. Yet, I believe this is where the worlds of art and science collide.

Working with artists and scientists for the last 10 years (8,9) has demonstrated to me that great art constitutes an open investigation into the human condition: into experience, memory and love – subjects that are also common to scientific study.

And that scientists and artists can collaborate with different aims and objectives, while pursuing similar kinds of questions. Artists might claim to have been manipulating our phenomenological experience of the world through artistic stimuli, which thrill, question and captivate, for many hundreds of years. It is for this reason that Semir Zeki holds

'It is the rigorous scientific method that allows scientists to pose questions and resolve them in a way that critics, philosophers and historians cannot.'

that 'artists are in some sense neurologists'. (5). These vivid sensations, which are second nature to the artist, may be stimulated by the qualia of visual and emotional components of art, drama, music or literature. The shared universal experience of living and dying is embodied in Bill Viola's *Nantes Triptych* which couples the shadowy bay between birth and death (6). Here we can experience the immediacy of a full-lived experience, it is here we can communicate the phenomenological experience of our world, it is in this arena that we open a platform into consciousness, not through the understanding of microtubules as Roger Penrose offers (7).

Today our understanding of the brain is being transformed by many new developments in science, not least the emergence of imaging technologies, including magnetic resonance imaging (MRI). MRI is extensively used in neuroscience research, highlighting which parts of the brain are activated when one feels elated, or angry, or scared, or whatever. But can the scientific method really explain what love or hatred is, even if it tells us which parts of the brain are associated with these emotions? Can it

really tell us what consciousness is? To look fully inside the brain, to really know what someone is feeling, maybe we need something more than science can offer, and maybe combining science and art goes some way towards providing that something more.

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