



Evolutionary Psychiatry (EPSiG)

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Editors: Dr Paul St John-Smith (Consultant Psychiatrist Single point Of Access Team, Hertfordshire Partnership University foundation trust)

Contact Emails:- paul.stjohnsmith@hpft.nhs.uk or paulstjohnsmith@hotmail.com

Riadh Abed (Retired Consultant Psychiatrist and Medical Director; currently Medical Member of the Mental Health Tribunal Service in England)

Address for correspondence: abedrt@btinternet.com

Dan McQueen Consultant Psychiatrist (Consultant Psychiatrist, Child and Family Department, Tavistock and Portman NHS Foundation Trust & Eating Disorder Unit, Cygnet Hospital Ealing).

Notes from the editor

We had a very successful Symposium in October 2016 which is now available as videos on the SIG website. Professors Randolph Nesse, Robin Dunbar and Simon Baron-Cohen gave superb keynote talks at this the First Evolutionary SIG symposium on October 4th 2016 at the RCPsych. We have now had over 1,550 viewings. The link is as follows:-

http://www.youtube.com/playlist?list=PL_gsGoSXTBofQfBCqFQfOqE2vTNnejt51

This gives access to all the talks and questions.

This is our 5th EPSiG newsletter and we are delighted to publish an interview with Randolph Nesse. Annie Swanepoel has also written a special article on dualism and mind. We hope members will add to this venture by writing in additions or suggestions. We also have a book review by Andrew Blewett on Robert Trivers' 'Wildlife: Adventures of an Evolutionary Biologist'.

Due to space considerations, I have delayed the third special article on criticisms of EP. This will hopefully be sent out sometime later in 2017 and will be the last of the 3 special articles

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assisting members to consider the pros and cons of evolutionary psychiatry and answering some of the criticisms, or at least covering some of the issues to help us all discuss such issues. This Article 3 will be on some of the criticisms levelled at EP from other anti-materialist or sometimes ultra-reductionist camps and philosophies. I will however add a separate article for the next letter complimenting Annie's article on dualism, explaining the nature of potential products of evolution. Exaptations, Spandrells and other by-products may explain some aspects of complex systems that evolve.

Resources and EPSIG Website

There are now links to the individual talks from the First EPSIG symposium as well as to the full PowerPoint presentations accessible through links on the EPSIG website.

<http://www.rcpsych.ac.uk/workinpsychiatry/specialinterestgroups/evolutionarypsychiatry.aspx?theme=mobile>

Future SIG meetings

Further dates for meetings etc have been discussed but not confirmed due to discussion with the college on potential availability of rooms. However these are the proposed dates so far.

Future meeting dates include:-

Jan 13th 2017 AGM Meeting @RCPsych

May 19th 2017 Committee Meeting @RCPsych

Nov 10th or 17th 2017 EPSIG 2nd Symposium

Agenda

Evolutionary Psychiatry Special Interest Group (EPSIG)

Annual General Meeting, 14:00-17:00, 13 January 2017, RCPsych, London

13:00-14:00 Registration, welcome and coffee

14:00-14:45 Presentation: Darwinian Theory and Psychiatry: a Historical Perspective presented by Hannah Sheftel (Chair: Paul St John-Smith)

14:45-17:00 EPSIG Business meeting (Chair: Riadh Abed)

1. Financial Report by Agnes Ayton, Treasurer.
2. Review of 2016 activities by Riadh Abed, Chair.
3. Report by Paul St John-Smith, Newsletter Editor,
 - a) Newsletters, i) interviews, ii) book reviews, iii) articles
 - b) EPSIG website
 - c) A new open access website
4. Forward planning for 2017 events

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5. a) May meeting,
 - b) November symposium (2nd Evolutionary Psychiatry Symposium)
 - c) RCPsych international conference
 - d) Adult Faculty annual conference
 - e) WPA conferences
 - f) Other activities).
6. MRCPsych syllabus
 7. Any other business

Getting Evolutionary Psychiatry into mainstream psychiatry and MRCPsych exams

We discussed this topic at the end of our symposium in October. Dr. Agnes Ayton is continuing leading on this. One aspiration of the SIG is to get Evolutionary Psychiatry ideas into mainstream psychiatry. This is something that we consider a high priority. This involves getting it into the MRCPsych curriculum (probably Paper 1) and to have a few questions each exam.

Articles for the newsletter

We still need articles, reviews and interviews for the newsletter. Please send to me at paulstjohnsmith@hotmail.com

To avoid disappointment when sending us articles etc, please note that we have to filter out non-evolutionary papers. There must be some evidenced or hypothesised evolutionary basis within any article accepted. However we do accept scientific challenges; just not denials or personal beliefs. We welcome well-argued or evidenced attempted refutations of an evolutionary idea already put forward. A view that is given which is just not Evolutionary or Darwinian is not acceptable on its own. It must be appropriately compared to the corresponding Evolutionary Theory and show how it is better e.g. more predictive or with better explanatory value. Also, just using the word evolution in the title does not make an article evolutionary. Remember that this is the newsletter of the Evolutionary Psychiatry SIG. Personal ideas on the way Darwin got it all wrong do need to demonstrate an understanding of what Darwin or whoever actually said!

The 'Virtual Interview'. Questions from Riadh Abed

Professor Randolph M. Nesse, M.D.

Foundation Professor of Life Sciences
Director, Center for Evolution and Medicine
Arizona State University
Professor Emeritus, Department of Psychiatry, University of Michigan
RandolphNesse.com
EvolutionaryMedicine.org

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1. *What triggered off your interest in evolutionary theory in relation to psychiatry/psychology?*

When I finished my psychiatry training and joined the faculty at the University of Michigan I was frustrated by the lack of a solid scientific foundation for our profession. My friends were all becoming psychoanalysts, behaviourists, or neuroscientists; each area seemed to me to be grabbing one leg of an elephant.

While browsing at the original Border's bookstore in Ann Arbor, Michigan in 1975, I found the just-published *Sociobiology*, by EO Wilson. I spent a considerable portion of my first pay-check as a psychiatry resident on the book. There was a scientific way to understand behaviour already well developed! I had already been trying to understand why natural selection didn't get rid of genes for aging, so that also paved the way for my collaboration with George Williams.

2. *Why would you say is evolution important to the understanding of mental disorder?*

Evolutionary behavioural ecology explains normal behaviour. It is, for psychiatry, what physiology is for the rest of medicine. Instead of just explaining how things work, it explains why organisms do what they do. Trying to treat emotional disorders without understanding how emotions give a selective advantage is hopeless. Trying to treat complicated relationship problems requires an understanding why humans have relationships, and how relationships work. Understanding the functions of normal systems is essential for understanding how to psychotropic drugs work. In many cases they disrupt normal systems in ways that relieve suffering the same way analgesics disrupt normal pain. Then there are evolutionary explanations for why genes for major mental disorders persist. So many applications are ready and waiting!

3. *Why have psychiatrists been slow to embrace evolutionary theory?*

Historians of science will eventually study this question. I find it astounding that behavioural ecology has not been the foundation for psychiatry for 40 years already. It's my impression that most psychiatrists simply have never thought about how evolution can be useful. Most have never had a chance to learn how natural selection explains behaviour. Most haven't even heard about evolutionary medicine and how evolutionary principles can explain why the body has apparent flaws that leave it vulnerable to failure. Some, no doubt, associate evolution with the moral disasters of the mid-20th century. Our goal is exclusively to use evolutionary principles to help individuals get relief from mental disorders.

4. *I know you believe that it's important to include evolution as a basic science into the undergraduate and postgraduate curriculum. US medical schools appear to have done better on this than their UK counterparts. What do you think is the best strategy to get medical schools to recognise the importance of evolutionary theory to the understanding of disease and dysfunction?*

I'm surprised that you think we do it better in the USA. I am pretty sure you in the UK are far ahead of us. We will never have a picture of Darwin on a banknote! Half of my countrymen don't believe that evolution shaped life, and many of them work hard to try to keep evolution teaching out of our schools. No medical school in the USA teaches evolution in any

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systematic way as it applies to disease. It's my impression that far more people in UK understand evolution than in the USA.

What strategy is best to bring evolution to medicine? I spent a year working on that question with a group at the Berlin Institute for Advanced Study. We concluded that efforts should go towards undergraduate education because medical schools were nearly hopeless. A related group sponsored by the National Evolutionary Synthesis Center in the USA came to similar conclusions. This strategy is working. Courses that many universities offer create students who are enthusiastic about evolution when they get to medical school, and some have already grown-up to become major research leaders.

Nonetheless, I keep trying to find medical school deans who see the huge opportunity to bring in a whole basic science that is only now being applied to medicine. In addition to all the specifics, understanding evolution gives students a framework for connecting the 10,000 facts they must learn. All kinds of things that I memorized mindlessly in medical school now seem sensible and fascinating, ranging from the pathway of the recurrent laryngeal nerve, to the intricacies of single carbon metabolism to the reason why the capacity for low mood exists.

5. *In your view why is there still no evolutionary psychiatry university departments and no academic journals dedicated to the subject whereas there are many dedicated to evolutionary psychology?*

I think special evolutionary psychiatry departments would be counterproductive. Special units would be regarded rightly with suspicion. "Evolutionary psychiatry," sounds like some kind of alternative treatment. Evolution is actually just another basic science, like genetics or neuroanatomy. Evolutionary biology should be a foundation for all work in psychiatry instead of a specialized area of work. All trainees should receive courses that ensure that they learn the basic principles of how evolution explains behaviour in general, evolutionary medicine in particular, and how evolutionary principles can advance research and clinical practice.

6. *How can evolutionary psychiatry fend off the accusations of promulgating 'just so' stories?*

Gould and Lewontin's critique set back evolutionary studies of behaviour by at least a decade. Many otherwise smart people who don't know how to test an evolutionary hypothesis still imagine that they're delivering a trenchant critique by saying, "Aren't those all just so stories?" The proper scientific starting assumption should always be neutral. All possible hypotheses about the status of a trait, as an adaptation or an epiphenomenon should be laid out and tested. The scientific method is the same for testing hypotheses about evolutionary behaviour as it is for everything else.

However, teaching evolutionary medicine for 20 years has made me realize that most people do have a tendency to attribute functions everywhere in an uncritical way. I think this as an evolved cognitive glitch in the human mind. Despite my best efforts, my students insist on looking for the utility of schizophrenia, ADHD, anorexia, and depression. I tell them, over and over that natural selection does not shape diseases, that diseases do not have functions, and that a correct evolutionary medicine approach instead focuses on explaining why the body has aspects that make it vulnerable to disease. Some catch on quickly; others turn in

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their final paper at the end of the term with some cockamamie idea about how schizophrenia is somehow helping the genome. Teaching in this area is hard work. To help, I wrote a paper that attempts to save students and others from the most basic mistakes, “Ten questions to ask when testing an evolution hypothesis about disease.” Many have found it helpful, but I need to write a new version that is even simpler.

7. *Why have there been so few interventions in psychiatry based on evolutionary science?*

Basic sciences don't directly lead to new clinical interventions, they generate hypotheses to test, and new ideas for treatments, each of which must, in my opinion, be subjected to proper clinical trials before being recommended in the clinic. That said, my residents tell me that understanding why low mood exists at all proves invaluable as they try to understand depression in their patients, and understanding the smoke detector principle proves useful in trying to treat panic disorder and to decide when drugs can be used safely to block normal defensive emotional responses.

8. *What would you say is your most important contribution to evolutionary Psychiatry?*

The most general contribution is to encourage asking questions about why we are vulnerable to each mental disorder, and to consider at least six possible kinds of explanations. My most important specific contribution has been to point out that emotions do not correspond to different functions; they correspond to different **situations** that have posed adaptive challenges over our evolutionary history. If you see an emotion, your first question should be whether it is or is not being aroused by the kinds of situations in which it's useful. Closely related is the Smoke Detector Principle, an application of signal detection theory to examine how selection shapes mechanisms that regulate emotions in ways that result in many normal false alarms. Finally, I have worked for years to understand the human capacity for morality and committed relationships. I think social selection explains many of these extreme human prosocial traits, and that these traits increase our vulnerability to social anxiety and mood disorders. This is very different from the usual simplistic approach focused only on kin selection and reciprocity.

9. *What aspect of your evolutionary work are you most proud of?*

George Williams and I didn't really grasp it at first, but I think we have succeeded in bringing a new question to the table, namely, why did natural selection leave the body vulnerable to this disease? Natural selection can explain maladaptations as well as adaptations. Answers to these questions provide a new kind of explanation for diseases, including mental diseases. An evolutionary approach is the key to providing a genuinely medical model for psychiatry.

10. *What advice would you like to offer to your fellow evolutionary psychiatrists?*

Constructive engagement will serve our field well. We humans have evolved tendencies to offer uncritical support for the ideas of in-group members and organized opposition to those with other views. People who try hard to be objective and really understand other's ideas are often at a disadvantage because they are seen as disloyal to the in-group. But engaging with each other's ideas critically will help us to build a strong evolutionary foundation for psychiatry. We really are at the dawn of a deeper understanding of mental disorders.

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Onto the review; PSTJS Ed.

‘Wildlife: Adventures of an Evolutionary Biologist’ by Robert Trivers. Published by Biosocial Research Publications, New Brunswick, NJ. First printing November 2015.

Here is a unique offering from one of the great figures of the evolutionary modern synthesis era, published as something of a retrospective from the vantage point of late middle age or perhaps early old age. Trivers has at least the appearance of a maverick and this is a short maverick-like book probably written by his own account if not between spliffs, then certainly at some point after quite a few. It has to be acknowledged that most of Trivers’ truly original contributions directly applicable to the evolution of modern humans and the continuing force of natural selection in human life were produced in the first flush of adulthood, his ‘productive era’. This early work is largely contained in a series of papers worth noting: ‘The evolution of reciprocal altruism’ (1971), ‘Parental investment and sexual selection’ (1972), ‘Natural selection of parental ability to vary the sex ratio of offspring’ (1973) and ‘Parent-offspring conflict’ (1974). While there is other work, for purposes of this review might be added a book demonstrating that the older Trivers is far from unproductive, ‘The Folly of Fools: the Logic of Deceit and Self-Deception in Human Life’ (2011).

Such was the impact of his work on social theory that in being invited to write the Preface to Dawkins’ ‘The Selfish Gene’, Trivers was able to advertise his emergent theme of evolved deception and self-deception, which has provided fertile ground for his subsequent thinking and which incidentally from the psychiatrist’s point of view must provide insight essential to the practice of psychotherapy. In his Dawkins Preface, a short exposé in its own right, Trivers concludes that ‘the conventional view that natural selection forms nervous systems which produce ever more accurate images of the world must be a very naïve view of mental evolution’ and ‘Darwinian social theory ... should revitalise our political understanding and provide the intellectual support for a science and medicine of psychology. In the process it should also give us a deeper understanding of the many roots of our suffering’. Amen to that. In ‘Wildlife’, Trivers discloses that he took a good look at psychology as an academic field in the 60s and found it wanting, internally inconsistent and immature. I wonder if a new young twenty first century Trivers would feel any differently. He writes from direct personal experience: his first bipolar psychotic episode resulting in hospitalisation disrupted his Harvard undergraduate career and has featured on and off in his turbulent personal and academic life ever since.

‘Wildlife’ is part exposition of theory, part autobiography and part an apologia for Trivers interesting long-term connections with the underbelly of Jamaican society and his former membership of the U.S. Black Panther movement including support for what can most safely be described as revolutionary activity, until as he puts it he was excommunicated for his own safety. In this book he makes no attempt to re-examine in detail the rigorous logic and mathematical basis for evolved social strategies apparently common to all human societies but he does examine his own life in the light of theory and resolves to be more reflective in relation to his own conduct as a result.

It will be clear by now that this is not a book for the scholar intent on grappling with equations, but it is a place to go for a reader aware of them and their significance and seeking to add some human context and a sense of the struggle to live honestly and well, laid painfully bare by their author. The wildlife in question concerns both Trivers’ personal history but also a lengthy discussion about various species of Jamaican tree lizard whose

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social habits and reproductive ways have been one of his decades long Jamaican passions. The element of genius is obvious but not asserted. Trivers has collaborated and otherwise interacted with many if not all of his generation's key evolutionary thinkers. He learned field biology from the Dr Dolittle-like dyslexic Bill Drury who's role may have been paternal as much as pedagogic, learned evolutionary theory from Ernst Mayr whose personal kindness also impacted on Trivers career. He formed positive academic and/or personal associations or friendships in no special order with Bill Hamilton, George Williams, Sarah Hrdy, Steven Pinker, Edward Wilson and Richard Dawkins amongst other luminaries. In contrast he has little sympathy for Stephen Gould's work, blamed for putting the evolutionary cause back twenty years, but writes warmly of well known figures with whom he collaborated including Jane Goodall and the (according to Trivers) misunderstood genius of Huey Newton, Defence Minister of the Black Panthers and an acknowledged close friend. Whether or not he agrees with commitment to the theoretical positions of others in the field, one has the impression that what really interests Trivers is a striving for intellectual and emotional integrity and a decisive search for scientific truth or at least the sense of justice which comes with honesty. This extends to some of the non-scientists he met and knew in Jamaica, the women he married or associated with, his mother in law, research colleagues and employees, smoking and drinking partners, wheelers and dealers, musicians, and a particular concern for the fate of gay men in the homophobic culture he recognised there, (Trivers was supportive of a rights group that sought to intervene in vigilante attacks). Of his own students he mentions Irven Devore, 'the baboon man', 'I taught him social theory based on natural selection, which came as a revelation to him, having been raised on the group selection fallacy of social anthropology'. Trivers is not impressed by group selection ideas, which it must be noted are still around.

Trivers account in this book is fractured and raw, and no doubt many editors might have tried to shape the book differently, but as it is this 'confession' of a book opens a window not only into Trivers enormous intellectual achievement, but also a far from predictable life of bar-room brawls, armed hold-ups, dodgy clubs and a joy in Jamaican-English dialect. Why would Royal College of Psychiatrists Evolutionary Special Interest Group members want to read this book? it is undoubtedly both educational and entertaining, sometimes highly amusing and clearly a rare and honest glimpse into the history of an original mind pasted into the story of evolution and social theory some of whose greatest exponents have been less than fully conventional. It is tempting to make comparisons with the equally startling life of George Price whose preoccupation with the evolutionary nature of human altruism was equally driven. Integrating evolution and social theory is still contentious, the struggle to understand and then return the understanding to society is far from over. That it has taken over fifty years from the time when much of the basic evolutionary theory so applicable to human behaviour was being rapidly pieced together to members of the College forming an interest group with a purpose to draw together evolutionary understanding and modern psychiatry says something about both our collective medical education and intellectual lacunae. For people like me, more persuaded that we would do best to get to grips with the evolution of normal human mental experience and behaviour before taking the discussion about evolution and illness or psychopathology too far, all Trivers' work is a revelation and any gems of insight into the painful labour and delivery of these complex ideas is a treat. That he writes a book so imbued with the personal impact of acute and persistent mental illness and substance use makes it exceptionally interesting.

Returning to the Trivers theme question of deception: many of us are flummoxed by not only our own and our patient's capacity for self deception if not deception of others, but we are

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painfully aware that human society seems as intent as ever on swallowing what Donald Trump's election team apparently referred to as 'exaggerated hyperbole'. By the time you are reading this review, the outcome of the U.S. Presidential elections will be known, and half the world will either be mopping its brow with anxiety or relief, the other half presumably rampant or alleging more deceptions. The cool objective question of who deceives who and the place of deception in personal and public life is to my mind under-rated as a legitimate area of enquiry. Restricting the discourse to moral outrage does not seem to take us very far. Arguably we in the U.K. have seen our own recent examples of social and political deception on a mammoth scale, with as yet totally unforeseeable and possibly alarming consequences at least for some. Trivers is a scientist who has devoted half his life to asking why and has produced an entirely coherent explanation. This is worth knowing about. Occasionally people play fantasy parlour games and the like asking who one would most wish to share lunch with. I would be more than happy to meet Robert Trivers on such a basis and this book would make an ideal conversation point.

Special Article on dualism

An Evolutionary view of the Mind-body problem may help reduce stigma

Annie Swanepoel, Riadh Abed and Agnes Ayton

Introduction

Mental illnesses have historically been distinguished from other medical illnesses because they affect higher cognitive processes that are referred to as the "mind". This has contributed to stigmatization of mental illness and psychiatry. Stating that an illness is "all in the mind" (*And by implication not in the body*), becomes pejorative with an expectation that people with mental illness should "sort themselves out" and that they are somehow to blame. In contrast, people diagnosed with cancer are usually treated with kindness and compassion and not blamed for being ill. These societal prejudices have probably contributed to vast inequalities in the care and research funding for physical versus mental health problems. How and why has this happened?

One reason for the persistent bias against mental illness is that there continues to be an intuitive distinction between conditions of the "mind", which are regarded as under personal voluntary control and illnesses of the "body" which are presumed to happen outside of the person's control. Even though the evidence is mounting that this split is inaccurate and simplistic, the mind-body dichotomy prevails. We can liken this intuitive belief to the times when people were convinced that the earth was flat, as you just had to open your eyes to see that this was the case. Similarly, as people feel aware of their thoughts and feelings, they often think they are (or at least should be) able to control these. They are consequently judgmental about themselves and others, especially if they consider the condition to be something like a character flaw or weakness of will and self control.

The fact that English has different words for "brain" and "mind" or "soul" presupposes and also reinforces commonly accepted views of duality of the physical body and an ethereal mind. These notions have been fuelled by various religions over the centuries. The mind-body problem nevertheless remains very relevant to contemporary psychiatry. This article aspires to not only improve our understanding of the conceptual history and current views, but also suggest future directions. We will begin by describing the background and then move on to seeing how neuroscience and evolutionary insights can help shed light on this age

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old problem. We conclude considering the related problems within psychiatry and how psychiatrists might work to counteract these.

Background

The mind-body problem is one of the oldest and most intriguing problems bothering both philosophers and psychiatrists. It is the question about the nature of the mind and its relation to the body. Are mind and body two separate entities? If so, how are they held together? What happens to the mind once the body dies?

Or, if they are not separate, does this mean that the mind is biological? Does it exist at all? Is it explainable in neuroscience terms, or does the terminology “mind” or “soul” just exist as abstractions in ordinary language?

The mind-body problem is notoriously hard and has occupied philosophers for many centuries. One difficulty is that it is formulated in inadequate terms, namely in ordinary language. This is a problem, because many languages, including English developed with the preconceived ideas of the doctrine that mind and body are separate entities by having a word to describe “mind”. We intuitively assume that there is more to us and others than just our physical bodies, which is closely related to having a “theory of mind” in order to make sense of what others are thinking and feeling. This is known as psychophysical dualism: the doctrine that mind and body are separate entities.

Bunge states in his book that the mere fact that we talk of the “mind-body problem” suggests that these concepts are separate entities (1). In contrast, we do not speak of the “motion-body” problem in physics or the “reaction-substance” problem in chemistry. We do not tend to reify properties, states or events – except when these are related to the nervous system. Bunge advises that it is imperative that we close this gap that keeps the study of the mind a scientific anomaly (1). He proposes that we do so by abandoning ordinary language and use scientific language instead.

Bunge cautions that the mind-body problem is not just of interest to scientists and philosophers, but is a vital component of many religions which have a vested interest in having us accept that the mind is ethereal and lives on after the body has died; usually in some paradise if and only if you accept and obey the tenets of their variety of religion.

Different schools of thought

Before the question of whether the mind exists can be answered, a definition of “mind” is required. The Merriam-Webster dictionary gives three definitions:

a: the element or complex of elements in an individual that feels, perceives, thinks, wills, and especially reasons

b: the conscious mental events and capabilities in an organism

c: the organized conscious and unconscious adaptive mental activity of an organism.

Bunge states that “the mind of an animal is not an entity but a set composed of some of its brain processes”. Typical mental processes are: perceiving, feeling, remembering, imagining, willing and thinking. The crucial question is “what is it that perceives feels, remembers, imagines, wills and thinks?” Is it the “mind” or the “brain/body”? This is the core of the mind-body problem.

Different schools of thought have developed around different answers to that question. Psychophysical **dualists** believe that the mind has an existence separate to the brain. Dualists

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believe that the body is material, exists in space and can be observed objectively. In contrast, the mind (or soul) is immaterial, does not extend in space and can only be observed by the own individual. In contrast, psychophysical **monists** believe that mental functions are an outflow of brain activity, or vice versa. Both of these main groups can be subdivided further – see Table 1.

Table 1: Ten takes on the mind-body problem

Psychophysical dualism	Psychophysical monism
1. Body and mind are completely independent (Wittgenstein)	6. Everything is mind – this is called idealism or phenomenalism (Berkeley)
2. Body and mind are parallel or synchronous (Leibniz)	7. Body and mind are manifestations of a single entity – this is called neutral monism (Spinoza)
3. Body affects/ causes/ secretes mind – this is called epiphenomenalism (Huxley)	8. Mind does not exist – called eliminative materialism or behaviourism (Skinner, Turing)
4. Mind affects, animates or controls body – this is called animism (Plato, Popper)	9. Mind is physical – called reductive materialism (Epicurus, Hobbes)
5. Body and mind interact (Descartes)	10. Mind is a set of emergent brain functions – called emergentist materialism (Diderot, Darwin)

It is important to consider each of these to see which is the most useful in modern Psychiatry. The numbers below refer to the numbers given in the table above:

DUALISM

1. Body and mind are completely independent – this is clearly not the case, based on discoveries in neuroscience. For example Alzheimer’s disease, which affects the brain, clearly impacts on the mind as well.
2. According to Leibniz, mind and body do not affect each other, but mental and physical processes are parallel and correlated which is ensured by God’s intervention. However, the reflex of pulling away when touching something hot before realising that this is what happened, argues against this.
3. Epiphenomenalism sees the “mind” as a separate by-product of the brain, as bile is a by-product of the liver.
4. Animism: the body is controlled by the mind. The mind or soul is not defined except to say that it is immaterial and incorporeal. From a scientific point of view, this is therefore not a feasible hypothesis to examine further (3).
5. Cartesian dualism states that mind and body interact and that this likely happens in the pineal gland. We now know that the pineal gland has other functions, e.g. secreting melatonin.

Dualist views are impossible to examine scientifically, because “mind” is viewed as an abstract ineffable concept and there is no characterization possible which uses natural processes or material reality that allows for systematic investigation. Because the

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presumption that the mind exists separately from the body, has not been demonstrated, the burden of proof to show its nature should remain with the claimant and not the scientist trying to investigate it. Dualism is therefore incompatible with science, but closely identified with the supernatural and religion (3).

MONISM

6. Phenomenology is the study from a first person point of view of what appears to be subjective human conscious experience (2). In the past, phenomenology was often motivated by the belief that subjective human experience is the proper foundation of all philosophy. However, science needs to adopt a more objective approach.
7. Neutral monism is a monistic metaphysics. It holds that ultimate reality is all of one kind. What distinguishes neutral monism from its monistic rivals is the claim that the intrinsic nature of ultimate reality is neither mental nor physical. This negative claim also captures the idea of neutrality: being intrinsically neither mental nor physical in nature ultimate reality is said to be neutral between the two. Neutral monism creates a further layer of obscurity, which is unnecessary and has no scientific basis.
8. Behaviourism ignores mind states. This does not provide a solution to the mind-body problem. For example, in order to understand behaviours of someone feeling warm, but without considering the feeling, would be impossible, due to the range of behaviours that could ensue. For instance, a person feeling too warm could take off a jumper, or eat ice cream, or switch on an air conditioner, or go for a swim (3).
9. Reductive materialism sees psychology as a branch of physics. This may well be too reductive and not compatible with the richness of subjective experience (3). Reductionism of psychiatry to the body would see it subsumed by neurology. Reductionism of psychiatry to the mind would lead to it being subsumed by psychology (4).
10. Emergentist materialism states that the central nervous system (CNS) is a biosystem which is complex and endowed with properties peculiar to living things. Emergent (or emergentist) materialism is a theory which considers that the mind has an irreducible existence in some sense, and that the study of mental phenomena has to be partly independent of other sciences. This is the view held by Darwin.

A common criticism of monism is that it fails to account for consciousness, free will and “qualia”, which are conscious, subjective and private experiences, such as sensations, emotions and mental images (3). Typical examples are seeing the colour red or tasting salt. This is linked with the “explanatory gap” between the third person perspective and first person experience. However, neuroscience is rapidly closing this explanatory gap, as discussed below. The complexity of individual human development and thus experience(s) is always unique so reactions to stimuli would be expected to be equally unique and individualistic. This explains why in psychiatry, group or nomothetic data cannot be used to exactly predict or explain individual responses or experiences. Like everyone else, you are unique and complex but not beyond science, that is if science is not only the systematic respect for evidence but also allows for subjective experience too.

Evolution and neuroscience

From an evolutionary point of view, the mind-body problem is reducible to the subject-object problem. A unicellular organism survives by sensing food or light and moving towards it. This requires a distinction to be made between the subject and the object – called the epistemic cut. It is only because of such subject-object distinction that populations of

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individual subjects can selectively adapt to their environment by heritable variations. This forms the basis of natural selection, which is a central tenet of survival of those with the best heritable fit to their environment and gives rise to evolution.

The brain and its sensory organs are adapted to the environment the animal inhabits and implement the behaviours necessary for survival and reproductive success (5). The structure and function of the human brain shows marked similarities to that of other animals and it would be difficult to pinpoint an entry point for the “mind” if this were to exist separately to the body (5). For example, dopamine is an important neurotransmitter in reward circuits not only in humans, but also in the *Drosophila* fly (5). Dopamine, like noradrenaline and serotonin (5HT) is found in many organisms including plants and bacteria serving biomediator functions (5).

An evolutionary view is most compatible with emergentist materialism. Davidson postulated the supervenience theory in which states that there are different levels of complexity in nature that are studied by different scientific disciplines (see Table 2).

Table 2: Levels of complexity and scientific disciplines

Levels of complexity	Scientific discipline
Atoms	Physics
Molecules	Chemistry
Cells and organisms	Biology
Minds	Psychology
Social Groups	Sociology

According to supervenience theory, more complex phenomena depend on lower level properties; however, they are not reductive to lower levels. A popular way of explaining this is that the whole is greater than the sum of its parts. An example is that biology depends on (organic) chemistry; however, chemistry does not depend on biology and occurs in non-living things as well (inorganic chemistry).

In emergentism, the “mind” is an emergent property of the brain. Emergent properties are defined as new characteristics that appear at higher levels of complexity that lower levels did not predict and that transcends the properties of its constituents. The origin of life from the primordial chemical soup might be another example.

The mental properties of the brain are not possessed by its component cells. In contrast, mental properties emerged from cell systems at some point during the course of evolution. Physics and chemistry are necessary but not sufficient to explain mental states. Similarly, knowledge of biology of other systems like the cardiovascular system is not enough to explain how the mind arises. In order to understand how thinking, feeling and remembering are possible, we need to explore neuroscience. Proponents of the existence of the “mind” as separate to the brain typically argue that consciousness, free will and qualia (subjective experiences) are not explicable in terms of brain functions. We briefly address these below, taking into account recent finding from neuroscience.

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Consciousness can be defined as “a higher-order cognitive system enabling access to intentional state” (6). Consciousness was long thought to be only present in humans, but this has been refuted (6). Comparative anatomy and physiology shows that consciousness likely arose in reptiles and can reliably be elicited in birds and mammals (6). Cabanac et al explain this as follows:

“Consciousness may have emerged because of the increasing complexity of life in a terrestrial environment. In this new adaptive landscape, existence required more and more stimulus-response pathways; eventually, a point was reached where it became more efficient, in terms of speed and flexibility, to route all decision making through a single mental space. Within this space, different possible responses would be compared and judged according to the degree of pleasure they evoked, the aim being to maximise pleasure and minimize displeasure. The hedonic dimension of consciousness thus became a common currency in decision making to select the final behavioural path. It proved to be so successful that it was passed on to all descendants of these early Amniota.” (6).

Consciousness can be studied by physical science and mapped to specific brain circuits (5). Raese explains that “Consciousness emerges as a result of the coordinated activity of brain networks spanning many scales of space and time” and “the function of neural circuits in bringing about mental states is emergent, arising from complex and constantly changing interactions of many neurons” (5). The conscious state requires the coupling of subcortical and limbic regions with parts of the inferior parietal and frontal cortex. The thalamocortical system is disrupted by anaesthetic agents leading to loss of consciousness during anaesthesia (5). Also, additional and different brain regions are activated during metacognition, which is the perception and monitoring of one’s own cognitive processes, again indicating that mental processes occur in the brain.

In order to test **free will**, subjects were connected to EEG monitoring and asked to report when they wanted to lift a specific finger. The brain showed a readiness potential 300ms *before* the person became conscious that they wanted to move. The authors explained this as that the decision is made by the brain and then communicated to the mind, where it becomes conscious. However, the initial brain process remains unconscious and therefore people think that they are making the decision consciously, but in fact only have the illusion of being in conscious command (3,7). Libet’s original findings have now been replicated by numerous subsequent studies, however, the interpretation and implications of these remain in dispute (8). To summarise, the brain makes a decision to move and communicates this to the conscious state and the muscles. These neuroscience experiments point towards the brain (activity) as being primary, and the subjective mind emerging from changes in nerve potentials. However, this does not necessarily mean that free will (as free choice) does not exist, as it needs to be seen in context. Laboratory experiments which look at decisions arising within milliseconds is hardly a reflection on everyday life in which decisions are typically made and acted upon in much longer timeframes. A more important factor may be to measure executive function and capacity as an indication of how free people are to override basic biological imperatives (9).

Qualia or “what it is like to have an experience” lie at the core of the so-called “hard problem of consciousness”. It is difficult to envision how such personal and intimate processes as emotions, sensations and memories may arise from biological processes. A common thought experiment is that of a colour blind scientist who researches and understands how colour vision works by tracking light waves through the rod cells of the retina to the V4 area of the occipital cortex. This scientist may understand everything there is to know about colour

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vision, but still does not know what green looks like. However, if she could connect the V4 area of her brain with a cable to the V4 area of a normal person looking at a green field, she could bypass the missing rods in her eyes and would therefore be able to experience what it is like to see green. Recently a brain-to-brain interface has been described in rats which showed a behavioural change which would be compatible with the transfer of sensorimotor information through microelectrode microstimulation (5).

Even complex processes like political beliefs have been shown to be linked to differences in brain functioning (10). Conservatives have a more sensitive response to threat and uses their amygdalas more, in contrast to liberals who process threat through their anterior cingulate cortices (10).

Implications for Psychiatry

According to emergentism, mental states depend on brain states and are not immaterial or separate from the body (3). The supernatural and other non-natural explanations have no scientific evidence and massively fail at the point of considering how they could interact with and change any material or natural process. The division of disorders as psychogenic versus organic has been challenged with studies finding that medication and (psycho) therapy work for both types of disorders. All brain processes so far discovered are underpinned and subserved by neurotransmitters and electrical neurological processes which are not conscious in themselves but can be demonstrated scientifically and correlated with experiences and behaviour. A unified physicalist description of psychiatric diagnosis and treatment is now in reach. This will map brain changes in time scales ranging from minutes to decades produced by epigenetic changes of gene expression (including those produced by social forces) and changes in brain connectivity by both psychopharmacology and psychotherapy (5).

Psychiatric explanations are so complex because causation or pathogenesis straddles all the levels of biology, psychology and sociology and is therefore open to examination and criticism from all of these disciplines (4). Some argue that all psychiatric disorders are solely within the brain and should be seen as neurological/neurochemical problems. Whether the neurological issues or neurotransmitter issues are the initiating cause as distinct from a secondary subservient part of the pathogenesis, can be argued for each case. Others argue that it is all in the mind and should be treated by psychology. Anti-psychiatrists like Thomas Szasz typically argue that all psychiatric problems stem from or are at the societal level and therefore mental illness (as a brain disease) is a myth. We suggest that as is often the case when there are strong polarized views, the answer is not an “either, or” but rather a “both and”. Psychiatric problems (for individuals) have aspects of each of biology, psychology and sociology and that is why the biopsychosocial model is so important in our work.

Mind/body dualism accepted unquestioningly and simplistically has potential adverse consequences for psychiatry, because it assumes that the mind of an individual is separate from science and not affected by material brain things such as disease or disorder and is therefore somehow to blame for aspects of personal behaviour leading to stigmatization of those with mental illness. This anti-science perspective leads to disdain for the disorders, reduced funding for patient care and research and cognitive distortions affecting the training and practicing of psychiatry. Dualism particularly distracts from the principled endeavour of researching the mind as it de facto puts it beyond naturalistic investigation and science.

We hope these problems may change as the wider neurosciences are increasingly capable of describing aspects of human thought, emotional responses and psychopathology as the manifestations of brain activity albeit requiring evolutionary phylogenetic as well as ontogenetic context.

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Conclusion

Many of our initial intuitive and common-sense approaches to understand nature turn out to be wrong. For example, we now know that the earth is not flat and is not the centre of the universe. The general and special theory of relativity is not intuitive. In spite of much evidence to the contrary, mind-body dualism as an intuition, is still pervasive. As psychiatrists, it is crucial to move beyond pseudo-explanatory dualism using a non supernatural (supernatural being beyond the natural) conceptualization of mind in our own thoughts and practices and help our patients, colleagues and funders to do the same. Only then will psychiatry be recognized as working at the forefront of the complex interaction between Neuroscience and Sociology. Only then will psychiatry move from being Cinderella to emerging as the queen of the medical specialties.

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Footnotes

For those interested in looking at more detailed evolutionary models of consciousness these articles/links may be of interest. The evolution of consciousness by Peter Carruthers <http://faculty.philosophy.umd.edu/pcarruthers/Evolution-of-consciousness.htm> and Evolutionary theory of consciousness: a comprehensive model https://figshare.com/articles/Evolutionary_theory_of_consciousness_a_comprehensive_model/1520439

Replies, suggestions and clarifications on Annie's article on Mind and any Evolutionary ideas of consciousness are welcomed and will be forwarded to her for reply. Please send them to me at:- paul.stjohnsmith@hpft.nhs.uk or paulstjohnsmith@hotmail.com

Constructive criticism and correspondence may be published in our next letter.

PSt J-Smith Editor