

Better not look down...

Leading neurosurgeon **Henry Marsh** reflects on mistakes, mystery and the mind

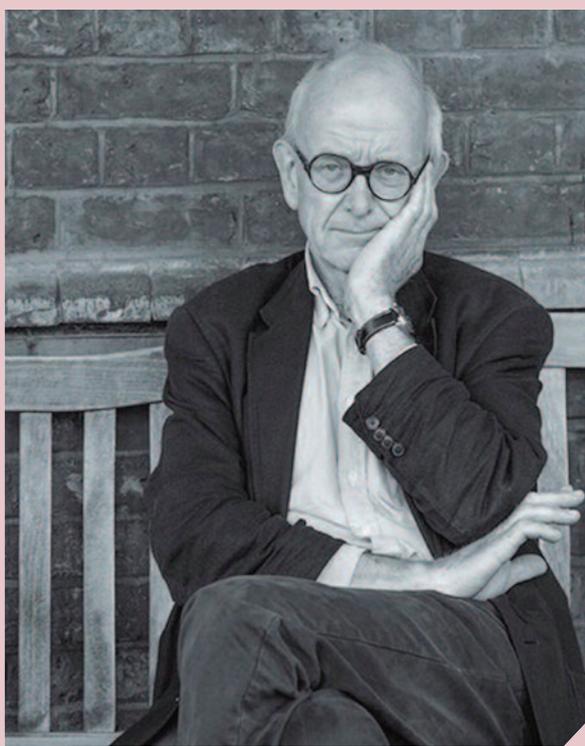
'Every surgeon carries about him a little cemetery, in which from time to time he goes to pray, a cemetery of bitterness and regret, of which he seeks the reason for certain of his failures.' *French surgeon René Leriche, 1951*

Two years ago, with retirement approaching, I thought I should look back on my career – almost four decades of neurosurgery – and reflect on what I had learned. This meant, of course, thinking about the many mistakes I had made over the years, since we learn little from success. So every night I took a notebook and pencil to bed with me and when I woke in the morning I would lie in bed and, drifting in and out of lucid dreaming, try to remember my mistakes. The ghosts of the patients who had suffered at my hands would drift up into my consciousness, like methane stirred up from a stagnant pond, long-forgotten and deeply painful to remember. It was an unpleasant process, and I soon discovered that if I did not write them down immediately I would quickly forget them all over again.

Doctors and lawyers involved in medical litigation usually distinguish between careless mistakes and 'errors of clinical judgement'. The former mistakes are negligent and culpable, the latter are not, and reflect the fact that medical problems are often complex and the consequences unpredictable. Even if the doctor has considered a problem carefully he or she can nevertheless make the wrong decision and the patient can come to harm. In my specialty of brain surgery, the harm can be terrible, and sometimes worse than death.

The essential distinction between the two types of mistake is that the doctor has been careful. A careful doctor is a good doctor, a careless doctor is a bad doctor. To my distress, as I lay in bed, I could not deny that many of the mistakes I was

remembering fell into the first category – I had been careless. They were also the mistakes I found most difficult to remember and I suspect that some of my worst mistakes remain buried in my



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subconscious or have been completely erased. It was also striking that the great majority of the mistakes had been mistakes in decision making, in deciding whether to operate or not, about how much of a tumour to remove, or in recognising a serious post-operative complication. Purely technical mistakes when operating are, in fact, rare, and the idea that the difference between a good surgeon and a bad surgeon is a matter of

'steady hands' mythical. And yet, like most doctors, I like to think that I am a good doctor. If you care for your patients and are a good doctor, how can you possibly be careless? It was difficult to escape the conclusion that my self-esteem relied on self-deception, a self-deception in part driven and supported by my patients' need to believe in me. But dangerous surgery – dangerous for the patient, that is – is difficult to do if you become too frightened by the risks, and it is why most doctors do not want to become surgeons, and in particular brain surgeons. In the words of B.B. King's song, 'Better not look down, if you want to keep on flying'.

It was while I was forcing myself to look down at the ground below me that I read Daniel Kahneman's *Thinking, Fast and Slow*. I had been drawn to brain surgery as a young doctor not just by the glamour and danger (and my own experience of a young son with a brain tumour) but also by a fascination with the brain and neuroanatomy. I had even flirted with psychiatry as a career. I had, therefore, some knowledge of psychology before reading Kahneman, and marriage to a social anthropologist (Kate Fox, the author of *Watching the English*) – social psychology and social anthropology having much in common – has been an important part of my education as well. Reading Kahneman was revelatory – I learned that my carelessness was part of being human, that we are not as 'rational' as we like to think, whatever the lawyers might argue in court. More importantly, the book gave me tools with which to understand my carelessness in terms of cognitive biases.

There are many cognitive biases, and since so much of surgery is about assessing risks, probability and people, surgeons are vulnerable to a whole raft of them. Here are three examples from among the headstones of my inner cemetery.

A combination of biases

I carried out a routine operation on a young woman for a congenital malformation at the base of her brain that

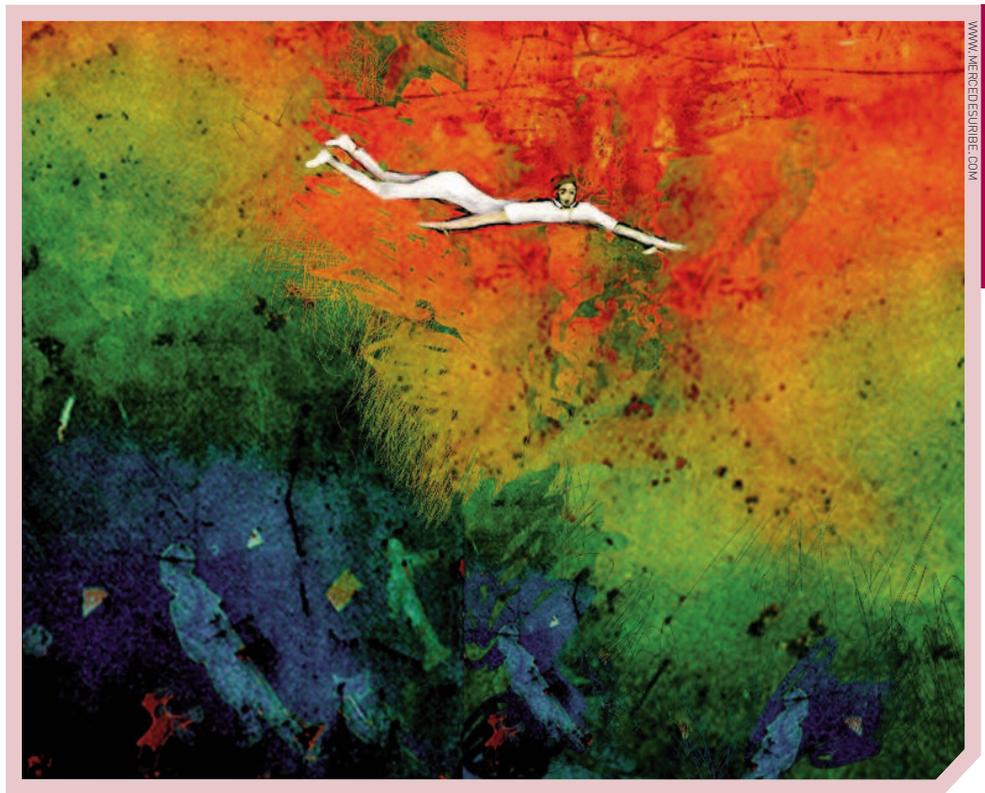
had been causing severe headaches. It is a fairly simple operation and I had probably done well over a hundred similar procedures before. The operation went exceptionally well. By chance one of my colleagues was doing an identical operation in the next theatre and I could see that his operation was not going well. I felt rather pleased with myself.

My patient recovered unusually quickly and went home two days after surgery. A few days later her husband telephoned me to say that she was feeling unwell. He did not sound too troubled, and since I had never had any serious complications with this operation before I reassured him that there was nothing to worry about. Only at the end of the conversation did he mention that the wound was leaking. This should have alerted me to the fact that there was a potentially serious problem but I disregarded it. The 'availability heuristic' (I did not associate the operation with severe complications) combined with the 'framing effect' (the critical piece of information only came at the end of the conversation) and my 'optimism bias' (a high opinion of myself) resulted in significant delays in diagnosing a rare and very serious infection that left the woman catastrophically disabled.

The halo effect

Surgery is a practical craft and you learn it by doing it. Although a lot of work is being done to develop simulators, there is still no substitute for experience. A very important part of a senior surgeon's work is to train and supervise the next generation of surgeons. You learn most as a trainee when you are operating on your own and your senior is not standing beside you dictating your every move. There is a serious responsibility, therefore, for the senior surgeon to know when and how much of an operation to delegate. There is an ethical responsibility to the patient in front of you but also an ethical responsibility to your trainee's future patients. These two demands are not easily compatible, and require careful assessment of the trainee's abilities.

I delegated the beginning of an operation to a senior trainee whom I liked greatly. By the time I joined him (it is, in fact, standard practice to let the juniors 'open and close' neurosurgical operations), he had the patient's head open, so that I could no longer see exactly where he had made the opening. I assumed it was in the right place but it turned out it was not, and when I opened the meninges there was severe haemorrhage from the sagittal sinus, one



of the brain's major veins. The patient died as a result. The 'halo effect' – a term coined by Edward Thorndike to describe the tendency for an overall impression to influence the observer's feelings and thoughts about that person's character or properties – had distorted my assessment of my trainee's competence.

I would like to think that I am now better at judging my trainees and knowing when to intervene and when not to – but it has taken me many years and there were other, similar problems (though not quite so disastrous) on the way.

Anchoring

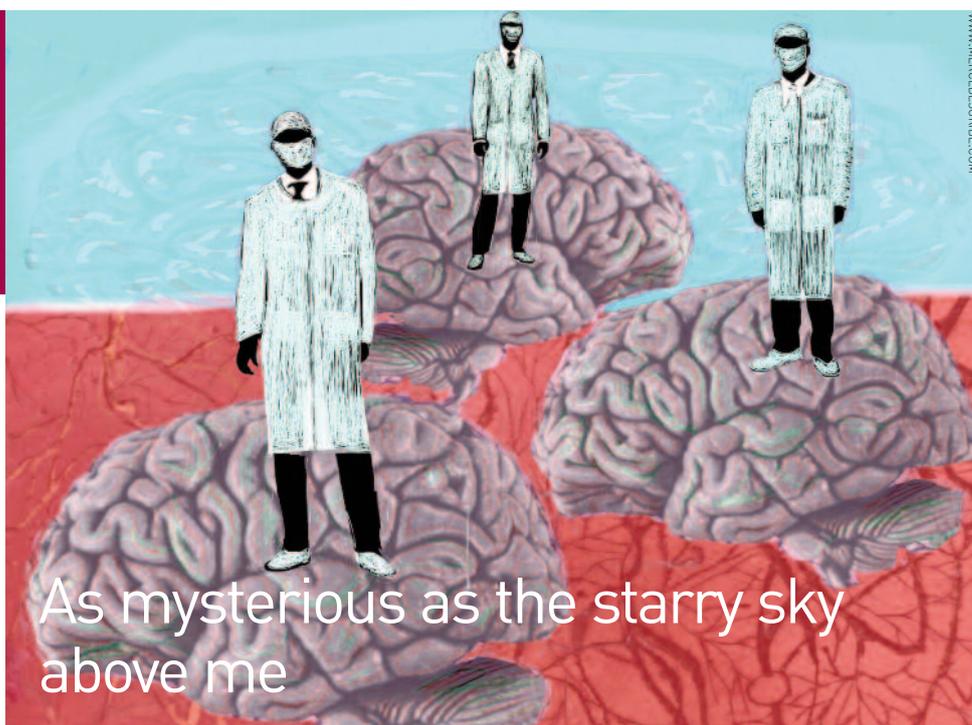
I had three simple lumbar disc operations to do in the private hospital. Two were on the right side, one on the left. The operation is done through a midline incision irrespective of the side of the disc prolapse but the surgeon then explores only the symptomatic side of the vertebral canal. I consented the patients myself, noting the side in each case on the consent form. I carried out the two right-sided operations but when it came to the third case the computer system crashed and I had no way of visually checking which side to operate on. My memory told me that the disc was on the right side and I operated on the wrong side. This is an example of the 'anchoring' effect:

relying too heavily on the first piece of information encountered (the 'anchor').

The story had a happy ending, however, in that the disc prolapse was large enough for me to remove it from the opposite (wrong) side, which only confirmed my (erroneous) belief I was operating on the correct side. The patient woke up with the left-sided sciatica cured but with some numbness in the right leg (a common post-operative and transient phenomenon). She was puzzled by this and I spent a long time on the evening after the operation trying to persuade her that her original sciatica had been down her right leg, so reluctant was I to realise that my memory had deceived me. I had to admit defeat when she showed me the consent form with 'left leg' written in my own handwriting. Fortunately she found this quite amusing, and her severe sciatica was better.

Learning from mistakes

The most important conclusion from Kahneman's book is that other people are better at seeing our mistakes than we are ourselves, and it follows from this that discussion of difficult cases should be an intrinsic part of surgical practice. In most surgical departments this takes place in retrospective 'Morbidity and Mortality' meetings, after the damage has been done, and – prospectively – in 'Multi-



Brain surgeons must often manipulate the brain and sometimes remove parts of it. The surgery involved is often much cruder than popularly supposed. The brain has the consistency of jelly – it seems something of a cruel miracle that thought and feeling, an understanding of quantum mechanics, love, hatred, the obscure and lengthy utterances of NHS management, Beethoven's late quartets and First Division football all derive from this stuff.

When operating there is a constant struggle between wanting to get on with the operation and knowing that you should handle your patient's brain with the same respect with which you would want your own brain to be handled. Brain surgeons must resist the temptation to handle it as 'just another organ', yet it is impossible to see the brain as anything other than matter when operating on it.

That's not to say the physical matter of the brain is not a wondrous thing.

I became entranced by neuroscience as a second-year medical student. When I saw my first cerebral aneurysm five years later as a junior doctor, I knew immediately that all I had ever wanted to be, without realising it, was a brain surgeon.

I shared the common misapprehension that seeing the exposed, living human brain – and operating on it – would in some way explain the great mysteries of existence and make me preternaturally wise. At first, as a trainee surgeon, I was too preoccupied with learning how to operate to think much more along these lines. When I became a consultant, the burden of responsibility for my patients' lives left little time for philosophical speculation.

I am certain, though, that I have never doubted the material nature of thought and feeling. You cannot see people whose very personality and moral being has been altered for the worse by damage to the frontal lobes and maintain

belief in some kind of mind or human soul separate from the brain – at least, if you do, you must exercise extreme cognitive dissonance.

In recent years, however, as my career reaches its end and the pressures of work have lessened, I have come to understand that dealing with the brain as a physical entity on a daily basis has taught me only one lesson – that the brain is indeed infinitely mysterious. The scientific view of the world cannot even begin to explain how consciousness and subjective feelings arise from the electro-chemical activity of nerve cells.

This does not downgrade thought or free will or moral judgement but instead upgrades matter into something rather wonderful, which we do not understand. I cannot believe in an afterlife, but I find this great cloud of unknowing – that my own consciousness within me is as great a mystery as the starry sky at night above me (to borrow from Kant), and in some ways just as important – very consoling.

Disciplinary Team' meetings. The value of these meetings depends greatly on the complex interplay of the personalities of the various people present. My own experience of working in the NHS for almost 40 years is very much in keeping with Kahneman's comment that 'There is... [a] remarkable absence of systematic training for the essential skill of conducting efficient meetings.'

Why should surgeons be particularly bad at meetings? It is generally accepted that medicine is a stressful occupation with high (self-reported) levels of anxiety and 'burn-out' (see, for example, research by Samantha Brooks, and Charles Balch: tinyurl.com/omzfdwq and tinyurl.com/cxymb8p respectively). Surgery attracts ambitious doctors who like challenges, and it is probably true to say that surgical culture does not favour public admission of doubt or weakness. Surgeons, it is often said, as opposed to physicians, cannot tolerate ambiguity and see confident, quick decision making as a virtue, although many surgical problems are often difficult and uncertain. Besides, patients undoubtedly prefer confident, certain surgeons, and all surgeons must learn at an early stage of their career to pretend to a level of experience and confidence that inwardly they know they do not have. As a young consultant you will soon face the dilemma of a difficult case where one of your senior colleagues has greater experience than you have and yet if you do not take on difficult cases yourself, how will you ever improve your skills? Self-deception and denial – pretending to yourself as much as to your patient – become important mechanisms of self-defence when confronting problems of this kind. This means, of course, that surgeons do not always take naturally to meetings and discussion where their self-deception may be exposed. Interpersonal relations between surgeons within surgical departments therefore play a very important part in what happens to patients, for better and for worse. Good colleagues are a very important part of 'Patient Safety'.

Patient care

There are many ways in which neurosurgeons can avoid confronting the fact that an operation they have performed might have caused their patient harm, and that perhaps they could have carried it out in a less damaging way. 'The operation was a success but the patient died', as the saying goes. It is a standard joke among neurologists that if a brain surgeon says a patient has 'done well' all it means is that the patient can

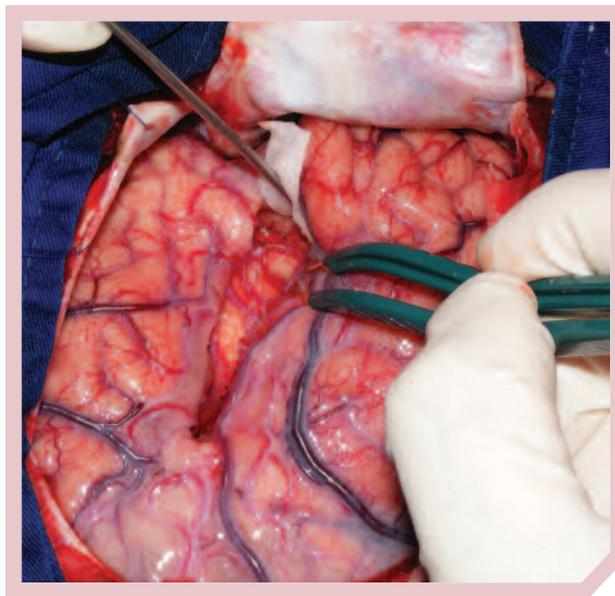
walk and thank the surgeon for operating, even though in reality the patient has been left hopelessly disabled. Brain surgeons often shy away from detailed psychological assessment of their patients in the post-operative outpatient clinic – perhaps because the more you look, the more problems you will find. The cognitive and psychological consequences of brain surgery can be subtle and easy to gloss over. They are easily justified on the grounds that the consequences of not operating would have been even worse. Judgement as to how to handle your patient's brain is all-important, and most surgeons, if they become patients themselves, are just as concerned with their colleague's personality (one might say psychology) and their reputation for sensible decision making as with their technical ability.

Doctors can make careless mistakes because of cognitive biases, but they can also make such mistakes because they do not care for their patients. It is often said – although as far as I know has never been convincingly shown – that surgeons have psychopathic tendencies. The antisocial personality disorder Factor 2 of Bob Hare's PCL-R model (unstable, socially deviant, criminality, impulsive violence) for diagnosing psychopathy is rather hard to apply to surgeons but the 'selfish, callous and remorseless use of others' with 'superficial charm' of Factor 1 can, I suspect, sometimes be observed.

In some respects, surgery is a blood sport – most surgeons become surgeons in a quest for stimulation and excitement as much as out of altruism, but the work is only exciting to the extent that you care for what happens to the patient after the operation. This care is usually based on empathy, but it can also be based on the wish for financial success and fame, and often a combination of both. The two motivations can be equally beneficial for patients (surgeons will not be successful in private practice if their patients tend to do badly), but surgeons who are primarily motivated by self-interest will probably be better exponents than their empathic peers of the arts of lying and manipulation. Furthermore, as Robert Trivers has written in *Deceit and Self Deception*, deceiving the self is the most effective way of deceiving others. As

social psychologist Peter Collett has explained, conscious lying is usually accompanied by give-away non-verbal 'tells'.

On the other hand it can be profoundly painful for honest and empathic surgeons to know that they have made a mistake and to tell their patient about it. It is only human to try to avoid the admission both to yourself and to your patient. Politicians and safety experts might talk of enforcing 'the duty of candour' with the force of the criminal law when mistakes have occurred, but it shows little understanding of the complex



tangle of feelings and facts involved. The same considerations apply to surgical research – successful new treatments will often be dogged by failure and much patient suffering in their early stages. A certain remorseless detachment is required if the work is to proceed to success.

Finding this balance between professional detachment and compassion is, of course, central to the practice of medicine and is a problem all doctors must face. It is most easily demonstrated by the way in which most surgeons would find it impossible to operate on members of their own family (or even friends or colleagues), although the single most important ethic in medicine is that you should only treat patients as you would want yourself or your family to be treated. I know a few surgeons who – as far as I can tell – do not suffer at all when their patients' suffer, but they are probably in a minority. Most surgeons, though they do not care to admit it, suffer to some extent with their patients when

things have gone badly, although they probably feel more compassion towards some patients than others. Drug addicts, attempted suicides, psychiatric patients – people who are, mistakenly, considered to be responsible for their own misfortune – will elicit less sympathy than others. On the other hand treating medical colleagues – your own tribe – will often produce anxiety in the surgeon as well as sympathy.

Forcing surgeons to look down

Can one teach wisdom, empathy and judgement? Can you force surgeons to look down? Will they just develop severe vertigo and learn nothing (just as the dancing mice in the Yerkes-Dodson experiments failed to learn if the electric shock was very strong)?

I have probably learned most from my own and my family's experiences of illness and health care, but when one is a young doctor such experiences are few and far between. Patients – at least in England – rarely complain or answer back, anxious not to displease the people upon whom their life depends, so it is surprisingly difficult to learn how to talk to patients, and how to make difficult decisions with them, because of this lack of negative feedback. I believe that much more is now taught in medical schools about practical psychology than when I was training, but students have no responsibility for patients and have not yet had to develop the self-deception and denial that is an important part of being a surgeon, which one must then struggle to overcome with experience.

Being an old doctor myself, close to retirement, I like to think that doctors get better with age. The importance of understanding psychology – one's own even more importantly than that of the patient – is probably something best shown by example rather than formally taught. This was perhaps easier in the days when surgery was still an apprenticeship and surgeons worked in small groups led by consultants known as 'firms' – many of the recent changes in postgraduate medical education and the shortened working hours have made this much more difficult, although not impossible. I have now retired from operating, but will continue to teach surgical trainees. I hope that I might be able to help them to understand themselves a little better, to understand psychology, and hence avoid making some of the mistakes that I have made in the past.