

*'A truly inspiring and fascinating book, with lots of simple ways to make the most of your biggest asset – your brain! Without doubt, a book you cannot be without!'*

**Dame Sarah Storey DBE**

**DR JACK LEWIS & ADRIAN WEBSTER**

# **SORT YOUR BRAIN OUT**



**BOOST YOUR PERFORMANCE,  
MANAGE STRESS AND ACHIEVE MORE**

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“This truly inspiring and fascinating book leaves you never wanting to waste a single second ever again. Everything you need to know about how your brain works and how to maximize it is contained in an easy-to-read way. The book proves you really can do anything and there are lots of simple ways to help ensure you too can make the most of your biggest asset – your brain! Without doubt, a book you cannot be without!”

**Dame Sarah Storey, DBE**

“For all the debate about governments nudging people to make better decisions or to adopt better behaviours, it is easy to overlook the fact that we can actually nudge ourselves. This book is a wonderful guide to how to do just that.”

**Rory Sutherland, Executive Creative Director and Vice Chairman, OgilvyOne London and Vice Chairman, Ogilvy Group UK**

“I thought it was accessible, thought-provoking and full of useful, easy-to-follow tips about improving your everyday life through a better understanding of the brain.”

**Killian Fox, writer for *The Observer* and other publications**

“A really great book that explains in layman's terms how the brain works and how you can then translate that knowledge to enhance your own performance. Thought-provoking and insightful, it will add considerable value to anyone still willing to learn, irrespective of which rung of the success ladder they are on. It's an enjoyable and extremely useful read.”

**Mark Hussein, Global Head of HSBC Commercial Insurance and Investments**

“*Sort Your Brain Out* is a must-read for everyone. It is a clever and thoughtful book designed to help the lay reader understand more about the brain's most intimate workings but most importantly it provides erudite yet easily consumed bite-sized gobbets of information on how to improve one's cognitive lobar lot. The fascinating examples are eminently readable and marvellously memorable; the reading of this book will stretch the brain in exactly the way the authors have devised. This is mental stimulation at its best.”

**Chantal Rickards, Head of Programming and Branded Content, M&S**

“As someone who has spent their life reviewing neuroscience material, I was struck by how this overview on offer contextualises some aspects of brain function in a novel and refreshing way.

In short, this is a delightful and illuminating read – it is the book that I would (will) give my family when they ask searching questions about neuroscience – and what it means for them.”

**Professor Karl Friston FRS, Scientific Director, Wellcome Trust Centre for Neuroimaging, University College London**

“*Sort Your Brain Out* has clarity of purpose and many features that puts it ahead of its competitors in an expanding area of interest. Making the best use of the amazing brains we are born with, even though they are destined to operate in a world far removed from the environment that

shaped their evolution, is crucial. There probably is no more important a task for us as individuals or for the groups we live and work in than this. Help and the chance to expand our insight is hand.”

**Ian Edwards, Head of Strategy, Advertising Planning firm Vizeum**

“Engaging, accessible, demystifying.”

**Dr Daniel Glaser, Director, Science Gallery London**

“This book explores the kind of topics we all think and talk about: Is the internet making us stupid? What do alcohol and caffeine really do to our brains? It provides you with exactly the kind of fascinating nuggets of information you end up reading out to whoever you happen to be with, as well as practical tips on how to maximise what we all have between our ears. Forget brainstorming, it’s all about brainshaking and dunking now. Neuroscience demystified and simplified without being patronising; a must-read.”

**Olivia Walmsley, *Mail Online***



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# **SORT YOUR BRAIN OUT**

**Boost your performance,  
manage stress and  
achieve more**

**Dr Jack Lewis and Adrian Webster**



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In memory of Susan Rose McColl and all those who were told they can't – but have.

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# What This Book Is All About

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Every human being on this planet has the most incredible device in the known universe residing within their skull. Yet despite all of us having more or less the same make and model, the vast majority of users are completely unaware of its stunning capabilities; let alone its phenomenal ability to adapt.

The human brain adapts to the demands of pretty much any environment. It physically changes its own circuitry to improve performance in any behaviour that is regularly required of it. It will change in a manner that enables skills and abilities to become faster, more accurate and more efficient the next time you come to do them.

This process of rewiring for self-enhancement is so gradual that the day-to-day improvements are usually imperceptible. Only if you continue to perform that behaviour intensively, regularly and consistently – over an extended period of weeks and months – will your brain change sufficiently for the improvement in ability to become noticeable.

But brains don't only adapt to accommodate good behaviours, they adapt to perform *any* regularly repeated behaviour; without even thinking about it. Whether it is something useful like safely steering a car whilst your attention is consumed by an absorbing radio show, or not-so-helpful like helping yourself to that second slice of cake, your behaviour is largely controlled by a brain operating on autopilot, for better or for worse.

The aim of this book is to inspire you to consider the tremendous impact that neuroplasticity – your brain's ability to physically change to deal with any circumstances – can have on your behaviour. Current beliefs and behaviours were formed according to past events and notions regularly encountered in your daily life prior to now. Future beliefs and behaviours will be formed according to whatever thoughts, people and places you *choose* to regularly and intensely engage with from here on. Your brain is constantly upgrading and downgrading its circuits inside your head, every single day for better or for worse.

By giving people a clearer understanding of how their own brains work and by changing the common but false perception that you “can't teach an old dog new tricks,” the main objective of this book is to harness the revelation that, throughout adulthood, we can fundamentally change the very fabric of our brains. As a result, we can subtly alter our habitual behaviours, beliefs, motivations and, eventually, bring about profound positive change. This book will provide you with a wide range of simple brain-enhancing tools and practical tips to do just that.

# Introduction

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Many people have a burning desire to be successful, some even have the know-how; and for those who don't there are literally thousands of self-help books out there, telling them how.

Yet, despite tsunamis of ambition and an abundant supply of well-meant advice, only a few people achieve real success and even fewer manage to maintain it.

The main reason is that despite being the most sophisticated piece of bio-wetware in the known universe, capable of running the most phenomenally complex software, your brain doesn't come with a user guide.

Incredibly, billions of people spend their lives scurrying around, all revved up, trying to get somewhere and devouring volumes of information on self-improvement. But they don't have a clue about the engine under their bonnet, its profound capabilities, or how best to use it.

In other words, they – as captain of the ship – may have all the drive, passion and heart's desire in the world to set and maintain a particular course, but if the engine room can't deliver, they'll be left wanting, drifting in the doldrums of success.

Most take their brain for granted, some even forget it exists, others spend hours at the gym working away on the bodywork, but only a few realize – that with a basic understanding and a small amount of care – just how much more they can get out of themselves.

In this book, we will help you to get a better understanding of how our brains work and explore ways of consistently getting more out of them. The eye-opening findings will explain the basic needs of our own – often idling but potentially brilliant – high-performance engines and, hopefully, help you achieve more from yours.

## **A bit about us**

We first met in January 2011 when we were both speaking at a conference in Tenerife. The theme of the event was “Are You Ready?” Our task was not only to inspire those attending but also to offer useful guidance to help them as a team be prepared for the tough challenges that lay ahead and enable them to capitalize on any opportunities heading their way.

As two very different people we found ourselves working together to deliver the same messages but from completely different angles. It was then that we realized just how impactful our combined knowledge could be, and what a difference it could make.

## **Where Adrian's coming from**

As a motivational business speaker I'd like to think that I am a highly motivated person, I'd be in the

wrong job if I wasn't! I'd also like to think, having written self-help books, that I have a fairly good idea of what it takes to be successful.

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However, despite being a reasonably fit, fairly intelligent and relatively successful person with bags of self drive and years of practical experience, especially when it comes to developing winning attitudes, I was keen to find out more about the hardware that supports the software – the engine that runs my mind.

I wanted to know more about my own brain, learn how to help it be even more productive and hopefully keep it in full working order for many more years to come.

Like you, I live in the real world. I run around at what often feels like a thousand miles an hour juggling family, work and social commitments. There are times when, even as a motivational speaker, I feel a bit run down – especially when doing a lot of travelling. The gym can at times be very unappealing; and with my batteries running low I don't always feel as mentally sharp as I'd like to be.

As a writer I sometimes find it hard to be as creative as I know I can be, and despite having clear goals it's difficult to consistently stay focused. On top of all this, when I do get to spend time with the most important people in my life, my family, it can be a struggle some days to unwind; my overworked brain just doesn't seem to want to stop revving!

As an everyday person I wasn't under any illusion that overnight I'd suddenly gain the combined planet-sized intellectual skills of a mathematical genius, the creativity of a Renaissance master and the single-mindedness of an Olympic athlete. I just wanted to sharpen up a little, consistently have more energy, hopefully stay focused for longer, be a touch more creative and enjoy quality time with my family. At the end of the day, I just wanted to make the most of the one I've got.

As a lifelong learner I'm not ashamed to accept all the help I can get, so I decided to team up with TV's favourite neuroscientist, Dr Jack Lewis, to see just how much of an improvement I could make in my own brain. I'm pleased to report that his practical advice has had an extremely positive effect, and I have already noticed a tangible difference in my brain's performance.

As we progress through this book together and look at ways of optimizing the capabilities of brain, Jack and I are going to share with you all the practical advice that he had to offer me and, at the same time, draw on our diverse experiences to give you some helpful suggestions about how you too could improve the performance of your brain. Hopefully you'll take them on board, start using them and see what a difference they make to you.

*For more information about Adrian – please visit: [www.adrianwebster.com](http://www.adrianwebster.com) or [@polarbearpirate](https://twitter.com/polarbearpirate)*

## **Where Jack's coming from**

At school I found biology absolutely fascinating and pursued this passion into the realms of neurobiology. I eventually ended up in Germany where I carried out post-doctoral research on the

edge of the Black Forest, using cutting-edge fMRI (functional Magnetic Resonance Imaging) scanning technology to plumb the depths of the human brain. Yet, since starting my PhD at University College London five years earlier, I had begun to feel increasingly frustrated. The neuroscience literature was brimming with fascinating revelations about the mysterious organ between our ears, and it seemed clear to me that these could genuinely help everyday people to better understand their own behavior and that of those around them. But the only people that appeared to be reading it were geeks like me and I felt that the rest of the world was missing out on something really valuable.

Thousands of experiments were accumulating every year, providing snapshots of how our brains sense the world around us, think, feel and make decisions – in a manner that, throughout human history, was previously unknown or completely misunderstood. All of these invaluable insights into our humanity were locked up inside pay-per-view academic journals from which only rigorously trained researchers could extract any meaning from the dense scientific jargon.

I have presented brain-related insights to millions of viewers across the world via the BBC, ITV, Channel 4, Sky, National Geographic, Discovery, TLC, Teacher's TV and even MTV! I have always had a burning desire to write a book that explains to “everyday” people (that's what I call non-scientists) how their brain works but I'd never found the right time to do this. That is until I spoke at the conference in Tenerife and the world of neuroscience merged with the world of motivation to cut through complex theory, and pass on compelling, much needed information to *everyday* people.

***For more information about Jack – please visit: [www.drjack.co.uk](http://www.drjack.co.uk) or tweet [@drjacklewis](https://twitter.com/drjacklewis)***

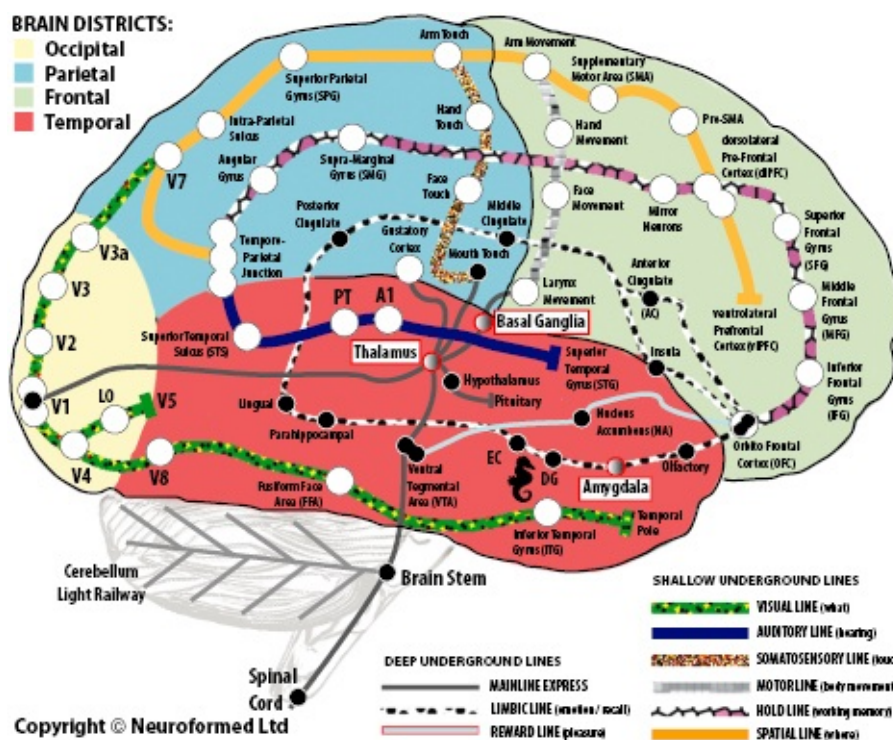


# Your Amazing Brain

The word “amazing” seems to be used pretty loosely these days to describe a lot of things, many which often turn out to be disappointingly mediocre; but in the case of your brain there is no other word that comes close to describing it.

This pink coloured, wrinkled lump of pulsating wetware, with a texture not dissimilar to blancmange is composed of around 85% fat and weighs in at around 1.5 kg. It contains a densely woven meshwork of 86 billion brain wires along with a further 86 billion support cells, all neatly packed away between your ears. It is *truly* amazing.

As the ultimate supercomputer, your brain is currently light years ahead of anything that man has so far managed to create. It works relentlessly, non-stop around the clock, continuously reshaping and adapting our skills and behaviours to suit an almost infinite variety of different real and potential future circumstances. Receiving and delivering data, analyzing information, performing complex multifunctional tasks in parallel and monitoring billions of functions; all at breathtaking speed. Its capabilities are quite staggering.



## But when it comes to performance, what does your brain look like?

The map in the illustration above shows some of the main stops on the underground system that your very own brain. There would be no benefit in overloading you with unnecessary information by talking about every area of your brain, but it would be useful to start by pointing out three key areas that are most relevant to what we'll be discussing in this book.

You may be wondering why there is a seahorse in the illustration. The Hippocampus includes the DG (Dentate Gyrus) and EC (Entorhinal Cortex) tube stops on the lower part of the Limbic Line,

particularly dense area of networked brain wires that is interconnected with virtually every other part of your brain.

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This part of your brain plays three key roles:

1. It helps you keep track of where you are in space – a basic GPS system that gives you a sense of where you are and how to get where you're going.
2. It enables you to create and recall memories of events and pieces of information.
3. It's even vital for the ability to imagine the future!

These two functions are closely related, as many of our memories of life events are closely intertwined with the places in which they were experienced. That way, when you return to that place the relevant memories are triggered. Hence a visit to your old primary school can trigger a surge of long forgotten memories. In reality the Hippocampus cluster of tube stops in your brain is deep under the surface, at the core of your Temporal Lobe, which runs from behind your ear to behind your temples (hence the name).

### Why a seahorse?

If your brain's Hippocampus was surgically removed from the core of your Temporal Lobe, it would actually look very much like a seahorse; indeed Hippocampus actually means “horse” (hippo) – “sea monster” (campus) in ancient Greek.

Just to the right of the DG you'll find the Amygdala tube stop. This ever-alert brain area is responsible for, amongst other roles, generating various emotions, and constantly monitoring the sensory information spilling in from your surroundings for signs of potential danger. Like a military listening post for your brain, it is forever looking out for possible serious threats, always primed and ready to push the “fear response button” the split second one is detected. This is the part of your brain that within less than a crotchet of time, having heard a loud bang or having spotted a rapidly approaching incoming object causes you to freeze in your tracks or duck out of the way – before you are even fully aware of it. With your heart now pounding and your muscles flooded with blood, you're all set and ready for a confrontation or a hasty exit.

Just above the Amygdala tube stop is the Reward Line that passes deep through the very centre of your brain. It evolved to produce pleasure whenever you engage in behaviours that promote the survival of our species i.e. eating, drinking and having sex. Known collectively as the reward pathways – the VTA (or Ventral Tegmental Area), NA (Nucleus Accumbens) and OFC (Orbitofrontal Cortex) stops are also critical to decision making. As well as enabling us to feel pleasure in any given moment, the NA stop provides a reward-based prediction built around how much pleasure or benefit is likely to be derived from choosing one particular option over another. This means that not only are they instrumental in directing every single decision we ever make, they are also fundamental to the learning process. Without the reward system we would never learn from any of our mistakes.

To help give you a clearer perspective of what we're looking at here, the London Underground can, at this moment in time, proudly boast a combined track length of 250 miles, with tube trains travelling

around between 270 stations at a top speed of up to 70 mph.



There are more connections between brain wires in your head than there are stars in our Galaxy – 0.15 quadrillion.

If all your brain wires were laid out end to end, they would be approximately 100,000 miles in length with hundreds of thousands of trillions of trains all travelling up and down, bang on time, at up to 25 miles per hour between 1,000 trillion connections; or synapses as they are known to science. And, all these wires – the white matter of your brain – were laid out as an underground train network would cover an area of 561,476 square miles, a surface area greater than that of South Africa, all tucked into a space smaller than your average pumpkin.

***But what really makes the human brain so very special is NEUROPLASTICITY. Its ability to continuously change, learn and, perhaps even more importantly, its ability to adapt to unexpected and widely varying circumstances in new and creative ways.***

Your brain can send up to one hundred, thousand, trillion messages per second using only the same amount of power as your average fridge light bulb. For a man-made supercomputer to send and receive that many messages per second it would require its own small hydroelectric power plant to provide the 10,000,000 watts needed to power it. Less than a litre of blood passing every minute through the brain of chess grandmaster Garry Kasparov was sufficient to keep his forehead cool to the touch, whilst his opponent – the IBM super computer Deep Blue – needed a fan-driven cooling system to prevent it from blowing up.

## Taxi!

Fresh challenges bring about physical changes to your brain. The drivers of London's famous black cabs spend years learning “The Knowledge,” a seemingly indigestible mountain of information to commit to memory by anyone's standards. Included in it are the whereabouts of 25,000 streets along with 20,000 places of interest that at any time a fare-paying passenger, having hopped into the back of their cab, may ask to go to. During this period of exhaustive information ingestion, the Hippocampi of these determined wannabe cabbies physically grow larger due to all of the extra connections required to retain all that information – only to return to their normal size after retirement. It really is a case of use it or lose it!

What this shows is that your brain not only adapts to take on new challenges, it physically restructures itself to meet them. As yet, there is no computer capable of reconfiguring in this way to cope with new demands asked of it. Not bad for a design that first appeared on the scene back in the Stone Age, and which still out-competes the most complex systems of the modern age – well, for the moment anyway!





When we sleep our brain cells shrink to allow cerebrospinal fluid to seep into the gaps to wash away the metabolic waste that accumulates each and every day.

It doesn't come with a guarantee or any warranties, but if you look after your brain, it should remain fully functional and in good working order throughout your entire lifetime. And, if you're ever worried about running out of memory space, please don't! You'll be relieved to hear that it comes with the equivalent memory space of a one million gigabyte chip. That's enough memory to record over three million hours' worth of your favourite TV programmes.

Your brain is a phenomenal, unimaginably brilliant piece of kit and, please note, the emphasis on your brain – we all have the same make and model. Provided you are of this planet, that you are a human being, and your name isn't Albert Einstein, there would have been very little difference between the brain that you had and the brain the person sat next to you had when you both started out in life.



During early pregnancy 250,000 new neurons are born in the fetal brain every minute.

Yours may be the same make and model but when it comes to shaping your brain and differentiating it's individual performance from that of others, there are three very big influencing factors:

1. The environments that you spend most of your time interacting with
2. What you are exposed to in those environments
3. What your time in those environments is actually spent doing

Yes, our brains are all amazing but it is how we have made use of our brains over our lifetime so far that makes them so very different. More importantly, when it comes down to performance, it's what we now choose to do with them from here on that will determine just how well they continue to serve us in dealing with the daily demands of our own lifestyle.

# Flying Start

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There are a few things that you could start doing right now to instantly improve your brain performance and get you off to a flying start. Let's call them Brain Optimization Tips, or BOPs for short. You can follow these simple suggestions to get your brain firing on all cylinders each and every day. Here are five for starters:

## **BOP1: Water – Start every single day by rehydrating your brain**

Believe it or not your brain is 73% water. The efficiency with which it can send electrical messages around the 100,000 miles of brain wires is compromised when you are dehydrated. The trouble is you wake up slightly dehydrated every single day. How do we know this? Well, if you managed to survive the night then you can't have stopped breathing. The reason that breathing is absolutely vital when it comes to staying alive is because this is the only way you can get oxygen into your body and carbon dioxide out. In order for your lungs to get these gases moving in and out of your bloodstream successfully they must be moist. But that means that upon every exhalation, we release a little bit of water vapour. This of course happens all day and night, but during the daytime we replace the lost water whenever hunger or thirst motivates us to eat or drink. During the night there are fewer, if any, opportunities to replace this lost water; and so by morning time there is inevitably an imbalance which needs to be corrected.

***BOP1: Drink a small glass of water the moment you wake up in the morning and make sure you stay well hydrated throughout the day – for your brain's sake.***

## **BOP2: Exercise – Vital for brain health (and holding onto your marbles)**

Exercise is well known to be good for the body but everyone overlooks its immense impact on the health of your brain. In the short term, the moment you start to do any form of even moderate to demanding exercise, your body automatically responds by releasing a torrent of hormones and brain chemicals that make you feel good. Even more importantly, an ever-increasing body of evidence suggests that people who take regular exercise enjoy better brain function for longer. It actually increases the rate at which new brain cells are created in the Hippocampus. It's more important than any other factor in helping people to hold onto their marbles well into old age.

***BOP2: Do a minimum of 20 mins moderate to intense exercise, every other day.***

## **BOP3: Stress – Control your cortisol to manage your stress**

Cortisol is an extremely important hormone that is released in your body in response to the problems of everyday life. It is responsible for making you feel “stressed out,” yet it is most definitely a friend and not a foe. We can all be agreed on the fact that feeling stressed is certainly not one of life's most pleasant experiences. But nonetheless, cortisol is a vital part of any happy, successful life. It helps us to get things done.

If cortisol did not make us feel uncomfortable we would lack the impetus to act. Not only that, but cortisol actually mobilizes body and brain to deal with life's daily stresses. It increases metabolism so that more physical and mental energy is available to deal with the problem. It puts the brain in an uncomfortable emotional state because we humans are fundamentally lazy – working hard only to remove discomfort and/or to gain greater comfort.

There is a natural daily rhythm to the release of cortisol ensuring that we are keyed up during the daytime and winding down towards bedtime. Bad news triggers a boost of cortisol to mobilize the extra resources required to help eliminate the problem.

So, stress is good but *chronic* stress is most definitely bad. This is because in order to help you deal with life's major challenges cortisol suppresses the immune system. This enables us to postpone feeling ill – which forces us to rest, directing energy and resources into fighting off the bugs – until the stressful situation has passed by or been resolved. Chronic stress describes a situation where cortisol levels remain high for many weeks and months, meaning that body and brain never get the chance to repair and fight disease. Whilst it is virtually impossible to remove the sources of stress in life there are several things you can do to reduce cortisol levels using the power of thought alone.

***BOP3: Manage stress by proactively setting aside GOM Time (see All Aboard the Stress Express chapter), clinically proven to reduce cortisol levels.***

## **BOP4: Sunshine – Soak up the sun's rays to stabilize your mood**

When ultraviolet (UV) light strikes the skin the human body can make vitamin D. Vitamin D is used in the brain to make a very important brain chemical called serotonin. Serotonin is crucial because it is involved in a wide variety of brain pathways including those involved in mood regulation. The most widely prescribed class of medications for depression are those that increase levels of serotonin. For instance, SSRIs (selective serotonin reuptake inhibitors) like Prozac work by slowing down the rate at which any serotonin that has been released into your brain's synapses gets removed. By keeping serotonin levels up, mood improvement is also kept on the up. Ecstasy, aka MDMA (3,4-methylenedioxy-N-methamphetamine), is very popular amongst recreational drug users, and also increases levels of serotonin in the brain. However, rather than just blocking the reuptake of serotonin like SSRIs do, it also triggers a massive increase in the release of serotonin into the synapse

connection between one brain wire and the next) – leading to feelings of intense pleasure and empathy with others.

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Your skin weighs three times as much as your brain.

Rather than meddling with the release and/or reuptake of serotonin, getting your skin in direct sunlight every day will ensure there's a plentiful supply of serotonin readily available for your brain to regulate your mood more effectively. Bear in mind that your motivation to go out of your way to do this should fluctuate with the seasons. As the days get shorter the likelihood that you will not be getting enough UV to keep your serotonin levels topped up increases and so you should be more vigilant in getting into the daylight. Don't be put off by cloudy days, although cloud cover cuts out a large proportion of the visible light, making it seem a bit gloomy compared to when the sun is out, the strength of UV light is not diminished to the same degree. This is why you can still get a nasty sunburn on the beach even when it is overcast.

***BOP4: Get your skin in daylight for at least 5–15 mins every day.***

## **BOP5: Caffeine – Good for your brain in many ways, in moderation**

It is estimated that more than 50% of the world's adult population consume caffeine on a daily basis. That's despite us all having heard at some time or other that coffee is bad for our health. Rumours have also circulated to suggest that coffee does not actually wake us up. So what's the story? Recent scientific evidence indicates that if you regularly drink tea or coffee then the active ingredients do indeed wake you up, but only to the levels that people who have never touched a drop in their lives enjoy every single day! But don't let this put you off – there are other brain benefits that have only recently been unveiled.

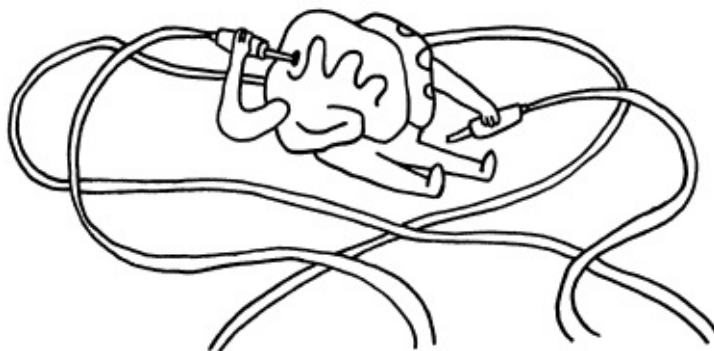
***BOP5: Moderate consumption of caffeinated beverages is actually good for your brain.***

# Old Dogs, New Tricks

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## Rewiring needed

New skills don't come easy when first attempted but, with a bit of dedication, the early signs of improvements soon become apparent as we start to get into the swing of things. Eventually, what once felt completely alien becomes as easy as a walk in the park.



Why? Because your brain has invested sufficient resources in rewiring the pathways involved in executing that task. The key is to not lose faith when the early improvements start to taper off. Instead, you must keep pressing on. By doing so – and continuing to challenge your brain – it will continue to invest resources in improving communication between brain areas involved in whatever skill you are practising. This, for most of us, is easier said than done. As kids we were constantly confronted with having to try new things on a daily basis and so struggling with new challenges was normal everyday experience. As adults, however, we are drawn by a natural instinct to seek comfort in behaviours that we know we are good at. As a result, we become less inclined to try new things that have the potential to make us feel like a failure. However, those who do trust their brains to adapt to any regularly encountered challenge and embrace the opportunity to try new things will inevitably continue to expand and develop their abilities.

As a child you were told by certain people who were most influential to you – parents, older relatives, teachers and peers – that you were good at some things and not so good at others. The themes that you regularly heard not only shaped your beliefs but also profoundly influenced the environments and tasks you chose to dedicate time to – the ones you became best adapted to – and the ones you tried to avoid.

If a teacher led you to believe that you were hopeless at maths then a self-fulfilling prophecy would be born. You would never again greet the prospect of having to do maths with any great relish. The shortfall in enthusiasm would result in you not trying; and a lack of effort would mean that your brain wouldn't be stretched and, as a result, unable to adapt. The inevitable poor results that followed would merely confirm your falsely held belief that you “cannot do” maths.

The exact opposite also applies, only this time in a self-propelling, upwards direction. If you really believed – because a figure of authority convinced you of your “inherent” talent – that you were good at maths, then of course you would be inspired to do more maths. The consequence of your newfound



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