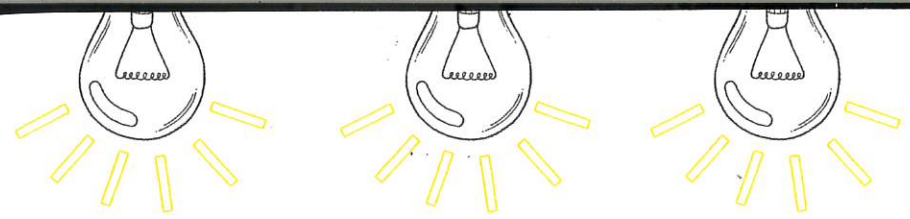




**YOUR
FANTASTIC,
ELASTIC
(& PLASTIC)
BRAIN**



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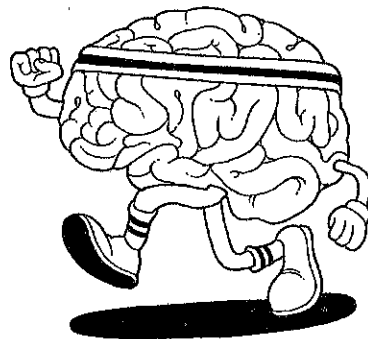
Some weird facts about your brain: (one weird fact is that I can't ever actually type the word 'brain' without making a mistake. I type 'Brian' and have to correct it. Every. Single. Time. And who is Brian anyway?)

BUT BACK TO THE POINT ...

- Your brain is more than 70 per cent water. Being dehydrated affects your concentration and memory (quick, get some water!).
- Your brain has about **100 billion** neurons.
- There are around 100,000 miles of blood vessels in the brain. If you untangled them all, they'd stretch nearly halfway to the Moon.
- The average person has about 60,000 thoughts every day.
- Your brain produces enough electricity to power a small lightbulb.
- **Sphenopalatine ganglioneuralgia** is the scientific term for brain freeze. Try saying that with an ice-cream headache!

But these facts are not even the most interesting things about the brain. There is something even more amazing, staggering and, dare I say it, **world changing**. This is relatively recent news even for the neuroscientists out there (perhaps one of them is called Brian?) so we really are at the cutting edge of science here.

The fact is, you can actually **train your brain**. Sort of take it to the gym, if you like. Make it stronger, and grow its capacity for learning new things.



Getting in shape usually means one thing, right? Physical fitness. The body really is an incredible thing. We can train it to be super-flexible or built for endurance sports, like marathons. Physically, our bodies are fully adaptable.

But it's also possible to **customise** your brain and get it in good shape – and fortunately, that doesn't involve spending hours in the gym ...

YOUR MARVELLOUS BRIAN BRAIN

Day after day, our brains are hard at work. They are Mission Control for every move we make, from blinking and breathing to walking and talking. Your brain might power down a bit at night, but even in sleep mode it is processing information and making sense of it.

But the brain is also a complex communication-centre. It's made up of billions of pathways that deliver signals to our central nervous system, which controls all activities in the body. These are called neural signals. Their job is to fire up every time we think, feel or do something. Some pathways are more active with signals than others. There are pathways in charge of basic functions that keep us alive, of course, but lots more are formed because we choose to DO certain things. From playing the guitar to learning lines for a school play, neural pathways take shape to deliver the signals we need to get that particular job done.

★
Play guitar

Sleep

This means we can shape up our brain just like we can shape up our body. Think of it as a mental muscle. If we put the brain through a fitness programme that helps to build neural pathways, we can mould it into something truly incredible. And the more we push ourselves, the more connections we make and the stronger they become.

★ Scientists have a name for this. Wait for it – it's called ...

Eat

NEURO PLASTICITY

GET CONNECTED

As well as being a table-tennis player, I'm a writer and **journalist**. I've been doing it for a long time. When I started writing, my table-tennis pathways were still very active. My chop loop shot across the table was pretty awesome. My 1,200-word article on the local football match, not so much.

But over time I have developed my writing skills. My brain (darn it! Again!) has adapted. I write better. And faster. I find the best words quicker and put them together more effectively. The more I have practised writing, the more **connections** I've grown to make me better at it. Sadly, though, my killer spin serve is not what it used to be.

Practise
Practise
Practise



But that's the thing with these pesky little neural connections. You have to use them or you lose them. They're fickle little things. They don't hang around if you're not paying them any attention. The more

Walk

you practise, the more they grow. If you stop practising, they're off. Gone. Sayonara. Au revoir. Start-from-scratchville. Think of taking a walk in a forest that no one has ever travelled through before. The first time you try, it will be pretty tricky. You probably won't leave much of a trail behind you and the plants will grow back quickly in your wake.

But if you keep walking the same route, day in, day out, then eventually you'll create a path. Making it easier to walk through the forest next time. Neural connections are the same. So, the more you **practise** maths questions (or skateboarding tricks, or level 53 of Minecraft), the stronger the connections become, making it easier the next time you try.

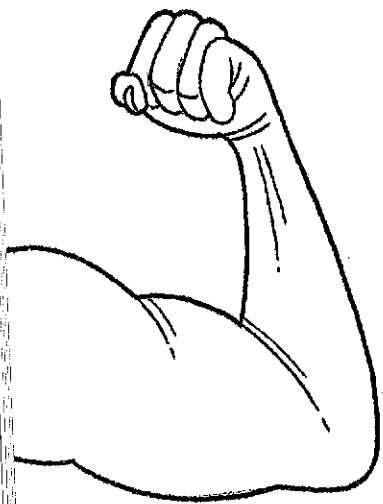
STRENGTH

GROW

'CONTINUOUS EFFORT

**- not strength or intelligence -
is the key to unlocking
our potential.'**

WINSTON CHURCHILL, WAR-TIME HERO,
PRIME MINISTER AND NATIONAL TREASURE



YOU'RE PROBABLY THINKING,
'What on EARTH has all this got to do with mindset?'

You thought you were getting a Growth Mindset and instead you're now thinking about a **WEIGHT-LIFTING** regime for the jelly-like stuff in your skull.

But, surely, this ability for the brain to physically change and create new connections is the very reason that having a Growth Mindset really works. It's proof that your ability isn't fixed at birth. If your brain actually grows when you practise, making things easier to achieve the next time, then it makes a whole lot of sense to start practising things.

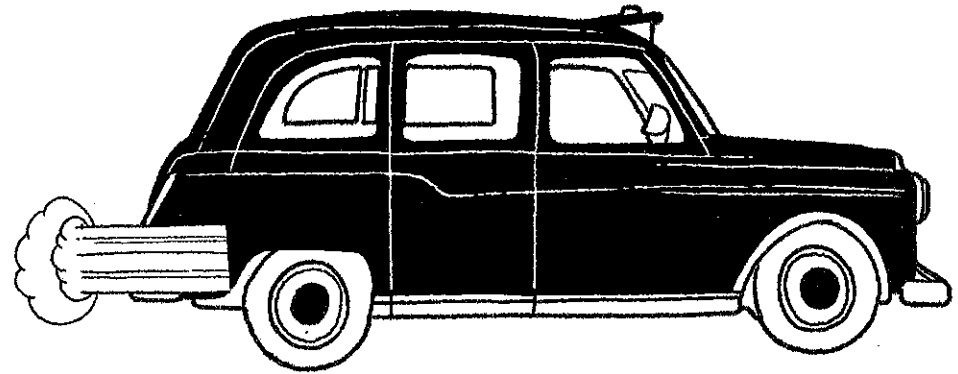
Now your brain isn't actually made from plastic, but it does share the same ability to be moulded and shaped. While we can't flatten it out or sculpt it into a model of the Eiffel Tower (just for example ...), we **CAN** re-set the pathways inside it to help us become **awesome** at something we really want to be good at.

If you need proof, then follow me as we jump inside the back of a taxi and stare at the driver's head. Why? Because something pretty awesome is happening in there ...

THE HUMAN SATNAV

London's black taxi cabs are famous all around the world. When you ask to be taken to an address on the other side of the capital, the driver will take the most efficient route there without getting lost or going in the wrong direction up a one-way street. How can they do this without looking at a map or a satnav? Because in order to earn your license to drive a black cab you need to pass an exam called ...

THE KNOWLEDGE



A black cab driver is expected to know about 25,000 streets in London, and thousands of landmarks. He or she also has to be able to drive there from any point in the capital without making a mistake. In The Knowledge exam, taxi drivers are asked to describe the routes they'd take between any places that the examiner might dream up. It's a huge mental undertaking, and requires several years of study before candidates are ready to take the exam. They put in tons of practice, which many hopefuls do by zipping around the streets on a scooter.

Amazingly, brain scans have shown that those who master the massive tangle of roads actually experience structural changes in their brains. They possess more **grey matter**, which is where mental processing takes place, compared to when they first set out on the streets. As they begin to make sense of the way the capital is connected, their brains build up new neural pathways to deal with the information required.

So, if you ever find yourself in a black cab, just think that the driver behind the wheel has worked hard at building his or her ...



Your brain has been specially designed to manage skills involving memory and visual processing. Your cabbie might not look exceptional, but watch them thread through the streets and you'll realise you're in the presence of a human satnav. That's an awesome feat of memory that takes masses of practice. It also goes to show just how adaptable the brain can be when it comes to helping you ...



STAND OUT FROM THE CROWD.



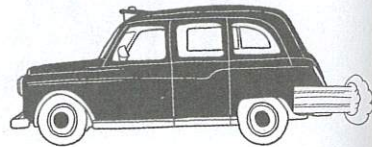
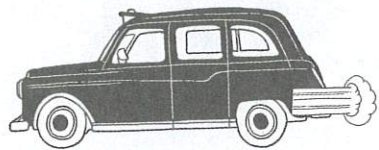
TAXI DRIVERS V BUS DRIVERS: THE MIND MATCH

In a similar piece of research, bus drivers were put under the spotlight with a brain scan.

Now, these men and women have to learn a lot of streets, too. But not as many as taxi drivers. And that's the crucial difference. After all, bus

drivers follow set routes and don't need to know every single part of the spaghetti-bolognaise-tangle of roads, streets, avenues and cul-de-sacs that go into making up London.

So, bus drivers' scans showed their brains had changed too, but here is the interesting bit: their brains hadn't changed as much as the taxi drivers' brains had. Why? Because it just isn't as tricky to be a bus driver. You don't need to learn so many street names. The practice isn't quite as challenging, so the bus drivers didn't need to build as many neural pathways in their brains as taxi drivers.



THE MORAL OF THIS STORY IS:

- The more challenging the practice, the more neural connections you build.
- Keep practising. Don't put down your maths homework early if you want to be good at it. If you do, those connections might start disappearing faster than your Uncle Pete's hair. You want your brilliant practice to mean something!

But you don't have to start from scratch. When it comes to shaping your brain to become awesome at stuff, just remember that you've already begun ...

OVER TO YOU:

YOUR WORST-CASE SCENARIO

Making everyday tasks harder is a great way of training your brain. Don't be afraid to be curious, try new things and never allow mistakes to put you off. Mistakes can actually help to grow your brain!

So ... can you think of ways to make your skate practice, or your maths homework or your dance rehearsal just that little bit trickier, to push you further?