CAN CHANGING YOUR BRAIN change your life?

DISCOVER HOW YOU CAN REWIRE AND RETRAIN YOUR BRAIN TO BECOME A SHARPER, SMARTER AND HAPPIER YOU

Just imagine if it were possible to turn your greatest weakness into your greatest strength. If you could rewire your brain to reverse ingrained personality traits from procrastination to pessimism and improve everything from your memory to your grasp of foreign languages. Well, not only do neuroscientists now believe this is possible, but they can show us how.

Positive thinking

Consider for a moment that everything we think, feel and do is governed by specific areas of our brain. So, if you pride yourself on your ambition and focus, you have probably got a strong prefrontal cortex (the part of the brain that helps us create and stick to goals). Alternatively, if you struggle to recall the story of a favourite book a few months after you've read it, this could be down to a weakness in your left temporal lobe (the part of the brain that governs memory for information).

However, thanks to advancements in neuroscience, we're no longer stuck with the neurological hand we've been dealt. By following specially developed exercises, we can correct brain weaknesses affecting anything from our mathematical ability to our moods. In her new book, *The Woman Who Changed Her Brain*, author Barbara Arrowsmith-Young explains how she used the principles of neuroplasticity to overcome her own severe learning disabilities, and describes how she now helps others do the same.

'What I've learned by doing this work for over 30 years is that just as our brain shapes us, we can shape our brain,' she says. 'And the really exciting thing is that it's never too late – a 74 year old makes the same progress as a 15 year old'.

Brain scans on London taxi drivers, for example – who have to learn and retain a detailed mental map of the city – showed they not only have a larger posterior hippocampus (the section of the brain governing navigation) than is typical, but that the area grows larger the longer they have been in the job. Another study on Buddhist monks found that during meditation, the monks had increased activity in their left prefrontal cortex (the area of the brain associated with happiness), which overpowered activity in the right prefrontal cortex (associated with negative moods). When the same study was carried out on novice monks, there was no such change, which suggests that, with practice, we can even rewire our brains to make ourselves happier.

> "JUST AS OUR BRAIN SHAPES US, WE CAN SHAPE OUR BRAIN – AND IT'S NEVER TOO LATE"

So how does it work? While it is, unfortunately, not yet possible to reverse brain disease, such as Alzheimer's, for the rest of us it simply takes targeted practice.

'You need to be working on your brain for at least 20 minutes, five times a week and pitching the difficulty level exactly right, so it's neither too easy, nor too hard,' says Arrowsmith-Young. 'And you need to gradually increase that level of difficulty as your brain improves.'

Here to stay

The great news is that, while it takes continuous work to make a change to the brain, once that change has been made, the gain is permanent – with everyday life providing the stimulation. 'I have tracked individuals 30 years after they did the Arrowsmith Programme and there is no loss of function,' says Arrowsmith-Young. 'The changed brain stays changed.'

So whether you want to boost your memory or your sense of direction, turn the page and get started now with one of five exclusive exercises developed by Arrowsmith-Young for *Top Santé* magazine. ➔

Forget wearing your heart on your sleeve, Claire's started wearing her brain on her head…

Rewire your brain to...

THE WOMAN WHO CHANGED HER BRAIN

Barbara Arrowsmith-Young, 60, overcame severe learning disabilities using brain exercises and now passes her expertise on to you.

Until I was 26, I lived in a dense fog. The logic of basic maths and the concept of telling time eluded me. In the playground, I couldn't follow the rules of simple games. I was always getting lost and constantly running into things. By the time I reached my teens, suicide seemed the only option.

What saved me was a book. When I was 25, I read the Aleksandr Romanovich Luria's *The Man With A Shattered World*, about a brain-damaged soldier. Reading about his journey, I realised that my learning disabilities were physical, each one rooted in a specific part of my brain. Using what I now understand to be an exceptional strength in my prefrontal cortex, the part of the brain that enables focus, I read and re-read Luria's book over and over and eventually I created my first brain exercise to help me tell the time. With nothing to lose, I did the exercise for up to 12 hours a day, dropping into bed exhausted.

What happened was nothing short of a miracle: not only did my ability to tell the time improve, but so did the related symptoms governed by this impaired part of my brain, such as my grasp of maths and logic. I was exhilarated. Encouraged, I went on to target other areas of my brain, radically increasing their functioning to normal and, in some cases, above normal levels. Since 1980, I've been using what I learned to help children with learning disabilities on the Arrowsmith Programme. We now train teachers in the US, Canada and Australia, and will hopefully extend to the UK and the rest of the world very soon.

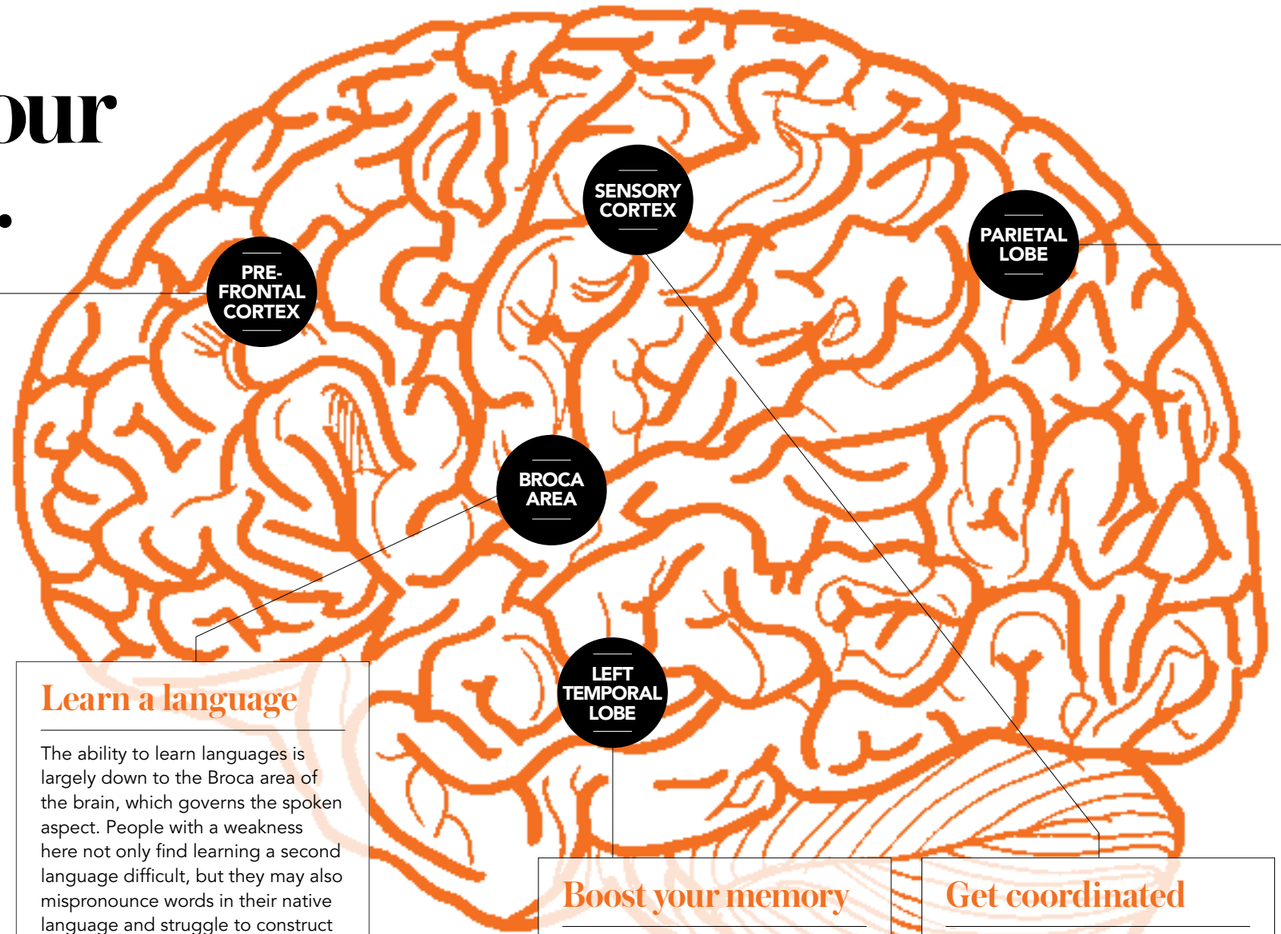
Stop procrastinating

This part of the brain is crucial to success in life. When an individual is described as ambitious, focused or driven, they're likely to have particular strength in this area of the brain. Someone with a weakness in this area, on the other hand, is likely to be disorganised and untidy – not because they're lazy, but because they have difficulty deciding what's critical and where to start. The tendency not to complete one task before starting another can lead to paralysis and what some consider a personality trait – procrastination.

EXERCISE Logic puzzles help get this part of the brain firing. Start with the classic river-crossing problem below. Write down each potential solution as you think of it, and analyse why it doesn't work. Keep going until you work out the correct answer. If you can't find a solution that works, you may need to enlist a friend to give you hints on how to solve it. Once you have mastered a problem, try another one, and increase the complexity of them as you get better at solving them. But make sure the puzzles you work with don't contain elements of maths because that would be working a different area of your brain.

Try this: a farmer must transport a fox, a goose and bag of beans across a river. He has a boat, but it's only big enough to hold the farmer plus one other thing. The fox will eat the goose if they're left alone and the goose will eat the beans if they're alone. How can he get all three across the river intact?*

This is easy: eins, zwei, drei…



Learn a language

The ability to learn languages is largely down to the Broca area of the brain, which governs the spoken aspect. People with a weakness here not only find learning a second language difficult, but they may also mispronounce words in their native language and struggle to construct arguments as they talk.

EXERCISE To wake up this part of the brain, you need to practise listening to and speaking another language – reading and writing won't do. Also, going to a weekly class won't be enough to make the difference – you must do it for 20 minutes a day, five days a week, ideally starting with a simpler language, such as Spanish or Italian. Try interactive CDs and computer programmes (michelthomas.com is a good one) or practise with a friend. The more you do it, the easier it will get. That's why people who master a second language find it easier to grasp more languages.

WORDS CLAIRE FOX. ILLUSTRATION ANTONELLA BORDONE. *THE WOMAN WHO CHANGED HER BRAIN* (£17.99, SQUARE PEG) IS AVAILABLE NOW. FOR INFORMATION ON THE ARROWSMITH PROGRAMME, VISIT ARROWSMITHSCHOOL.ORG

Boost your memory

Those with weak left temporal lobe function struggle to store facts, while those with a strength here may have an encyclopedic knowledge and are great at pub quizzes.

EXERCISE Memorising poems helps here. Start with short, simple, rhyming verse. Read it through, then commit it to memory line by line. When you're able to recite the full verse correctly the next day, add another verse or move on to a more complex poem. Increase complexity by choosing poems that don't rhyme and use unusual language. The aim isn't to build a memory bank of poems, but just to be able to recall each one, correctly, the next day. To get you started, try this verse from Wordsworth: 'Oft I had heard of Lucy Gray, and, when I crossed the wild, I chanced to see at break of day, the solitary child.'

Get coordinated

The somatosensory cortex (part of the sensory cortex) is responsible for muscle memory. People who have a strength here may take for granted the things they can do, such as touch-typing, playing sports and mastering musical instruments. But someone with a weakness in this area is more likely to be naturally clumsy, will often veer into the person they are walking with and will probably struggle to perfect the use of chopsticks.

EXERCISE Learning to dance will strengthen this part of the brain. Pick a type of dance you enjoy – it could be the foxtrot or your favourite pop routine. Start by learning a few steps. Once you master them, introduce new steps or add some complexity, perhaps by performing them backwards. To really isolate and work your muscle memory, perform steps with your eyes shut.

Be your own satnav

If you have a poor sense of direction and often lose things, it could be down to a weakness in the posterior parietal lobe area and hippocampus, which govern spatial reasoning and navigation. A weakness here can also make interior design difficult because of the need to be able to map out furniture in spaces.

EXERCISE Playing chess is the ideal workout to boost these areas of the brain, as it's part of an elaborate map-making exercise. The player has to ponder possible paths for each piece and every time a move is made, the map changes. After learning the basics of the game, play against the easy setting of a computer game. Before making any moves, plot the opponent's possible counter moves. Increase the difficulty as you improve.

ARROWSMITH-YOUNG'S *brain exercise rules*

1. You will need to spend at least 20 minutes per day, for five days a week, on one particular brain area to see results.
2. You should start to notice some improvement within about four months and significant improvement within 10.
3. The workout needs to be just on the edge of attainability: there should be mental strain required to complete the task but not so much that it would make mastery impossible.
4. The task or activity selected should have both novelty and complexity. If a task that was initially novel and required effort then becomes automatic, you'll need to add some complexity to increase demand on the brain. ◆

*ANSWER: THE MAN TAKES THE GOOSE ACROSS THE RIVER, LEAVING THE FOX WITH THE BEANS. HE THEN TAKES THE FOX ACROSS THE RIVER, AND TAKES THE GOOSE BACK IN THE BOAT WITH HIM. HE THEN SWITCHES THE GOOSE FOR THE BEANS AND TAKES THE BEANS TO THE OTHER SIDE OF THE RIVER, LEAVING THEM WITH THE FOX, WHILE HE GOES BACK FOR THE GOOSE.