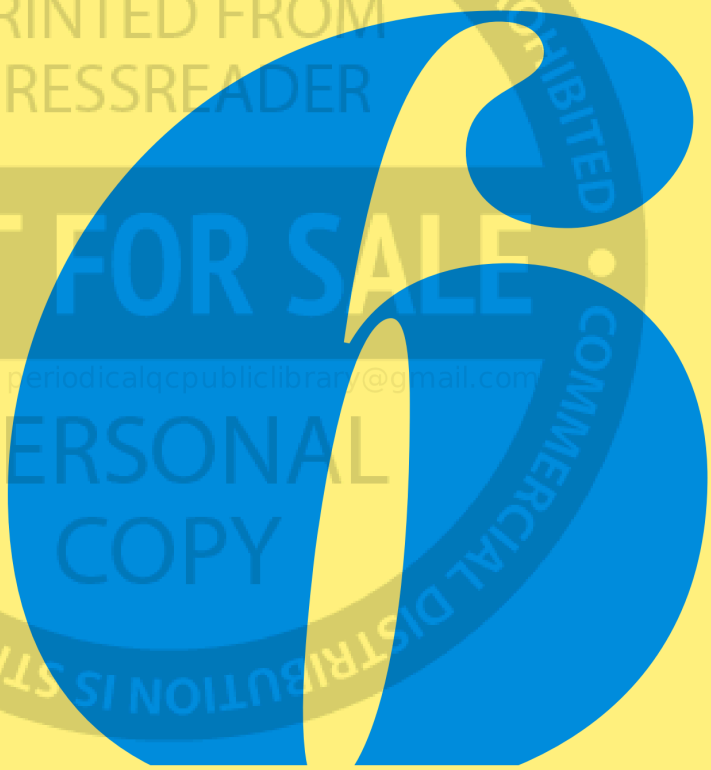
- Memory



SCIENCE-BACKED WAYS TO IMPROVE YOUR MEMORY

BY DR CHRISTIAN JARRETT

Forgetfulness doesn't have to be an inevitable part of life. Like going to the gym to stay fit, there are habits you can adopt to keep your memory sharp

ILLUSTRATION: GRACE RUSSELL

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Memory is the gift that guides us through life – from finding our way around to recognising our family and friends. We rely on our memories to maintain the story of who we are, allowing us to lead coherent, meaningful lives. "No memory means no rudder with which to navigate life," says Dr Kailas Roberts, a psychiatrist and author of *Mind Your Brain*. Given the immense value your memory holds, it makes sense to nurture, aid and protect it.

At a basic neurological level, your memories reside in the connections between neurons – in your synapses, of which you have hundreds of trillions. So it's not that your brain lacks the capacity to remember everything (researchers have found that, on average, ordinary people remember about 5,000 faces, which is plenty). It's more that lots of things you might want to remember don't make it into your long-term memory in the first place.

The good news is there's a range of techniques you can use to shift information from your brain's short-term cache to its long-term archive. In neurological terms, this involves processing them in the brain's hippocampus before they're distributed across the neocortex.

The even better news is that using these techniques – along with looking after your memory and overall health – can help keep it stronger for longer. Like any organic system, the brain undergoes cellular and chemical changes over time that can affect function and, in worst-case scenarios, can develop into dementia. Staying healthy by eating well, exercising and getting good sleep can help, but there are also some more unusual things you can do to give your memory a boost...

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1 PRACTISE ACTIVE RECALL



Whether it's a shopping list or vocab sheet, when you're trying to get information to stick, it's tempting to read it over and over. Countless studies have shown this is ineffective. It's far better to review the material and then try to recall it, for instance by attempting to reproduce it or having a friend test you. This is known as active recall or retrieval practice.

The act of trying to recreate the information helps strengthen the relevant neural pathways in your brain. "Retrieval practice is... a way to give the brain cues that tell it that information is likely to be important in the future," says Elizabeth Kensinger, Professor of Psychology and Neuroscience at Boston College. Testing yourself this way also highlights what you can and can't recall, so you can devote more attention to the things you're struggling to remember.

The timing of when to revisit the material is crucial, though. Repeatedly studying the same material in one sitting is called 'overlearning', which isn't much use. It's far better to wait and revisit the material after a delay.

How much of a delay depends on when you want your memory to be at its best. Cognitive psychologists recommend revisiting after 30 per cent of the time you wish your memory to peak. So if you have a test in 30 days, aim to restudy and re-test yourself on the material in about 10 days' time.

There are also benefits to pre-testing – quizzing yourself on the material before you've actually studied it. Many studies have shown it can boost your later memory of the material. Psychologists are still nailing down the precise mechanisms behind pre-testing's benefits, but it's thought to partly be due to the way the initial questions spike your curiosity and guide your attention when you later memorise the information.

So the next time you have something to memorise, try this: quiz yourself on how much you know already, then study and review the material and test yourself on it again, then, schedule a follow-up study and re-test session using the 30-per-cent rule.

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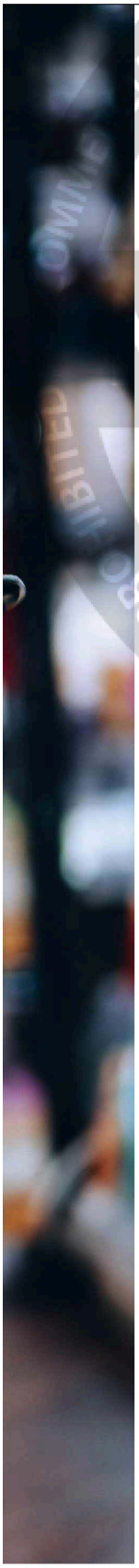

2 USE A MIND PALACE



If there's a list of things you need to remember in the correct order, a powerful technique for doing so is known as a 'mind palace' or the 'method of loci'. It works like this: as you review each item you need to remember, convert it into a meaningful image and mentally place it in a specific location along a route you know well from real life. It could be a route through your home or the one you follow to work. Once you've placed the items, you just need to imagine yourself walking along the route to see where each one is to recall everything in order. Your powerful spatial memory should support your recall of any harder-to-remember items.

"The mind palace combines three things that the hippocampus prioritises," says Kensinger. "It relies on a spatial map and navigation, on mental imagery, and on the creation and retrieval of associations. This combination makes it a particularly powerful mnemonic device."

If you want to get even more advanced you can merge images, combining multiple elements into a single, more vivid memory. Memory champions, like Joshua Foer, have used this technique to memorise the order of a shuffled deck of cards in minutes.

You could use this technique to help you remember information in a speech or revise for an exam. "In my memory clinic, it's a technique that's taught... to improve the ability of those with memory difficulties to manage day-to-day life," says psychiatrist Dr Kailas Roberts. "These familiar places are less prone to erosion than more short-term memories and so anchoring the latter with the former can be very helpful."



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3 MAKE YOURSELF LAUGH

In the 1970s researchers showed the benefit of humour in lectures – students better remembered the same material when it was presented in a funny lecture compared to a serious one. But it only worked when the humour related to the information, suggesting that the advantage stems from how it leads us to pay more attention to the material.

According to Prof Shelia Kennison, an expert on the cognitive effects of humour, when memories are encoded "physiological arousal increases when we experience a strong humour response. The brain changes occur because the humorous content is usually a bit surprising, unexpected and then funny, which leads to a pleasure response involving dopamine and the pleasure centres of the brain." In other words, when you find something funny it prompts mental and neurochemical changes that make it more likely you'll remember the material later.

To take advantage of this effect, aim to see the funny side of anything you're trying to remember. Experiment with amusing acronyms, convert any material you want to remember into humorous mental images or give funny names to the items on your shopping list.

4 DITCH YOUR SAT-NAV

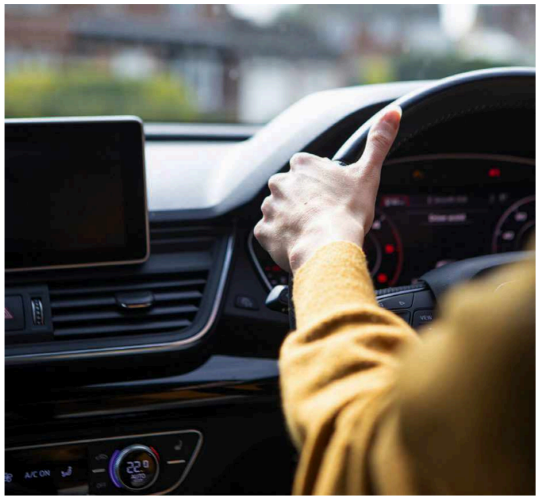
One change you can make to help protect your memory is to stop relying so much on sat-nav. Growing evidence suggests that habitually using sat-nav, rather than your own sense of direction, diminishes your spatial memory abilities over time.

A study by researchers at McGill University tested the spatial memory of 50 drivers who varied in how much they used sat-nav. In one task they had to remember the location of objects in a virtual maze. The drivers who relied on sat-nav more performed worse at this and in other tests that rely on the hippocampus (the brain structure that's key to memory and learning).

The researchers retested some of the participants a few years later and these results suggested greater use of sat-nav harms spatial memory, rather than people with poorer spatial memories being more likely to use sat-nav.

Findings like these suggest if you rely heavily on sat-nav, not only will it affect your ability to find your way around without tech, but that you'll also be at a disadvantage using techniques that rely on spatial memory, such as the memory palace.

The good news is that your spatial memory is highly adaptable depending on how much you use it. If you make a commitment to rely more often on your own navigation skills, then you can rebuild your spatial memory abilities. It might be daunting to ditch the sat-nav for long journeys, but you could start small by trying to resist using tech when finding your way around your local area.



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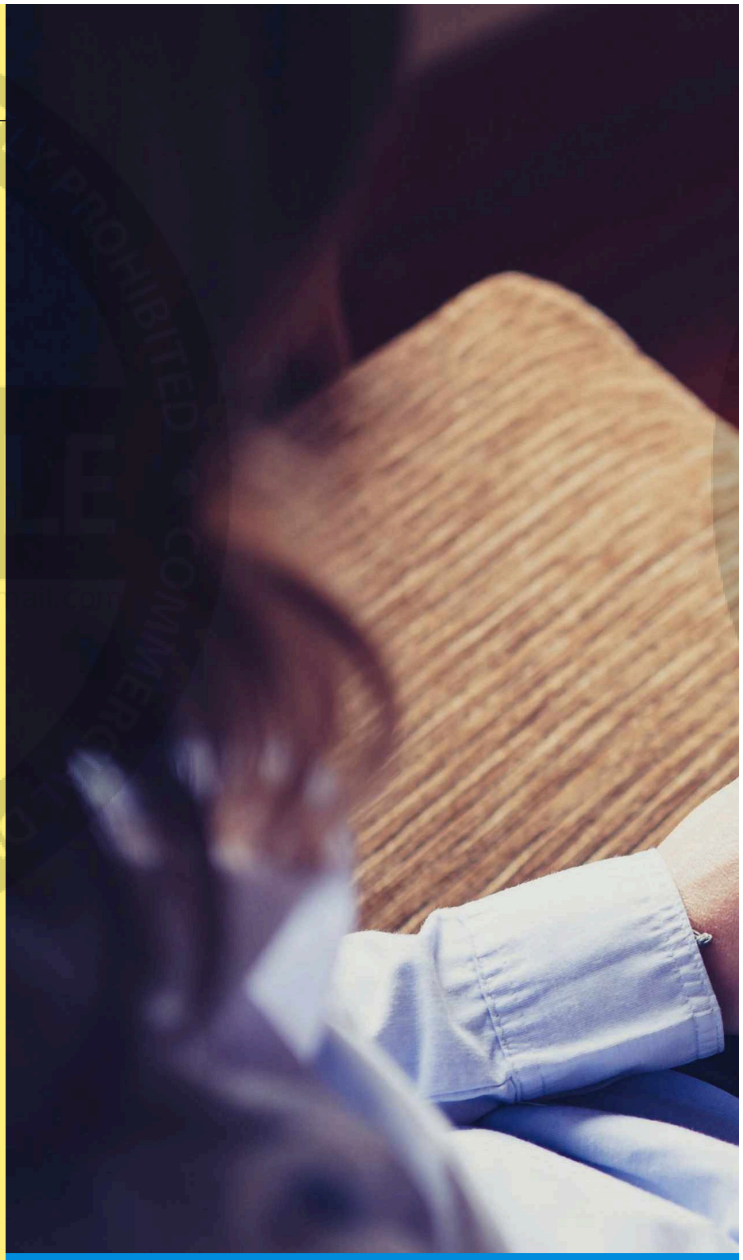

5 LEARN A LANGUAGE (OR ANY NEW SKILL)

You needn't stop at learning to navigate without your sat-nav – research shows that picking up new skills more broadly supports memory, helping to strengthen what's known as your 'cognitive reserve'. This is a kind of protective intellectual resource that allows your brain to keep functioning even when it's affected by ageing or illness. "We should be doing things that



are unfamiliar – these seem particularly effective at promoting new neuronal circuitry that might allow us to function at a higher level even when pathology affects the brain structure," says Roberts. One place to start could be learning a new language.

Distinguished Research Professor of Psychology at York University, Ellen Bialystok has conducted many studies showing that being bilingual can protect against the risk of developing dementia. One paper published in 2007 showed that older bilingual participants developed symptoms of dementia on average four years later than their monolingual peers. This is likely because managing multiple languages strengthens the executive control networks in your prefrontal cortex – the same brain networks that support working memory and attention.

Bialystok cautions that learning a second language later in life isn't the same as being bilingual, which typically means growing up with two native languages. That said, she has also conducted research showing preliminary benefits of later language learning. For example, a study from 2021 showed that after 16 weeks of using a language-learning app, older adults benefited from various cognitive gains, such as 'executive function' (the ability to pay attention to what matters) and working memory accuracy (effectively juggling information in short-term memory).

"If there is an effect," Bialystok says, "it's not because learning another language in older age makes you bilingual, but because learning a language is a difficult, engaging, stimulating activity and those things improve brain function."

If you don't like the idea of learning a new language, there are alternatives. The thing to bear in mind is to choose an intellectual or learning task that's challenging. Anything from learning new card games to a musical instrument should do the trick.

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6 GET SOCIABLE

Another important way to nourish and protect your memory is to socialise more often. It's probably the most natural form of brain training available.

A study published in 2020 followed thousands of middle-aged and older participants over several years. Those who engaged in more social activities showed less mental decline. The more different social activities they engaged in – such as seeing friends, volunteering, attending clubs – the greater the apparent protective effect.

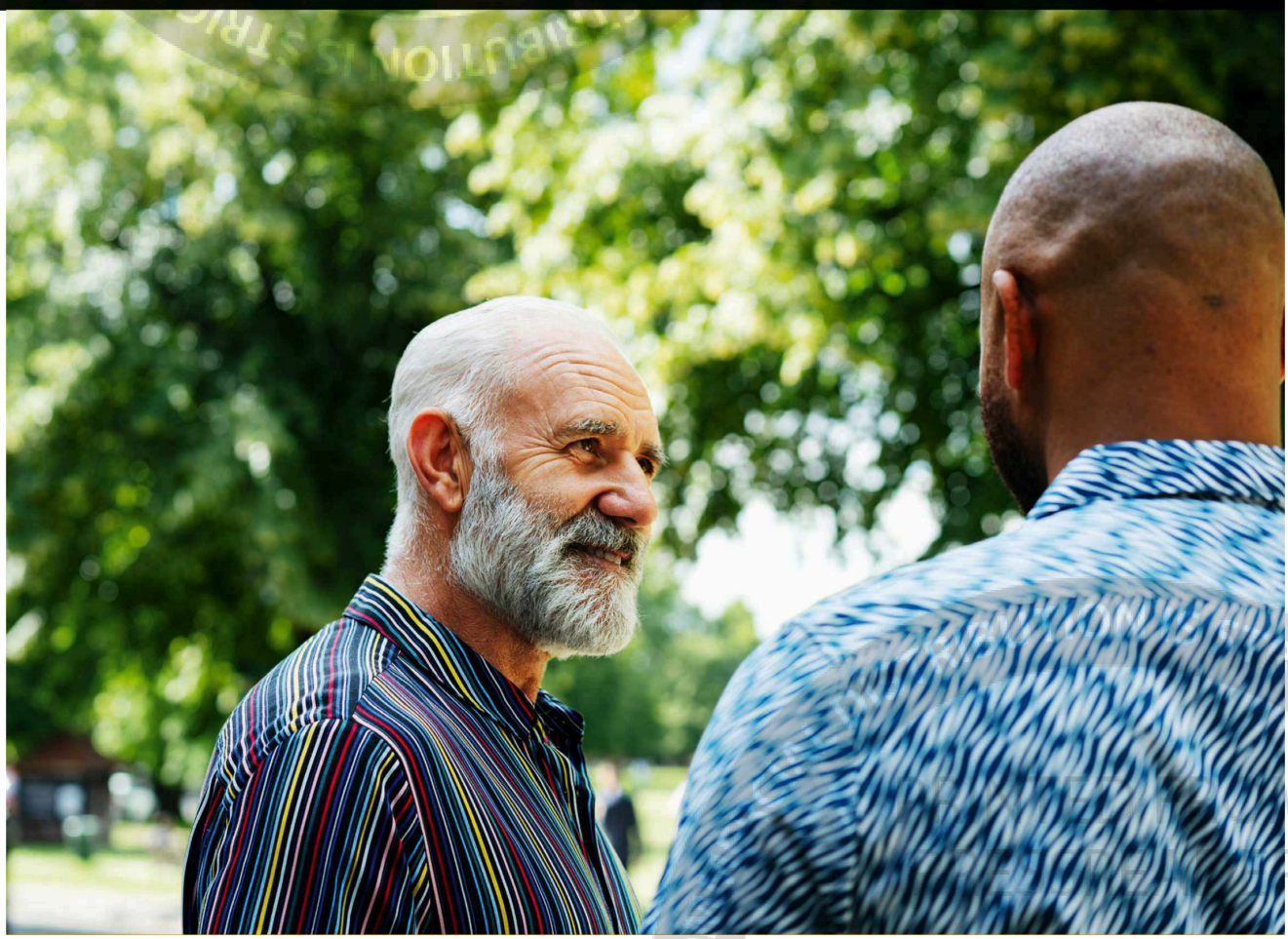
Another huge study, this one published in 2022, involved over 29,000 older participants. Socialising at least twice a week was one of the key lifestyle factors that protected them against memory decline over the ensuing years.

Prof Charan Ranganath is a director of the Dynamic Memory Lab at the University of California at Davis. He and his fellow researchers are still figuring out the mechanisms underlying the protective effects of socialising, but one possibility is that it helps with preventing depression and dealing with stress, both of which can be harmful to memory.

"Another possibility," he adds, "is when people are in strong, social relationships, they can develop skills to compensate for any natural brain changes that might be taking place that might normally reduce cognitive functioning."

The message from this line of research is that aiming to socialise at least twice a week with varied activities will help to protect you from memory decline. And there's no reason why you can't incorporate this with some of the other steps. For instance, you could go to evening classes to learn a new language – this will give your brain a good workout, and while there, you can chat and forge new friendships. At the same time, you could use testing and memory techniques (such as the mind palace) to help you learn new vocabulary, further exercising your memory muscles. Just don't forget to turn off your sat-nav and find your own way to class. SF

by DR CHRISTIAN JARRETT
Christian is a cognitive neuroscientist and the author of Be Who You Want: Unlocking the Science of Personality Change *(Robinson, 2021).*



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