

HUMANS // HABITS

Changing our ways can be hard, but now...

# SCIENTISTS CAN NUDGE HABITS INTO YOUR BRAIN

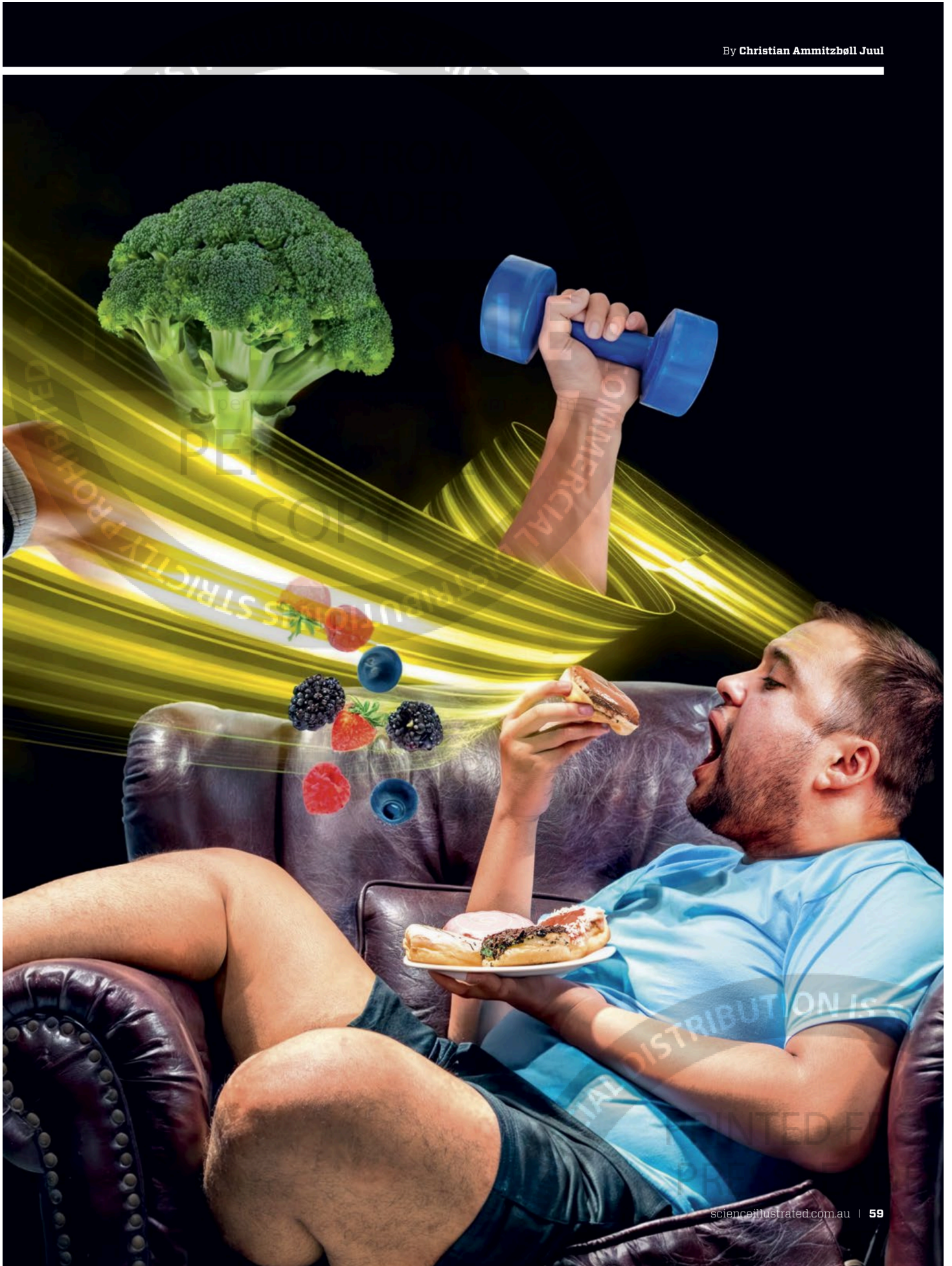
► Would you like to eat better, lose weight, or improve your attitude? Old habits can be hard to change, and new habits almost impossible to build. But scientists are now uncovering the secret of habits in the brain and how we encode them.

SHUTTERSTOCK & LOTTE FREDSLUND

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## HUMANS // HABITS

Three-quarters of us wish that we could change our habits in some way. Huge industries have built up around assisting people to exercise more or to eat healthier food. But as everyone knows, most people who start a diet fail to keep off the weight. Most who make New Year resolutions fail to keep them.

Why is it so difficult? Why do some people search repeatedly for new paths to success? The simple answer is that new habits require extensive reprogramming of the brain. And that's not easy.

But nor is it impossible. Research has revealed how specific methods can nudge a new habit into the brain, potentially without us even realising it.

### Habits become automatic

Researchers divide our behaviour broadly into two categories: purposeful behaviour, and habits.

Our 'purposeful' behaviour involves conscious actions in which we think carefully about the performance of the task at hand and its purpose.

Habits, on the other hand, are the automatic behaviours where we do not consciously think about the purpose at all. Habitual behaviours are often triggered by certain circumstances that may occur

regularly. Finishing dinner could trigger the habit of sitting in front of the TV with the rest of a bottle of wine, or a feeling of boredom might make us turn to social media on our phones.

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**months, with significant individual variation, is how long it takes for most habits to become automatic.**

Despite becoming 'hard-wired' into the brain, some habits can be harmful to physical and mental health. But other habits can be positive: habits of physical activity and healthy eating could lower risks of cardiovascular disease, cancer, diabetes, depression, and more.

Studies demonstrate that most of us are fully aware of the benefits of healthy habits, and that many also have a strong desire to incorporate such healthy habits into their everyday lives. However, only a

fraction of those who try will succeed. And scientists attribute this to one particular psychological phenomenon that gets in the way of most traditional methods for building new healthier habits.

### Knowledge does not help

It is known as the *intention-behaviour gap*, a mismatch between our intentions and our actual behaviour. Habit researchers repeatedly encounter this phenomenon: a large number of studies have shown that our intentions to do better, to exercise or eat well, will have only a limited influence on what we end up doing.

In other words, simply intending to build new habits is not enough. And this can cause many traditional health information campaigns to fail. One US study investigated the impact of a campaign that tried to get people to eat more fruit and vegetables by informing them of the benefits and thereby building willingness to change behaviour. The results showed that people did learn something, but their behaviour remained largely unchanged.

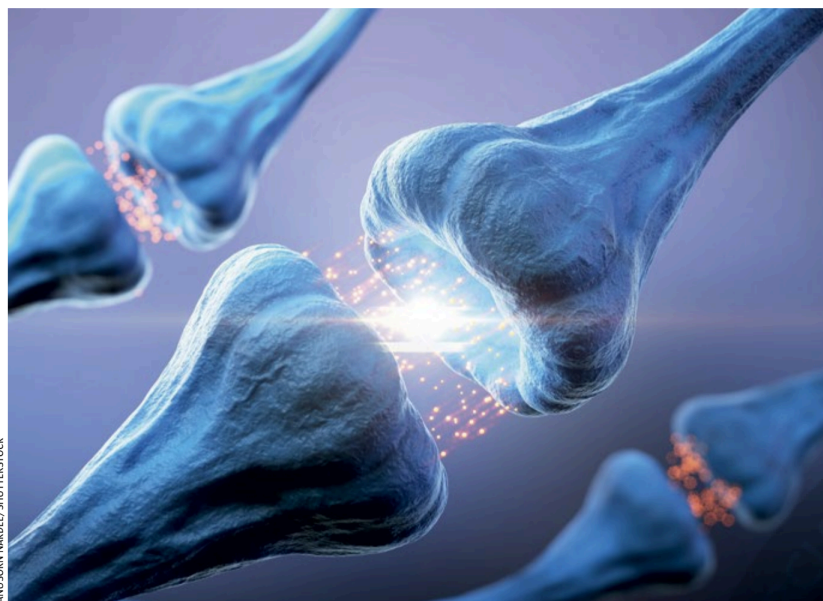
Australian campaigns for fruit and veg have similarly fallen on deaf ears. Despite campaigns like 'Boost Your Healthy', the latest ABS figures show fewer than 5% of Australian adults and children are getting their recommended daily levels.

The reason for this failure is in the brain. Our behaviour is governed by active brain cells, and the more often we use a particular brain cell, the easier it will be to activate it next time. In the same way, idle brain cells become harder to activate. This mechanism means that it is difficult to get rid of a behaviour that we have performed frequently, and also hard to start a new behaviour that the brain doesn't know.

Nevertheless, it is possible to make the leap from intentions to behaviour. And the first step is to recognise that it is not somebody else's fault that you find it difficult to make your plans come true. A 2022 review showed that your chances of building a new healthy habit are not affected by the distance to the gym or whether friends and family support you. You are the key: you and your brain.

### The brain switches networks

For decades scientists have been learning how habits form in the brain. Much of the early research was done with mice or rats, but the latest advances in MRI tech- ▶



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The link between two brain cells becomes stronger the more often they are used, so that signals flow more easily when you perform a task that is habitual. New tasks require new networks to be forged.



**The most important rule when trying to build a new habit is that the habit should be linked consistently with a specific time or routine. In this way it can more rapidly become 'automatic'.**

► niques allowed a 2023 study by Israeli and US researchers to forge new understanding of habits in our own species.

The researchers MRI-scanned brains of test subjects as they were training to build a new habit. At the beginning of the experiment, the participants had to think purposefully and consciously to solve certain tasks on a screen. But after a number of repetitions, they began to solve them more automatically and less consciously. The researchers could observe this change from purposeful behaviour to habit in the participants' brains, seeing how the brain activity switched from one network of brain cells to another.

The first network closely involved the caudate nucleus, a structure within the brain's basal ganglia which is known to help us focus on the purpose of actions. As the training progressed, the use of this network was reduced – consistent with what we know about habits, because once something becomes a habit, we do not really think about the purpose.

The new network includes the front end of the putamen, which is involved in unconscious learning. So the brain ensures that a habit is encoded to be performed automatically, without the use of the brain's more conscious networks.

However, the experiment went further than revealing the origins of habits in the brain. The researchers' special technique

of nudging habits into the brain can also assist anyone wishing to build a new habit.

That's because the researchers did not simply have the participants repeat the desired action over and over again. Such repetition alone, perhaps surprisingly, does not seem enough to build a habit. Rather it is crucial that to associate the new habit with certain circumstances, such as a particular time of day, or a particular feeling. If the actions in the

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**days was the average time it took to build a new habit, according to a UK study.**

experiment were repeated only when those certain circumstances were present, the researchers were more easily able to get participants' brains to subconsciously connect the circumstances and the action. The action then became an automatic response to circumstances, rather than a conscious action that required activity in the brain's targeted network.

## Planning is the key to success

This approach – connecting new habits to specific times or triggers – is already a known technique within scientifically-proven methods for building new habits.

In 2023, Chinese researchers reviewed a series of experiments with methods aimed at getting participants to exercise more. The most efficient methods were characterised by the fact that everything was carefully planned from the beginning ensuring that the new physical activity was always performed at a specific time or with a specific routine during the day. This made the behaviour easier to get started and to more rapidly become automatic.

Good planning also required a degree of problem solving, so that a plan can take into account everyday challenges such as work, children, and other distractions that could block the new habit.

The most successful plans also include concrete instructions for performing the physical activity, and a goal for what the individual aims to achieve with the new habit – preferably prepared with an expert on the subject involved. This may strengthen the relevant habit networks in the brain, and provide accountability to continue.

## How long to form a habit?

How long does it take to build a new habit? Scientists have tried to answer this question too, with studies following test subjects as they tried to change habits. They found that it takes on average around two months to build a brand new habit.

But recent research demonstrates that the answer is not quite so simple. In a 2023 study, French and US researchers used AI to monitor participants in their everyday lives, and the results show that some habits are harder to adopt than others. It took only a few weeks to make more regular washing of hands a habit, but it took 2-3 months to make going to the gym a habit. And importantly there was a big difference between individual participants.

So if you were brave enough to take on the challenge of a New Year's Resolution for 2025, don't become overwhelmed by feelings of panic, self-loathing or remorse even if your new habit has not fully taken hold by the time this issue of *Science Illustrated* publishes at the beginning of April, even if other friends have succeeded in their resolutions. Your brain may just need a little more time to reprogram itself. **SI**