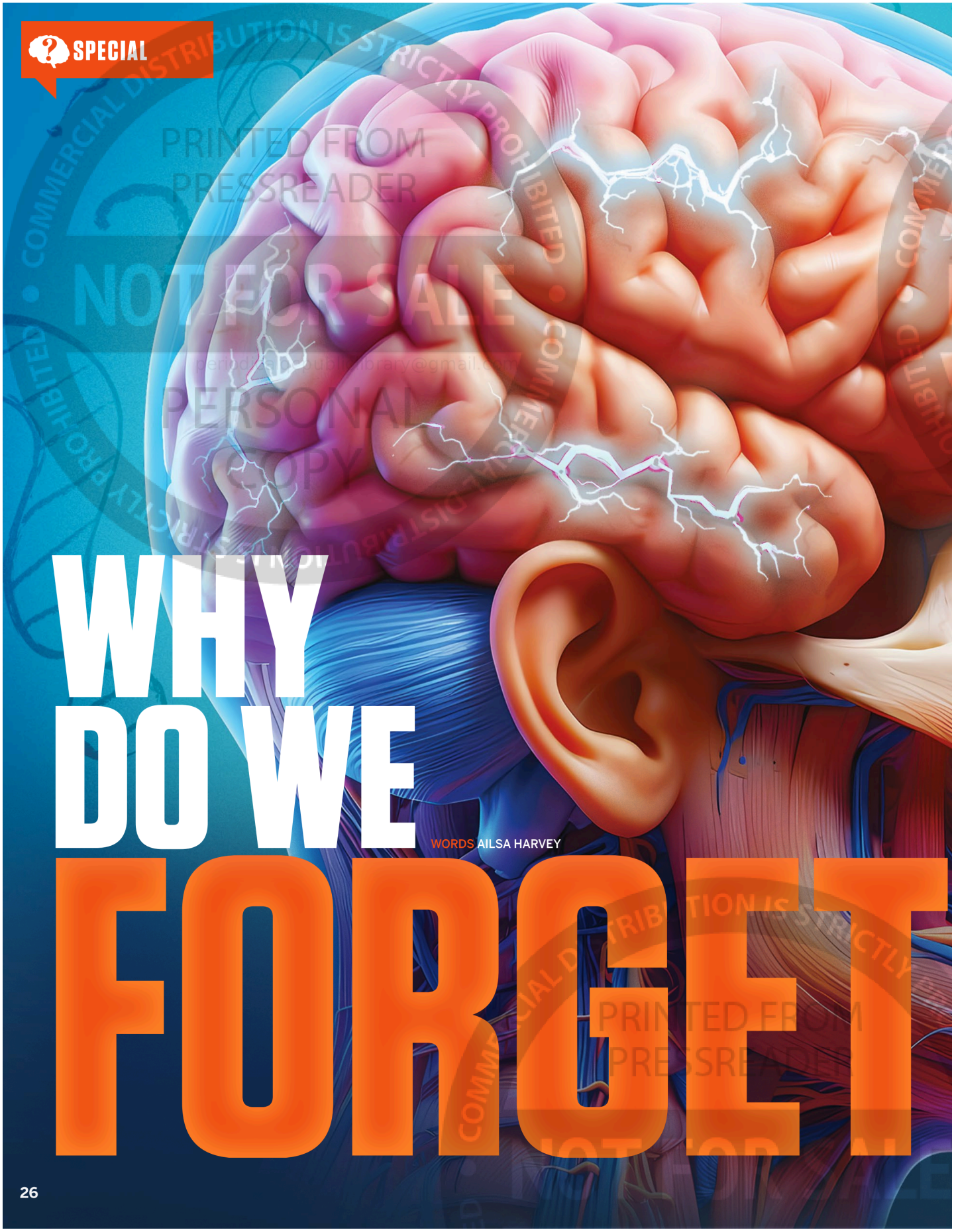
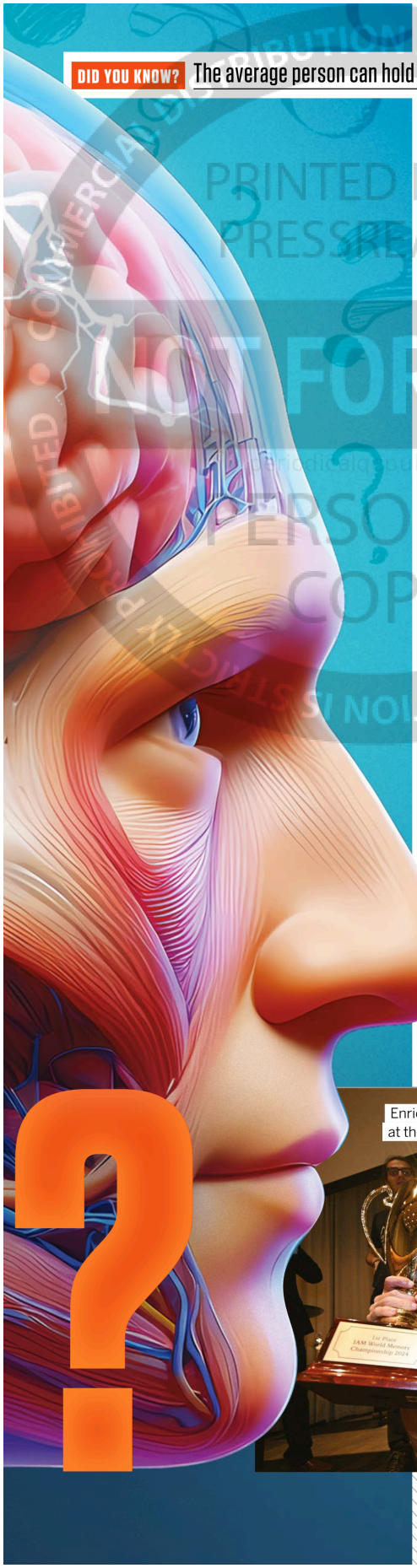
- Brain / Memory



WHY DO WE FORGET

WORDS AILSA HARVEY

COMMERCIAL DISTRIBUTION IS STRICTLY PROHIBITED
PRINTED FROM PRESSREADER
NOT FOR SALE
PERSONAL COPY



DID YOU KNOW? The average person can hold five to nine items in their short-term memory at one time

As we navigate life, we collect masses of souvenirs in the form of memories. But we can't keep all of these forever

Have you ever entered a room, only to forget what you went in there to do? Scientists think that the brain interprets entering a doorway as a new place and a new scene, causing you to temporarily erase your train of thought – the short-term memory of why you went there in the first place. This is just one of the brain's many memory quirks and tactics. And while forgetting can be frustrating, the human body can only function with a balance of erased and consolidated memories.

Your memory shapes who you are, connects chronological events, provides meaning to your surroundings and allows you to form relationships. Your memory also serves as a survival tool, keeping you alive. By learning what's dangerous and remembering simple information such as where you live and where to find food, you're better able to choose what will benefit you and what to avoid using your past experiences.

When you learn new information, whether it's a complex skill or the name of an object, the brain forms new connections between nerve cells called neurons. This creates a map throughout the brain that makes previously encountered information easier to retrieve. The more you revise the name of an object, for example, the stronger that connection becomes and the easier it is to remember its name. It might seem like the busier this neural map is, the more intelligent you will become. But just as a smart phone slows down when its storage reaches its limit, your brain is more efficient when it has less to process. It actively forgets information that isn't reused, or that hasn't induced a significant emotional reaction, by weakening the corresponding connections between neurons. Suppressing unimportant information from becoming active memories prevents the brain becoming overwhelmed. In other instances, painful mind-consuming memories of traumatic events can be blocked or rewritten to induce less pain. Suppressing these painful memories maintains the emotional stability needed in the brain for effective daily functions.

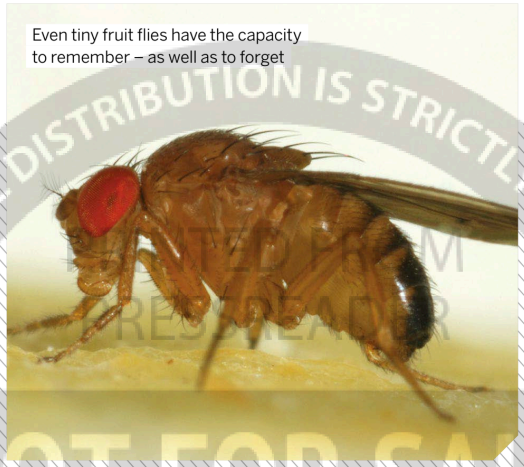
Did you know?
Alcohol temporarily halts long-term memory formation

Forgetting also builds creativity. If memories were permanent, our thought processes and actions would be too rigid and our brains couldn't evolve new ways of thinking. Creativity provides humans the ability to explore new approaches to problems and express themselves uniquely. When you feel overwhelmed or stressed, your brain is less able to form new thinking patterns and returns to more rigid habits and thought processes. This is sometimes the reason for experiencing a mental block during creative activities.

Forgetting is often considered a weakness – an indication of intelligence and the level of knowledge our brains can store. But at peak cognitive ability our memory is ever-evolving, and forgetting should be considered more of a superpower. When you delete the noise consuming your memory, more energy can be channelled into focusing, adapting and prioritising the information needed to shape your sense of self and mentally thrive.



Enrico Marraffa won nine out of ten awards at the 2024 World Memory Championships



Even tiny fruit flies have the capacity to remember – as well as to forget

© Adobe Stock / Alamy

DISTRIBUTION IS STRICTLY PROHIBITED • COMMERCIAL USE • PRINTED FROM PRESSREADER • NOT FOR SALE • PERSONAL COPY

SPECIAL

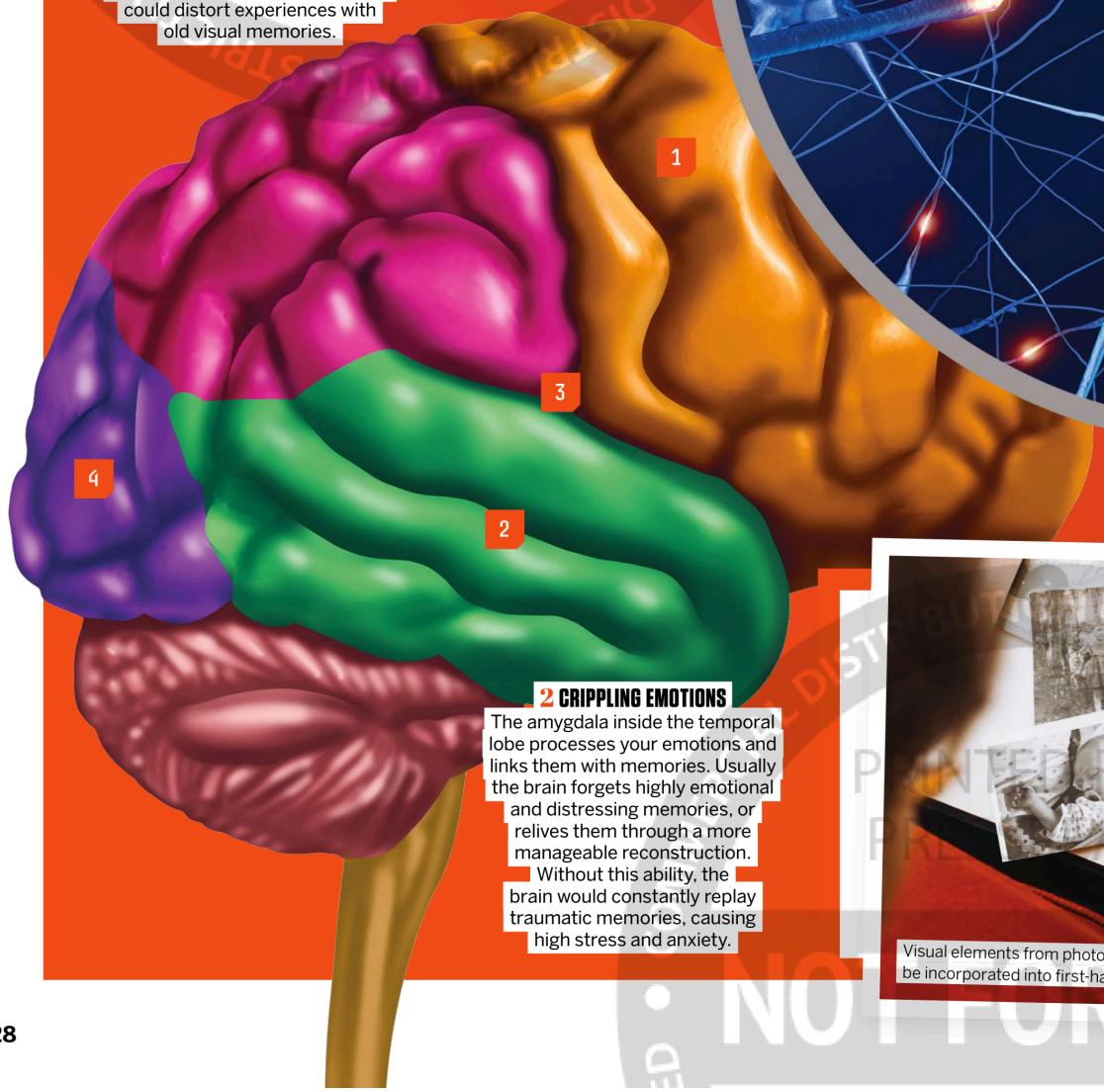
WHAT IF YOU DIDN'T FORGET?

If your brain had an infinite memory, the organ would become inefficient and overstimulated

3 HABIT CROSSOVER
A group of structures at the centre of the brain called the basal ganglia learns and remembers habits so they can be performed with little conscious thought. If you remembered all versions of a habit, conflicting methods would slow down your motor skills.

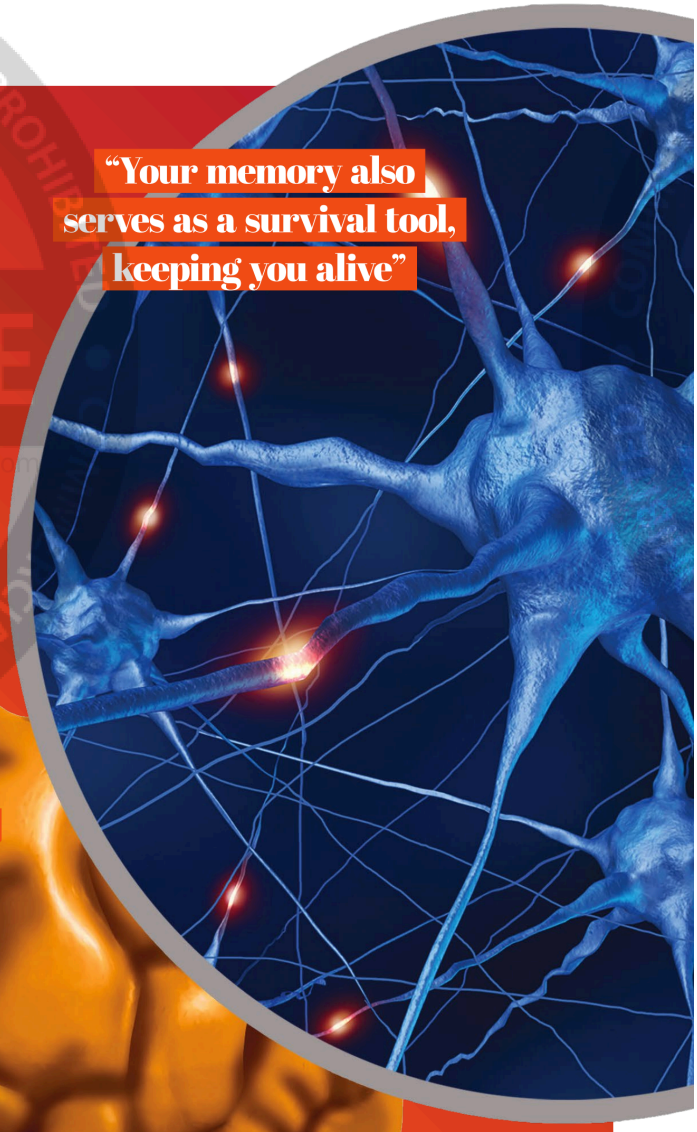
4 HALLUCINATING MEMORIES
The occipital lobe plays a role in visual memory to remember what places, objects and people look like. Holding onto too many memories could distort experiences with old visual memories.

1 DECISION PARALYSIS
The prefrontal cortex would be so overloaded with useless information that you would suffer from decision paralysis. This is the inability to prioritise an action to perform as there is too much data to filter through and process. As a result, the brain would lack focus, struggle to problem-solve and use more energy processing every trivial memory.



2 CRIPPLING EMOTIONS
The amygdala inside the temporal lobe processes your emotions and links them with memories. Usually the brain forgets highly emotional and distressing memories, or relives them through a more manageable reconstruction. Without this ability, the brain would constantly replay traumatic memories, causing high stress and anxiety.

"Your memory also serves as a survival tool, keeping you alive"





Visual elements from photographs can be incorporated into first-hand memories

COMMERCIAL DISTRIBUTION IS STRICTLY PROHIBITED • PRINTED FROM PRESSREADER • NOT FOR SALE • PERSONAL USE ONLY

DID YOU KNOW? The brain processes visual information 60,000 times faster than text



Memories form when the connections between neurons increase in strength or number

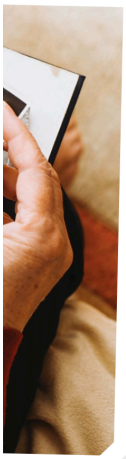
5

5 NEURAL FATIGUE
The brain's neurons would be constantly firing if we didn't let go of any information, damaging the cells. This would stop the brain pruning neurons – removing weaker neural connections and strengthening more essential memory signals.

ERASING CELLS

Specialised neurons called engram cells are responsible for making changes in the brain as you learn new information to store memories. But as well as storing memories, these engram cells help erase memories by weakening the connections of memory pathways. This makes the memories less accessible over time, and as a result causes you to forget a memory. Because of this, engram cells are often given the title 'forgetting cells'. Chemical changes in these forgetting cells change their state to make them less accessible for storing information. They decrease their synaptic strength so that it's more difficult for the brain to retrieve a memory. Not all the changes in engram cells are irreversible. Some memories are weakened and generally forgotten. But receiving new information about suppressed memories, or experiencing a sensory prompt related to the memory, can reorganise and strengthen a fading memory.

Did you know?
There are around 86 billion neurons in the human brain



IS YOUR MEMORY ACCURATE?

Have you ever witnessed a story travel around your friendship group, becoming more dramatic or having different elements emphasised the more it's retold? This too can happen internally, as your brain recalls a memory. If you have gaps in your memory of an event, you may create new information subconsciously to complete the missing timeline. Another reason you may invent a memory is if it's a highly emotional one. The brain protects you from experiencing painful and stressful feelings, so if you're thinking back to a highly emotional time in your life, you may skip out parts or subdue them to make them more emotionally manageable to recall.

Scientists used to think that memories were fixed. But as you recall memories, you can strengthen, weaken and even reshape them. Memories become temporarily unstable after they have been retrieved, making it possible to alter them. Memory reconstruction can be influenced by your emotions, thoughts and the environment at the time of memory retrieval. For example, if you are calm when revisiting a stressful time in your life, the emotional weight it holds can be reduced.

5 FACTS
THINGS THAT MAKE YOU FORGET

1 HIGH STRESS
When you're stressed, a hormone called cortisol is released in the brain. This can damage the hippocampus, which is the area of the brain responsible for retrieving information. You also tend to focus on the stressful subject, rather than new information.

2 LACK OF SLEEP
During deep sleep, neural pathways are strengthened to consolidate memories. Without a good sleep, long-term memories can't form properly. Being in a state of sleep deprivation also reduces focus when conscious, limiting memory-making abilities.

3 MULTITASKING
If you are engaging your brain in another activity while trying to remember new information, your brain needs to switch its concentration between the two tasks. This reduces its memory efficiency.

4 RELIANCE ON TECHNOLOGY
You can remind yourself of facts with a quick online search or set your phone to give you automatic reminders. But this stops your brain from practicing memory retrieval and weakens this ability.

5 DIET AND DEFICIENCIES
B vitamins, omega-3 fatty acids, zinc and iron are all key nutrients for memory function. They increase the production of neurotransmitters and boost synaptic plasticity.

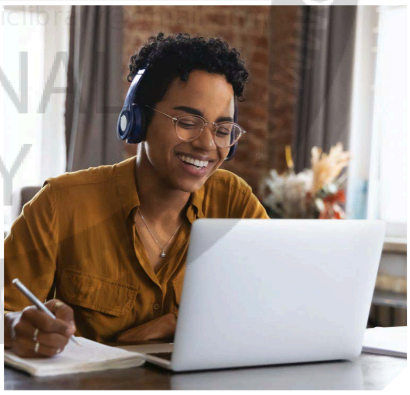
© Alamy / Shutterstock

PRINTED FROM PRESSREADER NOT FOR SALE

SPECIAL

MEMORY THROUGH THE YEARS





CHILDHOOD AMNESIA

The average person can recall their earliest memory from around 3.5 years of age, with females more likely to have an earlier first memory. But why is there a blackout in memories of our first experiences? It's because the brain hasn't fully developed yet, and the ability to store long-term memories is reduced.

PEAK MEMORY

Your ability to remember new information is at its highest when you are in your 20s. Your short-term memory continues to improve up until around age 25, when your brain fully develops. Then it remains at a consistent level for the following decade. At 30 years old, your ability to remember a person's face is greatest.



Did you know?

Sleep improves memory retention by 40 per cent



DECLINING EFFICIENCY

At around the age of 45, your brain's memory begins to lose its sharpness. This isn't a sudden change, but you may find it takes longer to recall a name from the past. One study carried out by University College London found that between ages 45 and 49 your mental reasoning declines by 3.6 per cent, and up to 9.6 per cent at ages 65 to 70.

AN AGEING BRAIN

Naturally, the memory-making part of the brain deteriorates gradually as you age. This can make elderly people more forgetful than children and younger adults. Older brains become less able to repair brain cells and stimulate new neural pathways, as there are less of the hormones and proteins needed for these roles being produced.

FORGOTTEN DREAMS

While you are fast asleep, your brain gets to work sorting and filtering your memories. Any excess information that reduces the efficiency of thought-forming is discarded, while beneficial information learned during the day is consolidated into your long-term memory so that it can be retrieved later. There are four main sleep stages. The first three are non-rapid eye movement (NREM) sleep stages and the third is REM sleep. It's during NREM sleep that you purposely 'forget' some of the day's information, preventing trivial things occupying too much of your mind.

Memory processing continues into REM sleep, including that of emotional memories. It's during this deep sleep that you also experience dreams. However, you are only likely to remember a small fraction of most dreams. For others, you may wake up fully invested in the dream, only to have completely forgotten its plot an hour later. This is because by the time you reach REM sleep, the neural pathways responsible for storing information in your long-term memory are less active. Short-term memory still functions relatively well in this unconscious state, but most dreams that you have while asleep are forgotten within 30 seconds. To remember them for longer, you usually have to wake up while the dream is still being formed.



Memory-strengthening deep sleep declines in your late 30s

https://www.pressreader.com/uk/how-it-works/20250130/page/28 1/1

DID YOU KNOW? After turning 60, you lose more than 0.5 per cent of your brain volume every year

THE RATE OF FORGETTING

In his 'forgetting curve', psychologist Hermann Ebbinghaus showed that 80 per cent of learned content is lost within one month



20 MINUTES

Soon after you learn new information, 42 per cent is forgotten. At 20 minutes, your brain undergoes its initial sorting process and the most dramatic loss of learning is made.



24 HOURS

If the information isn't revisited, around 67 per cent of the new information you have learned will be forgotten after one day.



31 DAYS

At the end of a month, you will retain only 21 per cent of this new information. Some of this will be placed into your long-term memory.



60 DAYS

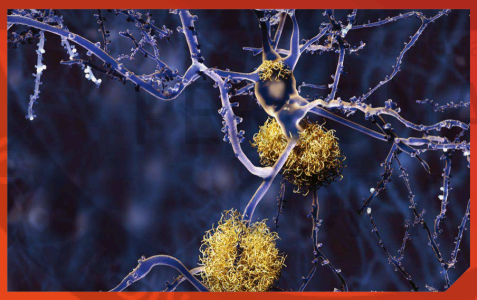
If you don't revise the information, which strengthens neural connections and consolidates the memory, 90 per cent of the information you learned will be forgotten after 60 days.

© Shutterstock

SPECIAL

MEMORY DAMAGE AND DISEASE

Dementia is an umbrella term for conditions of memory loss caused by neuron damage

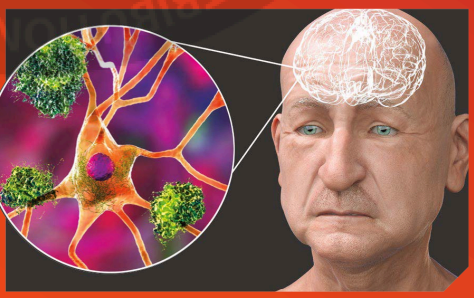


ALZHEIMER'S DISEASE

This illness is the most common cause of dementia. Memory loss worsens over time and is caused by a buildup of two proteins – amyloid and tau – in the brain. Amyloids are abnormal proteins that build up along brain cells. The second protein, tau, causes tangles inside brain cells. This combination prevents the usual formation and retention of memories.

FRONTOTEMPORAL

Frontotemporal dementia (FTD) occurs in the frontal and temporal lobes of the brain. When nerve cells here become damaged, connections can't be made between these lobes and the rest of the brain. Damage to the frontal lobe causes behaviour and personality changes, while temporal lobe damage makes language more difficult to remember.



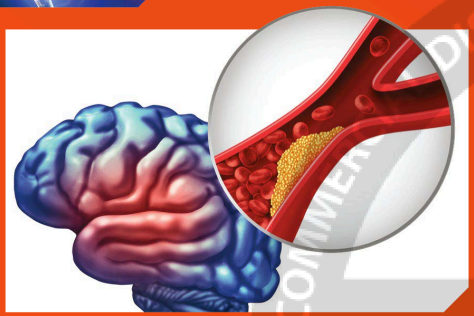


LEWY BODY

This form of dementia is a result of clumps of proteins called Lewy bodies forming inside brain cells. One in ten dementia sufferers have Lewy body dementia. These proteins prevent cells from communicating with each other to recall memories as they get in the way of the chemical messengers needed to do so.

VASCULAR

This is the second most common form of dementia, caused by reduced blood supply to the brain. Vascular dementia can occur as a result of blood clots in the brain or a narrowing of blood vessels. As a result, oxygen levels in brain cells are reduced, causing damage and impairing memory circuits.





MRI scans show any changes in the brain's structure and function following a severe injury

A HIT TO THE MEMORY

A knock to the head causing a traumatic brain injury (TBI) holds more risk than many other physical accidents, as the organ compromised is responsible for your mobility, personality and memory. A mild TBI can temporarily affect your brain cells, while a serious one has the potential to cause more long-lasting memory issues. Head trauma can cause tears or damage to the brain cell connections that send memory signals. This connection disruption can cause retrograde amnesia – the loss of long-term memories from before the accident – and makes it more challenging to form new memory connections.

A severe concussion, which results from a blow to the head that causes the brain to bounce against the inside of the skull, can result in brain tissue swelling. In these cases, the increased pressure in the head restricts blood flow and the lack of oxygen hinders memory. Finally, when cells are damaged during a head injury, the brain can't regulate its release of chemical messengers like glutamate. Usually, glutamate helps send messages between nerve cells to aid memory. But too much can overstimulate the cells, damaging them and increasing forgetfulness.

Did you know?

Ten per cent of over 65 year olds have Alzheimer's disease

"When you feel stressed, your brain is less able to form new patterns"

DID YOU KNOW? Temporarily forgetting something you know is called 'blocking'

HOW ANIMAL MEMORIES COMPARE

Animals can remember key survival information for a lifetime, but how long before they forget trivial events in their working memory?



BEES

TWO MINUTES

Bees' short-term memory helps them navigate maze-like environments

THREE DAYS

Bees remember the location of a hive for days at a time



CROWS

30 SECONDS

Most bird species forget short-term memories after half a minute has passed

17 YEARS

Crows held a grudge against a human captor for nearly two decades

CHIMPANZEES

20 SECONDS

This suggests humans' short-term memory developed after we evolved from our shared ancestors

25 YEARS

Chimpanzees can retain memories of faces for 25 years



27 SECONDS

The average short-term memory of 25 species of birds, mammals and bees

ELEPHANTS

FIVE MINUTES

Information is quickly dropped to keep their social and environmental memory strong

12 YEARS

Elephants can remember a relative's scent for over a decade

HUMANS

48 HOURS

Humans can recall random events for over two days

INDEFINITE

Our large brains can store some memories for a lifetime

DOGS

TWO MINUTES

A dog will only remember the last couple of throws in a game of fetch

TEN YEARS

Ingrained tricks stick with canines after a decade

DO PLANTS HAVE MEMORY?

Plants don't have brains, which means they can't have memory in the same way humans remember and forget. However, most plants possess complex signalling systems that enable them to communicate with each other and learn from environmental events and triggers. One example of a plant deemed to have short-term 'memory' is the carnivorous Venus fly trap. The Venus fly trap has a jaw-like mouth made up of two sets of leaves that clamp shut when an insect enters.

To detect the presence of an object, the Venus fly trap has sensory hairs lining its leaves, which are bent when a fly lands on top of them. So that it can conserve energy, when a raindrop stimulates the plant's hairs, the trap isn't triggered, but the movement of a fly activates the snap. To achieve this, the plant has a short-term memory of 30 seconds, during which it remembers the first point of contact with an object. A live insect will then crawl across the leaf, knocking another hair. The plant, knowing this is the second trigger by a potential meal, closes to secure its prey. In a sense, the plant is remembering a pattern corresponding to food.



When prey touches the hairs of a Venus fly trap, the plant releases calcium signals

© Shutterstock

NOT FOR SALE