

Once upon a time, if you believed your own fantastical stories it was a sure sign you were away with the fairies. Now it turns out we all like to create happy-ever-afters, says **Helen Phillips**

Everyday fairytales

● ONE of the last times I saw my grandmother in her nursing home she chatted cheerfully about her son, who was away studying at university. She spoke with complete conviction and considerable pride, despite seeming also to recognise that her only son – my father – sitting right beside me, was not far off retirement age. The impossibility of her tale caused her no apparent distress or confusion. Her story was lucid and complex. It was as though a perfectly plausible anecdote had been plucked from several decades earlier and woven into the void of her recent memory.

Many older people gradually develop amnesia about recent happenings while retaining a wealth of detail from their younger days. They may make up stories to cover their embarrassment about the blanks, and generally they know their memory is foggy. The kind of storytelling my grandmother did after a series of strokes is a little different. Neurologists call it confabulation. It isn't fibbing, as there is no intent to deceive and people seem to believe what they are saying. Until fairly recently it was seen simply as a neurological deficiency – a sign of something gone wrong. Now, however, it has become apparent that healthy people confabulate too.

Confabulation is clearly far more than a result of a deficit in our memory, says William Hirstein, a neurologist and philosopher at Elmhurst College in Chicago and author of a book on the subject entitled *Brain Fiction* (MIT Press, 2005). Children and many adults confabulate when pressed to talk about something they have no knowledge of, and people do it during and after hypnosis. This raises doubts about the accuracy of witness testimony (see "The unreliable witness", p 34). In fact, we may all confabulate routinely as we try to rationalise decisions or justify opinions. Why do you love me? Why did you buy that outfit? Why did you choose that career? At the extreme, some experts argue that we can never be sure about what is actually real and so must confabulate all the time to try to make sense of the world around us.

Confabulation was first mentioned in the medical literature in the late 1880s, applied ▶



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Neurologist Oliver...
Einstein College of Med...
wrote about a man with...
in his 1922 book 'The Man...
Who Forgot His Name'. The...
Wife said that Mr. Thomas...
from memory to move...
was or why or to whom...
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to patients of the Russian psychiatrist Sergei Korsakoff. He described a distinctive type of memory deficit in people who had abused alcohol for many years. These people had no recollection of recent events, yet filled in the blanks spontaneously with sometimes fantastical and impossible stories.

Neurologist Oliver Sacks of the Albert Einstein College of Medicine in New York wrote about a man with Korsakoff's syndrome in his 1985 book *The Man Who Mistook His Wife for a Hat*. Mr Thompson had no memory from moment to moment about where he was or why, or to whom he was speaking, but would invent elaborate explanations for the situations he found himself in. If someone entered the room, he might greet them as a customer of the shop he used to own. A doctor wearing a white coat might become the local butcher. To Mr Thompson, these fictions seemed plausible and he never seemed to notice that they kept changing. He behaved as though his improvised world was a perfectly normal and stable place.

Also sharing this penchant for storytelling are some people who have suffered an aneurysm or rupture of the anterior communicating artery, a blood vessel in the brain that carries blood to frontal lobe regions. These people also have profound amnesia, yet seem unaware they have a problem and confabulate to cover the gaps. The same thing can happen in people with Alzheimer's

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disease and other forms of dementia, and after parts of the brain are damaged in a stroke.

Armin Schnider, a neurologist from the Cantonal University Hospital in Geneva, Switzerland, says that the vast majority of confabulations he has heard from his patients over the years relate directly to their earlier lives. One of his patients, a retired dentist, worried while in hospital that he was keeping his patients waiting. Another, an elderly woman, talked regularly about her baby in the present tense. Most of these patients had damage to the temporal lobes of the brain, particularly the memory regions of the hippocampus, so it seemed likely that they had somehow lost the ability to make new memories and were retrieving old ones instead. The intriguing thing was that they didn't realise these memories were old – they seemed convinced by their stories, and sometimes even acted on them. So Schnider decided to study their memory in more detail.

He found that his patients certainly had poor recall. If asked to learn a list of words, half

an hour later they would be unable to name any of them. But was the problem to do with making new memories or accessing them later? To find out, he showed each person a series of pictures and asked them to point out any that appeared twice. Some confabulating patients and all amnesiac non-confabulators failed the task, unable to learn new information as the images flashed past. Often, though, even profound confabulators could do the task well.

Reality check

The most revealing thing about the experiment emerged when Schnider repeated it an hour later with the same images presented in a different order and with different ones repeated. The subjects were asked only to report repeats in this particular viewing, forgetting the earlier run – again, normally a very easy task. The scores of amnesiac non-confabulators were identical to the first session, but confabulators all performed terribly this second time around. Often they said they had seen a picture earlier in the run, when actually it was one they had seen an hour before. So the problem for people who confabulate is not necessarily that they can't make new memories, but that they confuse memory and present reality. "They seem unable to suppress memories irrelevant to ongoing reality," says Schnider.

He believes that we must all have a pre-conscious brain mechanism that distinguishes between current reality and fantasy, or a memory that is no longer relevant. "The brain decides long before the thought becomes conscious," he says. His recent recordings using scalp electrodes show that when people see the pictures in a second run, yet correctly suppress memories irrelevant to this test, they show a characteristic pattern of brain activity after 0.2 to 0.3 seconds, whereas it takes twice that time for people to become consciously aware of the judgement. The decision process happens subconsciously, too early for awareness. Our brain sorts fact from fiction well before we know our own thoughts, he concludes.

So confabulation can result from an inability to recognise whether or not memories are relevant, real and current. But that's not the only time people make up

The unreliable witness

Our tendency to confabulate – to believe a fictitious story or memory – is a serious concern when it comes to trusting an eyewitness.

How easily do our made-up stories become false memories? Maria Zaragoza of Kent State University in Ohio showed people an event on video and then asked them leading questions. When they did not have an answer – because the information just wasn't on the tape – she encouraged them to make one up. People are very uncomfortable doing this, she says. They say they don't know, and are just making up an answer, but a week later, more than half of the subjects report their false statements as true events.

Another experiment reveals that children behave in the same way in a real eyewitness situation. When asked to report how a maintenance man they had seen

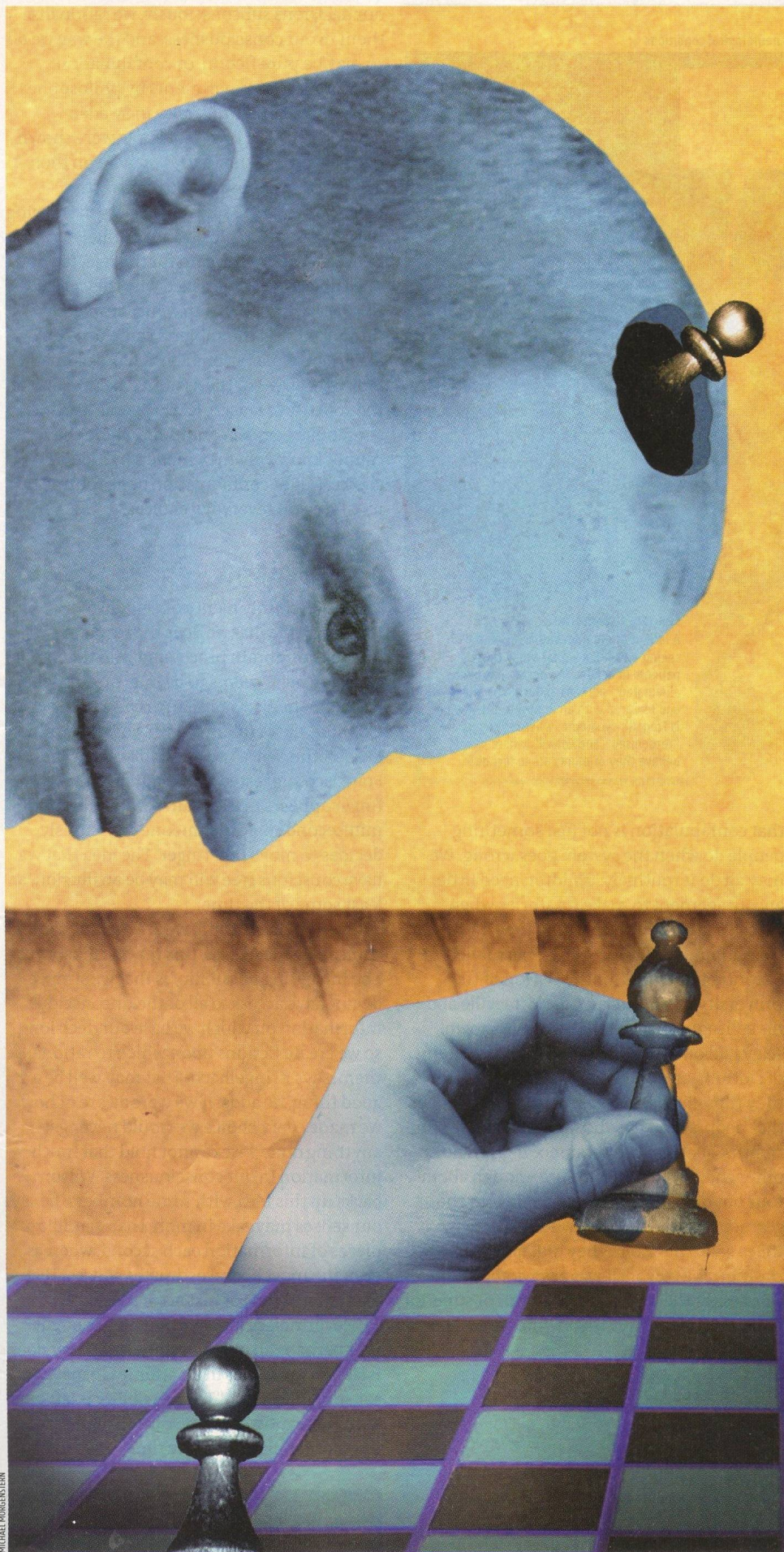
in a waiting room had broken something that he had not in fact touched, they said he didn't break it, or that they didn't see. They were then asked to make something up. A week later, many of the children believed their lies and would now willingly confabulate about the false situation. As with the adults, the effect was strongest when the questioner gave positive feedback, telling the person that their made-up answer was correct.

Zaragoza says these findings have worrying implications for the way forensic interviews are conducted, and particularly for the credibility of forced confessions.

Another controversial forensic technique is hypnosis. Its reliability was tested experimentally in the 1980s by psychologist Jane Dywan of Brock University in Ontario, Canada, at a time when hypnosis

was increasingly being used, with little opposition, to "refresh" eyewitness memory. She showed people pictures and then tested their recall over the following days. After a week, she hypnotised the same people and asked them again what they could remember. They all "recalled" more, but almost all the newly volunteered information was wrong.

Dywan says that hypnosis increases the focus of our attention and so increases the vividness and the ease with which information comes to mind. This may give us the sense of confident familiarity for false memories that we would normally only get with true ones. Hypnosis seems to interfere with our ability to judge what is real and what is not. Combine this confidence with increased recall, and you have set up a very dangerous situation, she says.



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stories, says Hirstein. He has found that those with delusions or false beliefs about their illnesses are among the most common confabulators. He thinks these cases reveal how we build up and interpret knowledge about ourselves and other people.

It is surprisingly common for stroke patients with paralysed limbs or even blindness to deny they have anything wrong with them, even if only for a couple of days after the event. They often make up elaborate tales to explain away their problems. One of Hirstein's patients, for example, had a paralysed arm, but believed it was normal, telling him that the dead arm lying in the bed beside her was not in fact her own. When he pointed out her wedding ring, she said with horror that someone had taken it. When asked to prove her arm was fine, by moving it, she made up an excuse about her arthritis being painful. It seems amazing that she could believe such an impossible story. Yet when Vilayanur Ramachandran of the University of California, San Diego, offered cash to patients with this kind of delusion, promising higher rewards for tasks they couldn't possibly do – such as clapping or changing a light bulb – and lower rewards for tasks they could, they would always attempt the high pay-off task, as if they genuinely had no idea they would fail.

One rare condition can make people confabulate even more elaborate tales. Capgras's syndrome sometimes affects people after a stroke, and can leave them believing that their loved ones have been substituted by identical-looking impostors, so they make up stories of alien abduction and conspiracy in an attempt to explain this crazy situation. In similarly strange conditions people may lose the ability to recognise themselves in the mirror, or may even believe they or another person are dead, despite all evidence to the contrary. In each instance, the affected person confabulates to explain the weirdness, oblivious to the absurdity.

What all these conditions have in common is an apparent discrepancy between the patient's internal knowledge or feelings and the external information they are getting from what they see. In all these cases "confabulation is a knowledge problem", says Hirstein. Whether it is a lost memory, emotional response or body image, if the knowledge isn't there, something fills the gap.

Helping to plug that gap may well be a part of the brain called the orbitofrontal cortex, which lies in the frontal lobes behind the eye sockets. The OFC is best known as part of the brain's reward system, which guides us to do pleasurable things or seek what we need, but Hirstein and Schnider suggest that the system has an even more basic role. It and other frontal brain regions are busy monitoring all