

Our memories make us who we are. But what if it turned out that even our most vivid remembrances can't be trusted? By Alix Kirsta



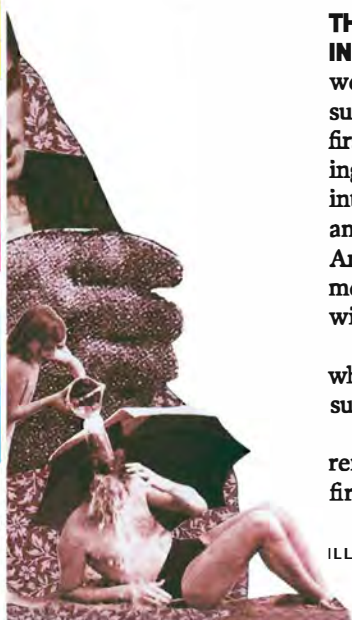
the memory game

THINK OF HOW YOU LEARNED ABOUT ANY SHOCKING WORLD EVENT. Who can forget where they were at the time of the London Underground suicide bombings, Princess Diana's death or the first moon landing? How many of you recall watching the TV in horror as two aeroplanes smashed into the World Trade Centre? Or the footage of an El Al jet crashing into an apartment block in Amsterdam in 1992? Our memories of those moments seem indelible: after all, we witnessed them with our own eyes.

Or did we? In a surprising number of cases, what people claim to remember about catastrophes such as 9/11 never actually happened.

Melanie Barnes, a New York gym instructor, remembers being transfixed by TV images of the first American Airlines jet ploughing into the

ILLUSTRATED BY MARTIN O'NEILL



World Trade Centre as she got ready for work. “I’ll never forget the horror; the plane just sliced into the north tower and exploded in flames and smoke,” says Melanie. “My whole body froze. I had friends who worked there.” But Melanie could never have seen that image. There was no live footage of the first jet crashing into the tower; the first live coverage was of the second attack. It was only later that day, after the attacks were over, that an amateur video of the first attack (filmed unintentionally by someone in mid-town Manhattan) was televised.

Similarly, there was never any film coverage of the El Al Boeing 747 crashing into an Amsterdam apartment block: TV crews only arrived in time to record the raging fire and rescue operations.

RECENT RESEARCH HAS PRODUCED INTRIGUING INSIGHTS into the tricks human memory plays. It seems that “false memories” of major events are commonplace.

When researcher Kathy Pezdek questioned New Yorkers about their 9/11 memories, 73 per cent of participants claimed—like Melanie Barnes—to have seen live TV images of the first plane crash in the morning. President Bush famously made the same claim. And when Hans Crombag, a Dutch law professor, interviewed people ten months after the El Al crash, 60 per cent reported seeing the tragedy live on TV;



9/11 : are our memories of it accurate?

many gave detailed descriptions of the crash, which they couldn’t have seen.

As a result of such studies, the theory that very vivid “flashbulb memories” of events work as factual records (much like a photograph or a video) has been largely debunked. Such memories in fact change with time. In January 1986, a day after the explosion of the Challenger space shuttle during take-off, 106 people answered a questionnaire about how and where they heard the news. Three years later, 44 of those respondents were contacted and asked identical questions. Twenty-five per cent were wrong on all the original questions—but they insisted their memories remained correct.

SEAN ADAIR/REUTERS; SIPA PRESS/REX FEATURES



A more disturbing discovery is that we may have memories of personal incidents that never actually happened. Elizabeth Loftus, one of the world's leading memory researchers, has carried out many experiments proving how easily false childhood memories—including those of incest and sexual abuse—can be implanted into adults.

In one famous study, volunteers aged 18–53 were given booklets containing written accounts of true childhood memories, reported to the researchers by the volunteers' families. Among these incidents, researchers inserted a false episode about getting lost, aged five, in a shopping centre.

TWENTY-NINE PER CENT OF PARTICIPANTS REMEMBERED THE FALSE EPISODE. In follow-up interviews they continued confidently to claim they had been lost in a shopping centre; some even spontaneously provided

extra details of their imagined ordeal.

In a similar study involving college students, researcher Professor Ira Hyman, of Western Washington University, discovered that non-existent events were more likely to be “recalled” at second and third interviews, after the students had had time

to think about the alleged childhood incident.

When Hyman first questioned students about spilling a bowl of punch over the parents of the bride at a wedding reception—something that didn't happen—none of them

recalled it. Tested again days later, almost 25 per cent remembered the punchbowl episode—and some elaborated on the incident. As one student told researchers at the first interview: “I haven't a clue. I've never heard that one [the punchbowl accident] before.” At the second interview she said: “It was an outdoor wedding. I think we were running around and knocked over



Did you really see footage of the Amsterdam apartment block targeted by an El Al jet?

A more disturbing discovery is that we may have memories of personal incidents that never actually happened

something like the punchbowl and made a big mess, and of course we got yelled at for it.”

Also alarming is how easily false memories can be implanted through suggestive questions. In another classic experiment, Elizabeth Loftus showed people videos of traffic accidents, then asked them what they had seen. She found that the question “How fast were the cars going when they smashed into each other?” led to higher estimates of speed than if the more neutral “hit” or “bumped” were used.

The verb “smashed” also led more

surveys show that, in 20 per cent of cases, witnesses will select the wrong person in an identity parade,” says Conway, “Many sources confirm that wrong identifications are a leading cause of false convictions.”

The mistake, says Conway, is to assume that memories provide a precise record of reality: they do not. Rather, they’re an interpretation of events, constructed from diverse sources including visual and other sensual information, as well as more general knowledge and past experience.

“Many different parts of the brain

Most judges, lawyers and police aren't up on the current research and don't realise that memory is a constant encoding process

people to falsely claim they had seen broken glass, although there was none. Even the question “Did you see the broken headlight?” prompted more respondents to claim, incorrectly, that they had, while saying “a broken headlight” produced a correct negative reply.

Such minor but significant errors have obvious implications for police and lawyers interviewing witnesses. Cognitive psychologist Professor Martin Conway, from Leeds University, recently carried out a report for the British Psychological Society and the Law Society on the defects of human memory in a legal context. “Several

are involved in forming memories. The brain edits the information we take in even before it's laid down as a memory, and there's more editing as the memory is formed,” explains Conway. “Most judges, lawyers and police aren't up on the current research and don't realise that memory is a constant encoding process within the brain. We now know that similar parts of the brain become active whether someone is talking about a real, mistaken or made-up event.”

HIS OBSERVATIONS ARE BACKED UP BY NEW ADVANCES in scanning technology, such as “functioning” MRI scans, which provide a window on



different workings of the brain. Recent experiments by Professor Kathleen McDermott at Washington University show that recalling a past occasion and imagining a future event spark similar brain activity.

Until now, scientists believed that thinking about the future occurred only in the brain's frontal lobe. In fact, when it comes to imagining oneself in a specific future episode, neuro-imagery shows that the brain areas associated with remembering and those connected to forethought both light up. Researchers hope this discovery may aid research into Alzheimer's and other forms of amnesia, since in addition to having lost their memory, most amnesiacs cannot visualise what they'll be doing in the future.

We all know memory fades: constantly recalling experiences may cause us to invent incidents to fill in the gaps. But the most radical new discovery is that far from being "stored" in a stable form, almost all memory—especially if connected to strong emotion—undergoes constant, subtle changes over time.

It seems the very act of remembering causes memories to become temporarily flexible, leading to "re-storage" in a slightly revised form. This finding, by American and Canadian neuroscientists, could revolutionise the treatment of major panic and anxiety disorders, thanks to experiments that greatly reduce the distress associated with certain memories.

The method appears deceptively simple. A group of researchers at

TEST YOUR FALSE MEMORY



Researchers Henry Roediger and Kathleen McDermott of Rice University, Texas, devised a series of memory tests for a paper published in the *Journal of Experimental Psychology*. Here is one example—try it on friends and see how they score.

1. Read out 15 words, all related to one another. They are: candy, sour, sugar, bitter, good, taste, tooth, nice, honey, soda, cake, chocolate, eat, pie, heart.
2. Ask volunteers to try to recall as many words as possible and write them down.
3. Recognition test: ask them which of the following words, some related to the previous list, were included and how sure or not they are about this. The words are: 1. **Taste.** 2. **Point.** 3. **Sweet.**
4. Results. In previous experiments, many people were sure that "taste" was on the list—and it was. Many believed "point" was not on the list—and it wasn't. Many assumed "sweet" must have been on the list—but it wasn't.

In some people, the encoding of terrifying memories may not have happened, thus “wiping” the memory for ever

McGill University in Montreal asked patients with post-traumatic stress disorder (PTSD)—including war veterans and victims of rape—to talk about their worst experiences. As they talked, they were given harmless beta-blockers, normally used to treat high blood pressure. When the patients next recalled those experiences at a later date, they remained calm and relatively detached; their overwhelming panic had disappeared.

ALTHOUGH IT'S EARLY DAYS, SCIENTISTS HOPE SUCH RESEARCH may eventually help to treat PTSD as well as addiction and obsessive-compulsive disorders. The beta-blockers appear to target the amygdala, which regulates the influence of emotion on memory.

According to Dr Oliver Hardt, of McGill University, it's therefore possible to turn down the emotional content of a terrifying memory. Despite the spectre of mind control, Dr Hardt insists the goal is not to remove memories entirely. “The drug works by interrupting only the brain circuitry that connects memory to fear,” he says. “You wouldn't want to erase someone's memory, even with PTSD. But you can reduce the part that's upsetting.”

Could breakthroughs such as these eventually predict which victims of war and other traumatic events are likely to develop PTSD? Israeli and US psychiatrists recently followed the experiences of Israeli citizens who survived terrorist attacks, assessing their memories and health at regular intervals between seven and 120 days after the events. Although all the survivors had initial gaps in memory, those whose memories—gaps and all—remained unaltered over time did not develop PTSD.

One hypothesis is that the hippocampus, the part of the brain responsible for processing and storing memories, is very sensitive to stress hormones such as cortisol, which flood the body at moments of extreme danger and fear. In some people, the encoding of terrifying memories may not have happened, thus “wiping” the memory for ever.

For some, the cure for PTSD may lie in a reportedly effective technique called rapid eye movement desensitisation and reprogramming (EMDR), developed by US psychologist Francine Shapiro. EMDR is increasingly used by psychotherapists in the US, UK and throughout Europe. Patients ▶



who have experienced a traumatic episode are asked to talk about it to a therapist. While talking, their eyes remain on the therapist's hand, which moves repeatedly from left to right, often up to 70 or more times.

This method has proved so successful that in 2005, NICE (the body responsible for NHS treatment guidelines) recommended EMDR as one of two best treatments for PTSD. Experts believe that it generates the brain chemistry normally associated

with rapid eye movement sleep, which is when the brain processes information and experiences. After three to five sessions, many people's PTSD symptoms dramatically subside, as the traumatic memories are reprogrammed. According to war veteran Rob, who suffers from PTSD, after undergoing two sessions: "The results have been startling. For the first time in 20 years, I slept through the night without a nightmare in eight out of 20 nights."

CARD TEXT BY NICOLE SWENGLEY; V&A IMAGES/VICTORIA & ALBERT MUSEUM, LONDON

PICK A CARD, BUT NOT JUST ANY CARD

Planning a game of cards this Christmas? Then take a closer look at the deck. The value of vintage cards has been rising, thanks to the recession, so if you've got a complete set in top condition, you could have a winner on your hands...

A limited-edition pack marking the 1983 UK elections, costing £9.99, would now fetch upwards of £60.

A *Wizard of Oz* deck, published to tie in with the 1940 film, is worth around £100.

A Queen Victoria souvenir deck, commemorating her 1897 diamond jubilee, could earn you £150. But a Dixieland pack from the same year, issued in the US, would fetch £250–£300.

A pack published in 1863 marking the marriage of the Prince of Wales (later King Edward VII) to Princess Alexandra of Denmark is now worth around £300–£500.

In general, complete decks from the late 17th and early 18th century sell for between £3,000 and £10,000—for example, a **17th-century English Popish Plot pack** (pictured) would fetch anything up to £5,000 today—while a good deck from 1820 to 1880 could fetch around £300.

But if you find a rare Renaissance deck in the attic, you've really hit the jackpot—they're snapped up by museums for as much as £93,000!

THE NEXT SALE OF CHESS SETS, GAMES AND PLAYING CARDS TAKES PLACE ON JANUARY 17, 2011. AT BONHAMS. SEE READERSDIGEST.CO.UK/LINKS FOR DETAILS.

