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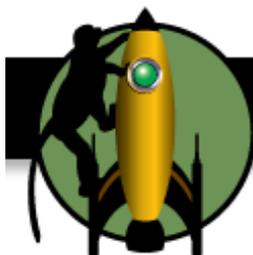


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9/11 memories reveal how flashbulb memories are made in the brain

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Research
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I have only ever seen one car crash and I remember it with crystal clarity. I was driving home along a motorway and a car heading the opposite way simply veered into the central reservation. Its hood crumpled like so much paper, its back end lifted clear off the tarmac and it spun 180 degrees before crashing back down in a cloud of dust. All of this happened within the space of a second, so the details may be different to what I remember. But the emotions I felt at the time are still vivid – the shock of the sight, the fear for the passengers, the confusion over what had happened.

Many studies have shown that peoples' memories become particularly clear when it comes to traumatic or shocking events. Even learning about a shocking event, rather than witnessing it first-hand, can produce unusually clear recollections. Many of us still remember where we were when we learned that famous figures like Princess Diana or John F. Kennedy had died (I found out about Diana on the toilet).

Scientists have suggested that this type of event triggers a process that produces a very specific and exceptionally vivid type of memory called a '[flashbulb memory](#)'. This concept has been kicking around since the 1970s, but the evidence that flashbulb memories actually exist is inconsistent.

[Tali Sharot](#) and colleagues from New York University decided to find some proper answers by studying the brain activity of people remembering a traumatic event. Doing such experiments would normally be ethically impossible – you cannot after all willingly [traumatise someone](#) in the name of science. But Sharot did not need to – unfortunately for us, the twenty-first century has already provided its fair share of traumas.



On September 11, 2001, the people of New York experienced terror and devastation on a massive scale. If any event led to the formation of flashbulb memories, this one would. Sharot recruited 24 people who had witnessed the World Trade Centre attacks first-hand and asked them to remember either the attacks, or a random event from another summer.

She found that people who were in Downtown Manhattan near the attacks had distinctly different

memories than those who were twice as far away in Midtown. The Midtown group recalled their 9/11 memories in the same way as their generic ones. But the Downtown group remembered their 9/11 experiences more vividly, strongly and confidently and gave both longer and more detailed descriptions. They reported seeing the towers “burning in red flames”, smelling the smoke and hearing “the cries of people”.

Not content with relying on descriptions, Sharot used a brain scanner to see if these differences were mirrored in the volunteers’ brains – specifically, in a small region called the [amygdala](#), the brain’s emotional control centre. The amygdala affects how memories are stored in the long-term and animal studies have shown that this storage is influenced by stress hormones. Sure enough, when asked them to think about 9/11, the Downtown group showed much greater activity in their left amygdala, while the Midtown group did not.

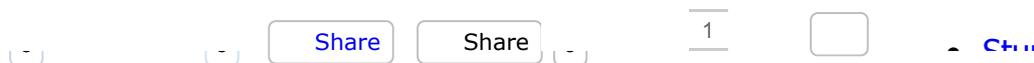


Despite these results, Sharot is still tentative about concluding that flashbulb memories, as they are classically defined, exist. Nonetheless, her results clearly show that experiencing a shocking event yields a very different and exceptionally vivid type of memory than the humdrum occurrences of daily life. These memories – flashbulb or not – are formed through a special mental route which involves the amygdala.

And Sharot’s brain scans turned up something more unexpected. When the Downtown group thought about 9/11, they also showed much lower activity than normal in the parahippocampal cortex. This part of the brain is thought to be involved in processing and recognising details of a scene or event. If its neurons are dimmed during shocking situations, this could explain why people who experience surprising events remember how they felt, but cannot reliably provide details.

During the tragic shooting of [Jean Charles de Menezes](#) in 2005, eyewitnesses proved to be wildly inaccurate, with first-hand accounts of his clothing, police action, and the number of shots fired clearly contradicting each other. If emotions are prized over details in memories of shocking events, how much value can we truly place on eyewitness accounts?

Reference: T. Sharot, E. A. Martorella, M. R. Delgado, E. A. Phelps (2007). How personal experience modulates the neural circuitry of memories of September 11 Proceedings of the National Academy of Sciences, 104 (1), 389-394 DOI: [10.1073/pnas.0609230103](https://doi.org/10.1073/pnas.0609230103)



October 14th, 2008 by [Ed Yong](#) in [Inside the brain](#), [Memory](#), [Neuroscience and psychology](#) | 8 comments | [RSS feed](#) | [Trackback >](#)

8 Responses to "9/11 memories reveal how flashbulb memories are made in the brain"

1. 1. [Ian Tindale](#) Says:

[October 14th, 2008 at 4:41 pm](#)

Argh! Now I have an indelible memory of you learning of the demise of Princess Di! I'll never erase that vivid imagery from my brain – need a mental Brillo pad, now!

2. 2. [Robert V Sobczak](#) Says:

[October 14th, 2008 at 8:45 pm](#)

Excellent post, and excellent blog (citations, etc). I also have an indelible memory of princess Di, but it was folded into an Arlo Guthrie concert on a really foggy night in Cape Cod. Can't the brain also do just the opposite even better: block things out?

3. 3. [DCBob](#) Says:

[October 15th, 2008 at 8:35 am](#)

My folks recently saw a hit-and-run accident at a roundabout in England. Five or six people happened to see the event, and they all had different memories – of the color and type of the car, of the timing, and so on. It turned out that nobody got the actual color and make right. My folks, who both pride themselves on the accuracy of their memories, were very impressed by the inaccuracy of everyone's perceptions. I've heard from cops that the only good witnesses are kids – they have no preconceptions and so they tend to accurately process what they see.

4. 4. [RBH](#) Says:

[October 15th, 2008 at 7:40 pm](#)

Elixabeth Loftus, of course, has been doing work on the unreliability of eyewitness testimony for decades. This provides some neuro support for her array of findings. I'm a little wary of anecdotal evidence from cops. I would *strongly* like to see some evidence of that. I'm not at all sure why kids should be less susceptible to confabulation than adults.

5. 5. [Paul Sunstone](#) Says:

[October 21st, 2008 at 12:31 pm](#)

I'm curious about the comment that kids might be the best witnesses since they lack preconceptions of what they should see. As I understand it, certain meditative practices are said to reduce preconceptions too. It would be interesting if there were some studies on that.

6. 6. [wayne](#) Says:

[June 17th, 2009 at 10:39 pm](#)

Excellent site here. I have always been interested in this type of memory. The picture that is taken when trauma hits. Where you were and what you were doing will be burned in your brain forever. I have a site that msy interest some. It's about collecting these memories and hopefully, if I get enough response, I will put a book together with everyones memories in it. You can check my lens out at <http://where-were-you-when-911.blogspot.com/> or <http://hubpages.com/hub/Share-Your-911-Story-Flashbulb-Memories>. Thanx and I look forward to hearing from you.

7. 7. [wayne](#) Says:

[June 27th, 2009 at 7:41 am](#)

Excellent site. Thanx for more info on flashbulb memories. They are something that have interested me since JFK was killed way back when I was in grade school. Memories such as that day, the Columbia Space Shuttle, Man walking on the moon and of course 9/11 are burned in my mind for a lifetime. I have started a site that some may be interested in having to do with 9/11 and flashbulb memories. Please come and share where you were and what you were doing when the planes hit the WTCs. Have a great day and thanx again for this site. Never Forget!

8. 8. [Kim](#) Says:

[August 30th, 2009 at 10:23 pm](#)

Interesting post, except at this point I need to disagree – I had a car accident 18 months ago and I remember NOTHING about the accident. This was the case at the time and I assumed it would come back – but it hasn't. Given I usually have a very reliable memory this is completely odd.

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• About Not Exactly Rocket Science



Ed Yong is an [award-winning](#) British science writer. His work has appeared in New Scientist, the Times, WIRED, the Guardian, Nature and more. Not Exactly Rocket Science is his attempt to talk about the awe-inspiring, beautiful and quirky world of science to as many people as possible.

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"Head and shoulders above many broadsheet hacks" - Ben Goldacre

"Ed Yong... is made of pure unobtainium and rides TWO Toruks." - Frank Swain

"Ed Yong is better than chocolate, fairy lights, and kittens chasing yarn. That is all." - Christine Ottery

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