

Erase your fear...

... or banish your addictions with the help of memory-boosting pills. Jessica Hamzelou faces her own phobia to find out more

IT'S happening again. My heart starts pounding and my pulse races. I can feel my face flush and my palms start to sweat. It is all I can do to prevent myself from breaking into a full-blown panic attack. And yet I'm not in any real danger. I'm just at the top of an escalator, making my way down to a London Underground rail platform, along with hundreds of other Londoners who don't seem phased in the slightest – but the sight of the drop below me is the stuff of my nightmares.

This scenario will sound familiar to the many other people with phobias. All it takes is a worrying thought or glimpse – whether of a steep drop or a spider's web – for the mind and body to race into panicked overdrive. These fears are difficult to conquer, largely because the best way of getting over a phobia is to expose yourself to your fear many times over.

But there may be a short cut. Drugs that work to boost learning may help someone with a phobia to “detrain their brain”, losing the fearful associations that fuel their panic. This approach is also showing promise for a host of other problems – from chemical and gambling addictions to obsessive nail-biting. In a bid to find out if it really works, I head to West Virginia to take part in a trial.

The brain's extraordinary ability to pick up new memories and forge associations is so well celebrated that its dark side is often neglected. In the case of a phobia, it may have been an unpleasant experience that once triggered a panicked response to spiders, mice or, for me, heights, leading the feelings to resurge whenever we see the relevant cue. Former drug addicts have similarly learned responses when they see something that reminds them of their habit: the sight of rolled-up bank notes for a cocaine user, for instance.

So how do we overcome such deep-seated associations? One answer is exposure therapy, a treatment primarily used to deal with anxiety and phobias. In those initial studies, people gradually expose themselves to increasingly anxiety-triggering situations – called a “fear hierarchy” – until they feel at ease with them. In my case, that would involve scaling a series of ever greater heights. As the individual becomes more comfortable with each situation, they create a new memory – one that links the cue with reduced feelings of anxiety, rather than the sensations that mark the onset of a panic attack. This process is called extinction learning.

Unfortunately, while it is relatively easy to create a fear-based memory, expunging that fear is pretty hard work. Each of those exposure trials will probably involve a great deal of stress and anxiety, leading some psychotherapists to conclude that the treatment is unethical.

For that reason, neuroscientists have been looking for new ways to speed up extinction learning. One such avenue is the use of “cognitive enhancers”. One of the most promising contenders is an antibiotic originally used to treat tuberculosis. Apart from its action on germs, D-cycloserine, or DCS, also acts on neurons. The drug slots into part of the “NMDA receptor” – a site that seems to modulate the neurons' ability to adjust their signalling in response to events. This tuning of a neuron's firing is thought to be one of the key ways the brain stores memories, and at very low doses, DCS appears to boost that process, improving our ability to learn.

In 2004, Kerry Ressler at Emory University in Atlanta, Georgia, and his colleagues were among the first teams to test whether DCS could also help people with phobias. They performed a pilot trial on 28 people undergoing exposure therapy for acrophobia – a fear of heights. Sure enough, they found that those given a small amount of DCS alongside their therapy were able to reduce their phobia to a greater extent than those given a placebo. Since then, other groups have replicated the finding in many more trials.

Future research may show ways to refine the method still further. It still takes a long time to accomplish even one of the steps on a person's fear hierarchy, says Cristian Sirbu, a behavioural scientist and psychologist at West Virginia University in Charleston. “You ▶



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