



“Could thinking really hard melt the pounds away?”

Jeff Wise

BLOGS

How Risky Is It, Really?

Why our fears don't always match the facts.

by [David Ropeik](#)



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Afraid? Forget About it!

New Strategies to Counter, or ERASE, Your Fears!

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Take a moment, and remember, in as much detail as possible, a time in your life when you were REALLY AFRAID!

I bet you could summon up a scary [memory](#) pretty easily, and that maybe your heart sped up or your skin got a little clammy or you had some sort of feeling in the pit of your stomach. We are really good at remembering things that scare us. With good reason. If we face a threat once, and survive, it's pretty handy to remember the details so we can avoid that situation in the future, or survive it again if we have to. Now [neuroscience](#) is looking inside that process, and discovering ways to counteract, or even erase, [fearful](#) memories. The implications for a wide range of psychological conditions is profound.

In experiments led by Jamie Peters of the University of Puerto Rico School of Medicine, (*Science*, June 4, 2010: Vol. 328. no. 5983, pp. 1288 - 1290), rats were conditioned to fear the sound of a bell. Every time they heard the bell, they got a shock. That fearful memory can then be counteracted with what's called extinction training, repeated exposure to the potentially harmful stimulus, without the harm. You ring the bell a bunch of times but don't shock the rats. After several rings of the bell, they learn that sometimes when the bell goes off, there's no shock. Extinction training is a common [therapy](#) for people with a wide range of anxiety and fear-related problems but, depending on the circumstances, it can take a long time and lots of repeated exposure to the stimulus to work. Fear is stubborn.

Now for the magic. Scientists studying fear memory had previously discovered that a naturally-occurring chemical called Brain Derived Neurotrophic Factor (BDNF) is important for forming fear memories, and that an area in the brain called the infralimbic medial prefrontal cortex is a key area involved in encoding these memories. (That's part of the brain behind the forehead.) The scientists injected BDNF into that part of the rats' brains, put the animals back in the cage where they got shocked, rang the bell once without a shock, and - Presto! - the rats were not as afraid as they had been conditioned to be. It didn't take several rings of the bell like extinction training normally dose. The BDNF and one ring of the bell were enough. BDNF acted just like extinction therapy, which usually takes much longer.

But extinction therapy has one important limitation. It doesn't erase the old fearful memory. It just adds a new one. If you take fear-conditioned rats who have had extinction therapy and expose them to the combination of the bell and the shock again, even once, they're quickly back where they started. The old memory is there. Wouldn't it be great if we could just erase the memory of what freaked us out in the first place? That may be possible too, according to a remarkable piece of research led by NYU neuroscience post doctoral fellow Daniela Schiller. (*Nature*, January 7, 2010 vol. 463-7, pp 49-54) And this one was done on people!

Subjects were shown a colored square, and got a shock. They learned to fear the sight of the square. They were brought back in a day later, and shown the square again, without the shock. The reminder made all of them afraid (as measured with sensors on the skin). Then the group was divided into thirds.

- One-third got extinction training ten minutes after seeing the scary square.
- The second third didn't get extinction training until six hours later.
- The last third got no extinction training.

All the subjects were brought back in one day later and shown the square again. Remarkably, the ones who had been given the extinction training just ten minutes after seeing the square, FORGOT THE FEAR! It was GONE! The subjects who had to wait more than 6 hours for their extinction training, and those who didn't get extinction training at all, were still afraid.

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