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## How to Erase Fear--in Humans

To get rid of a bad memory you may need to relive it first

By [Daniel Lametti](#) | March 23, 2010 | 29

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“Memory”, wrote Oscar Wilde, “is the diary that we all carry about with us”. Perhaps, but if memory is like a diary, it’s one filled with torn-out pages and fabricated passages.



*Image: joshblake*

In January, a group of New York University neuroscientists led by Daniela Schiller [reported](#) in the journal *Nature* that they had created fearful memories in people and then erased them. Besides being rather cool, the result provides new insight into how to treat traumatic memories in people.

The research was based on the work of neuroscientist Joseph LeDoux, a coauthor on the paper. Ten years ago, while experimenting with rats, Ledoux made a discovery that changed the way neuroscientists view memory from that of Wilde’s tidy diary to something more along the lines of a [James Frey](#) memoir.

In [that experiment](#), Ledoux conditioned rats to fear a bell by ringing it in time with an electric shock until the rats froze in fear at the mere sound of the bell. Then, at the moment when the fear memory was being recalled, he injected the rats with anisomycin, a drug that stops the construction of new neural connections. Remarkably, the next time he rang the bell the rats no longer froze in fear. The memory, it seemed, had vanished. Poof!

Ledoux concluded that the neural connections in which memories are stored have to be rebuilt each time a memory is recalled. And during rebuilding—or reconsolidation, as he termed it—[memories can be altered](#) or [even erased](#). Neuroscientists now believe that reconsolidation functions to update memories with new information—something of an unsettling idea, suggesting that our memories are only as accurate as the last time they were remembered.

Since the discovery, scientists have been searching for ways to use similar methods to alter the fear memories that cause posttraumatic [stress](#) disorder ([PTSD](#)). This, however, has proven difficult. Test subjects participating in research experiments are, of course, not lab rats, and scientists can't simply inject them with drugs as they please. But in her new paper, Schiller and her team may have discovered a noninvasive method to bring Ledoux's memory-erasing experiment to humans.

Psychologists have known for some time that it is difficult to treat fearful memories with therapy. Humans, like rats, can be trained in a laboratory to fear an innocuous stimulus—a sound or a color—by pairing it with a shock. But even after a form of laboratory therapy known as extinction training, where the stimulus is repeatedly presented without a shock to extinguish the fear, most subjects still show a rebound in the fear response a few hours later. Similarly, PTSD patients often show symptoms after years of therapy.

In both the laboratory and on the psychologist's couch, trauma therapy likely fails because it simply creates new competing memories without actually altering the fear memory causing the problem. Schiller reasoned that she might be able to make extinction training—"lab therapy"—more effective by triggering reconsolidation first, allowing traumatic memories to be altered with new, less fearful information.

To do this, she created fear memories in 65 test subjects by flashing yellow and blue squares at them, pairing some of the yellow squares with a mild shock to the wrist. After conditioning, the appearance of a single yellow square was enough to raise her subjects' skin conductivity—a fear response typically caused by an increase in sweat

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She then divided her subjects into three groups: A third were simply given lab therapy; they repeatedly viewed yellow and blue squares without shocks until they failed to break a sweat. The rest had the fearful memory triggered first by the sight of a single yellow square, and then got lab therapy after a lag of either six hours or ten minutes. Importantly, since reconsolidation takes about ten minutes to kick in after a memory is recalled, and lasts for a couple hours, only the ten-minute group would be in the process of reconsolidating the memory at the start of lab therapy. This timing, Schiller hypothesized, was everything: the ten-minute group would actually rewrite old memories, while the others would merely create new memories.

The next day, as expected, the memory had returned in some subjects—the yellow square still caused them to sweat—but the fear response did not return in any of the subjects whom she had triggered reconsolidation in ten minutes before therapy. Just as in Ledoux's rats, the memory had vanished. Poof!

To test how permanent the effect was, one year later, Schiller tracked down about a third of the original test subjects and got them to come back into the lab so she could again flash colored squares in their faces. The subjects that she hadn't triggered reconsolidation in ten minutes before lab therapy still broke a sweat in the presence of the yellow square—a nice demonstration of just how hard it is to eliminate a fearful memory. But the subjects that she had triggered reconsolidation in ten minutes before therapy still didn't break a sweat when they saw the yellow square; in these subjects, the fear memory had been permanently erased.

Schiller believes that by timing lab therapy so that it was initiated precisely when the memory was being reconsolidated—when the neural connections it was stored in were open to change—therapy did not simply create new memories, but actually rewrote the original memory with one that didn't include a fear response.

Real life fear memories, which involve multiple senses, are much more complex than memories created by scientists in a laboratory. But the results of the experiment do make the important suggestion that in order for PTSD therapy to be effective, the traumatic memory may have to be fully remembered first. This means, of course, that if you want to overwrite a frightful mugging with a day at the beach, you may have to relive every last detail of the mugging—a reality that might make reconsolidation-based PTSD therapy rather, well, traumatic.

**ABOUT THE AUTHOR(S)**

Daniel Lametti is a PhD student in psychology at McGill University in Montreal and the science and technology columnist at The McGill Daily. He blogs at daniellametti.com.

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1. [Matthewt69](#)  
12:40 AM 3/23/10

I have found that i can remove at least some of the painful emotion from bad memories. I catch myself at the time I am recalling a painful memory with all its associated emotions and then deliberately play the whole episode again in my mind, but this time attempting to maintain a neutral or positive view point. After doing this once or twice the painful memory seems to just wither away.

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2. [lahmad](#)  
02:53 AM 3/23/10

While this science is interesting, it can be really misused by governments who are very fond of wars. Or it can be used in a dictatorial set up against political enemies. Scinetists need to recommend safegurads for such interesting reserach activities.

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**3. MikelnMaine**

06:03 AM 3/23/10

Careful Lahmad.. someone may want to erase your "fear of government".

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**4. sillofthedoor**

07:41 AM 3/23/10

This is already being done in various therapies. One I have guided people in as well as taking part in it and experiencing the effects is to recall a past memory and then decided on a new scenario to replace the old one and with the help of a couple of supporters to play the roles of others role play the new scenario.

Very effective you can feel the change happening in the body as you engage with the role play..

P.s. don't try this on others at home kids, I'm simplifying the process and there are a lot of pitfalls to avoid which could lead to actually reinforcing the initial problem or replacing one problem with another. For a start the scenario has to be win-win orientated so if you don't believe that's possible you aren't qualified to lead anyone into it.

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**5. lansowelo**

08:03 AM 3/23/10

The Book "Waking The Tiger- Healing Trauma" by Peter A. Levine, has some interesting material about how to better relate to Trauma and how to shift out of cycling and re-cycling traumatic experiences.

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**6. lansowelo**

08:07 AM 3/23/10

the book "Waking The Tiger- Healing Trauma" by Peter A. Levine, ISBN #1-55643-233-X has some very intriguing information about how to relate to trauma outside of the unproductive cycling and re-cycling of the traumatic memory. This book has been quite beneficial for me.

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**7. Lee Robert**

08:57 AM 3/23/10

You can use something called EFT (Emotional Freedom Technique) to do the same thing. You tap acupressure points with your fingers (this has a calming effect) while reliving a traumatic or emotional event. You can tap and say a statement or you can visualize. It doesn't always have to be exactly on a acupressure point, but you do need to do it for a few minutes or a few repetitions of the points. It is free and easy, but you may have multiple emotions to tap on for an incident. Like you may have fear or terror because of an event and you may also have guilt for not responding a certain way. You may have anger at others for not helping or being there when you needed them. There are books and info on the internet. It can also help with emotional food addictions, anxiety attacks, and etc.

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**8. arynix**

09:11 AM 3/23/10

As a survivor of emotional abuse from an alcoholic family, I was helped greatly by a counselor practicing NLP (neuro-linguistic programming), which seeks to do exactly what this article talks about, only without injections or drugs. By first framing the traumatic experience in sympathetic terms (children's fear of abuse is rational- a normal reaction to an abnormal situation), and then helping the "adult" part to learn a better reaction to current situations by realizing the trauma is in the past, one can "rewrite," if not the memory, at least the reaction.

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**9. Riley Toole**

03:34 PM 3/23/10

This research seems to fit well with the experience of most of us that you have to "deal with" a loss or traumatic event, you can't just try to forget it, or ignore it, or replace it with pretty memories. "Dealing with it" seems to often involve reliving and/or analyzing the event and your responses in detail. Perhaps this research explains the success of techniques that follow that kind of path.

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There appears to be a close connection between this research

**10. garyinpullman**  
04:13 PM 3/23/10

and an extremely therapy used for treating PTSD known as eye movement desensitization and reprogramming (EMDR), which interested readers can look up on wikipedia.

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