

Well-timed timeout effective in wiping out fear memory response

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Banishing a fear-inducing memory might be a matter of the right timing, according to new research.

Marie Monfils, an assistant professor of psychology at The University of Texas at Austin, has taken advantage of a key time when memories are ripe for change to substantially modify memories of fear into benign memories and to keep them that way.

The finding is a significant advance in learning how [memory](#) can be manipulated in rodents. It also could indicate a potential treatment for humans suffering from anxiety-related disorders.

Current treatments are not dependably long lasting and some of the treatments include drugs, many of which would be hard to administer locally in humans and have harmful side effects.

Monfils' paper was published this week in *Science Express*, an online publication of *Science*. She conducted the study with colleagues at New York University where she was a post-doctoral researcher. She joined The University of Texas at Austin faculty in January.

The experiment began by inducing fear in rats by sounding a tone and then shocking them under the feet. Eventually, the rat would exhibit fear from just hearing the tone.

The standard treatment for getting rid of the fear response is to sound the tone repeatedly, without a shock. Eventually, the rat does not exhibit fear at the sound. The method is called [extinction](#).

There's something else going on when a stimulus evokes the fear response. The memory of fear is being reconsolidated, or recommitted, to long-term memory. Each time memory is retrieved (by giving a single presentation of the sound), it is susceptible to change (which is called a labile state), and the reconsolidation process can be

interrupted (usually pharmacologically).

Monfils' idea was to alter the timing of the extinction process.

In her experiment, the tone to stimulate a fear response was sounded. Then, after an interval, which made this initial tone presentation stand out, extinction training was applied.

"I thought why not try to maximize the strengths of both of these techniques? The concept of extinction and the concept of reconsolidation," Monfils said, "and try to come up with a way to target a memory when it's weakened, after it's been retrieved and when it's in this labile stage and then target it with a standard extinction protocol."

The rats treated with this technique showed lower levels of fear induced by the sound itself, but also smaller chances that the original fear memory would spontaneously resurface.

"It seems that we have this window of opportunity," Monfils said. "So when you retrieve the memory it becomes susceptible to disruption but only for a certain period of time."

She said the findings might find their way into treating humans with [anxiety](#) disorders.

"But we have a lot more work to do before we actually get there," she said. "And that's something I'm pursuing right now with various collaborators, trying to extend the findings to see how we can translate them to being used in humans."

Source: University of Texas at Austin ([news](#) : [web](#))

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