

# Remembering to forget: Destroying bad memories and breaking bad habits

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(Medical Xpress) -- Retrieving a memory is crucial when trying to extinguish it completely, according to research published today by University of Birmingham scientists in the journal *Nature Communications*.

Birmingham [psychologists](#) tested the [hypothesis](#) that if you cause a [memory](#) to be recalled, wait for a short time and then undertake a cue exposure or 'extinction' procedure this can completely disrupt and destroy the memory.

This approach could be beneficial in patients with post traumatic stress disorder or drug addiction problems. Dr Jonathan Lee, lead investigator from the University of Birmingham's School of Psychology said: "We know that trials are ongoing in which PTSD patients are treated using drugs in a similar way – they are asked to relive their traumatic episode as part of the 'retrieval process' and are then given a betablocker drug. This seems to disrupt the memory and may give the patient genuine remission. Recent research suggests that this disruption of traumatic memories could be achieved by without resorting to pharmaceutical agents. We wanted to see if this also applies to the memories that underlie reward-seeking behavior."

In this study two groups of rats were used to find out whether the combination of a brief memory retrieval and extended cue exposure is enough to destroy the memory completely. In the first group, over a 9 day period, the rats learnt that when a [light](#) came on, [food](#) was given. On

the 10th day the rats were given a cue exposure session, with the light presented many times without being given food. Cue exposure alone results in the light gradually losing its motivational properties as the rats were not given any food when it was switched on. However, the light quite easily recovers its motivational properties over time and with reminders.

The psychologists undertook the same process with the second group of rats, but this time the rats were given a brief reminder session, in which the light alone was presented to induce the rats to remember the light-food memory one hour prior to cue exposure. In this group, the rats became completely indifferent to the light and the link with the food was permanently broken.

Dr Lee continued: "We assessed whether the light means anything to the rats by ascertaining how much the rat is willing to work for the light, just because of its link to food. Just adding the memory retrieval renders the cue exposure much more effective. The [rats](#) appear to become completely indifferent to the light, and it seems that the light never recovers its motivational properties."

"This procedure could also be useful in treating compulsive eaters and drug addicts. By retrieving a memory – showing an addict a syringe or a compulsive eater pictures of food – and then extinguishing that memory by not giving the patient access to drugs or food we might be able to break the connection between the food and the stimulus which is predictive of the reward and that drives the behaviour. If you can break the associative link between the stimulus and the reward it loses its motivational impact on behavior."

Provided by University of Birmingham

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