Our brain dissociates emotional response from explicit memory in fearful situations

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Researchers at the Cognition and Brain Plasticity group of the Bellvitge Biomedical Research Institute (IDIBELL) and the University of Barcelona have been tracking the traces of implicit and explicit memories of fear in human. The study has been published in the journal *Neurobiology of Learning and Memory* and describes how in a context of fear, our brain differently encodes contextual memory of a negative event (the place, what we saw...) and emotional response associated.

The study measures electrodermal activity of 86 individuals in a fearful generated in the laboratory and in a neutral context in which they have to learn a list of words. One week and two weeks after the experiment they are tested to see which words they remembered.

"In both contexts," explains Pau Packard, author of the study, "forgetting curve was normal. Over time they forgot all the words, the explicit trace. Moreover in the fearful context the electrodermal activity, the emotional implicit response, was exactly the same, much higher than in the neutral context."

"In the traumatic events seems that over time there is a portion of memory that is erased or we do not have access, we forget the details but still maintaining the emotional reaction. The imprint is divided into two separate paths. The brain dissociates the explicit memory of a negative event from the emotional response"

This may help to understand why in pathological situations of post-traumatic stress disorders, the uncontrolled emotional response linked to the negative event is generated without knowing what causes it.

As explained by Lluís Fuentemilla, project coordinator, the study "helps explain how the processing of fearful memories can lead to post-traumatic stress disorder and also opens the door to the investigation of new therapeutic strategies for these disorders because the implicit memory trace in a fearful context does not loose over time and can be detected through electrodermal measures."

More information: Packard P.A., Rodríguez-Fornells A., Stein L.M., Nicolás B., Fuentemilla L.. Tracking explicit and implicit long-lasting traces of fearful memories in humans. *Neurobiol Learn Mem.* 2014 Sep 26;116C:96-104.

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