

## Dreaming takes the sting out of painful memories: study

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They say time heals all wounds, and new research from the University of California, Berkeley, indicates that time spent in dream sleep can help.

UC Berkeley researchers have found that during the dream phase of <u>sleep</u>, also known as <u>REM sleep</u>, our stress chemistry shuts down and the brain processes emotional experiences and takes the painful edge off difficult memories.

The findings offer a compelling explanation for why people with <u>post-</u> <u>traumatic stress disorder</u> (PTSD), such as war veterans, have a hard time recovering from painful experiences and suffer reoccurring nightmares. They also offer clues into why we dream.

"The dream stage of sleep, based on its unique neurochemical composition, provides us with a form of overnight therapy, a soothing balm that removes the sharp edges from the prior day's emotional experiences," said Matthew Walker, associate professor of psychology and neuroscience at UC Berkeley and senior author of the study to be published this Wednesday, Nov. 23, in the journal <u>Current Biology</u>.

For people with PTSD, Walker said, this overnight therapy may not be working effectively, so when a "flashback is triggered by, say, a car backfiring, they relive the whole visceral experience once again because the emotion has not been properly stripped away from the memory during sleep."



The results offer some of the first insights into the emotional function of Rapid Eye Movement (REM) sleep, which typically takes up 20 percent of a healthy human's sleeping hours. Previous brain studies indicate that sleep patterns are disrupted in people with mood disorders such as PTSD and depression.

While humans spend one-third of their lives sleeping, there is no scientific consensus on the function of sleep. However, Walker and his research team have unlocked many of these mysteries linking sleep to learning, memory and <u>mood regulation</u>. The latest study shows the importance of the REM dream state.

"During REM sleep, memories are being reactivated, put in perspective and connected and integrated, but in a state where stress neurochemicals are beneficially suppressed," said Els van der Helm, a doctoral student in psychology at UC Berkeley and lead author of the study.

Thirty–five healthy young adults participated in the study. They were divided into two groups, each of whose members viewed 150 emotional images, twice and 12 hours apart, while an MRI scanner measured their brain activity.

Half of the participants viewed the images in the morning and again in the evening, staying awake between the two viewings. The remaining half viewed the images in the evening and again the next morning after a full night of sleep.

Those who slept in between image viewings reported a significant decrease in their emotional reaction to the images. In addition, MRI scans showed a dramatic reduction in reactivity in the amygdala, a part of the brain that processes emotions, allowing the brain's "rational" prefrontal cortex to regain control of the participants' emotional reactions.



In addition, the researchers recorded the electrical brain activity of the participants while they slept, using electroencephalograms. They found that during REM dream sleep, certain electrical activity patterns decreased, showing that reduced levels of stress neurochemicals in the brain soothed emotional reactions to the previous day's experiences.

"We know that during REM sleep there is a sharp decrease in levels of norepinephrine, a brain chemical associated with stress," Walker said. "By reprocessing previous <u>emotional experiences</u> in this neurochemically safe environment of low norepinephrine during REM sleep, we wake up the next day, and those experiences have been softened in their emotional strength. We feel better about them, we feel we can cope."

Walker said he was tipped off to the possible beneficial effects of REM sleep on PTSD patients when a physician at a U.S. Department of Veterans Affairs hospital in the Seattle area told him of a blood pressure drug that was inadvertently preventing reoccurring nightmares in PTSD patients.

It turns out that the generic blood pressure drug had a side effect of suppressing norepinephrine in the brain, thereby creating a more stressfree brain during REM, reducing nightmares and promoting a better quality of sleep. This suggested a link between PTSD and REM sleep, Walker said.

"This study can help explain the mysteries of why these medications help some PTSD patients and their symptoms as well as their sleep," Walker said. "It may also unlock new treatment avenues regarding sleep and mental illness."

Provided by University of California - Berkeley



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