PRESS RELEASE

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Cognitive Bias Modification for Memory Bias (CBM-M) May Help Reduce Stress

The study provides the first evidence that memory-based training reduces stress and alters its underlying neurobiological mechanisms

Negative memory bias, the tendency to remember negative experiences more easily than positive ones, can fuel cycles of anxiety and depression. In a recent study, researchers from the University of Toyama identified Cognitive bias modification for memory bias (CBM-M) as a potential, accessible intervention for people at risk. Using a randomized controlled trial and brain imaging techniques, the study shows that CBM-M can reduce psychological and biological stress and alter brain circuits linked to emotional memory.

Our minds have a tendency to latch onto negative experiences more strongly than positive ones. While occasional negative thoughts are a common human experience, persistent ones can trap people in a self-reinforcing cycle, deepening feelings of anxiety and depression. To help break this cycle, researchers developed a targeted mental training approach known as the cognitive bias modification for memory (CBM-M). This training is designed to encourage the active recall of positive information, particularly in response to positive cues presented in a sequence with negative ones. Early research has found that CBM-M can strengthen the recall of positive words and occasionally improve mood. However, its overall effectiveness has remained unclear and inconsistent.

A new study from the University of Toyama, Japan, now examines the neurobiological effects of CBM-M, offering insight into how this training may work. Researchers led by Professor Yuko Hakamata from the University of Toyama, along with Professor Hirokuni Tagaya at Kitasato University School of Allied Health Sciences, Japan, and Director Hiroaki Hori from National Institute of Mental Health, Japan, found that CBM-M may reduce both psychological and physical stress by modifying biased memory-processing patterns of memorization and retrieval, rather than by explicitly reconstructing past experiences, as is common in many psychotherapeutic approaches. The results were published online in Volume 55 of the journal *Psychological Medicine* on December 24, 2025.

"These findings provide the first evidence of its effectiveness in reducing stress and its underlying neurobiological mechanisms," says Prof. Hakamata.

The study involved 58 participants with elevated anxious and depressive traits, who were randomly assigned to either a CBM-M group or a sham (placebo) training group. Over the course of 1 month, both groups completed eight web-based sessions involving word memorization and recall of both negative and positive words. Participants in the CBM-M group were instructed to vividly recall a specific positive autobiographical memory in

response to each positive word, such as a moment when they felt confident or capable. The sham group memorized the same words but did not perform this personal recall exercise.

Both groups showed reductions in anxiety and depressive traits and improvements in mood over the course of training, suggesting that engaging in structured, emotionally focused tasks may have general benefits, possibly due to repeated exposure to positive material.

However, only the CBM-M group showed specific biological and cognitive benefits. Compared with the sham group, participants who received CBM-M showed reduced stress vulnerability, including lower fatigability, a decrease in explicit negative memory bias, and reduced daytime levels of the stress hormone cortisol.

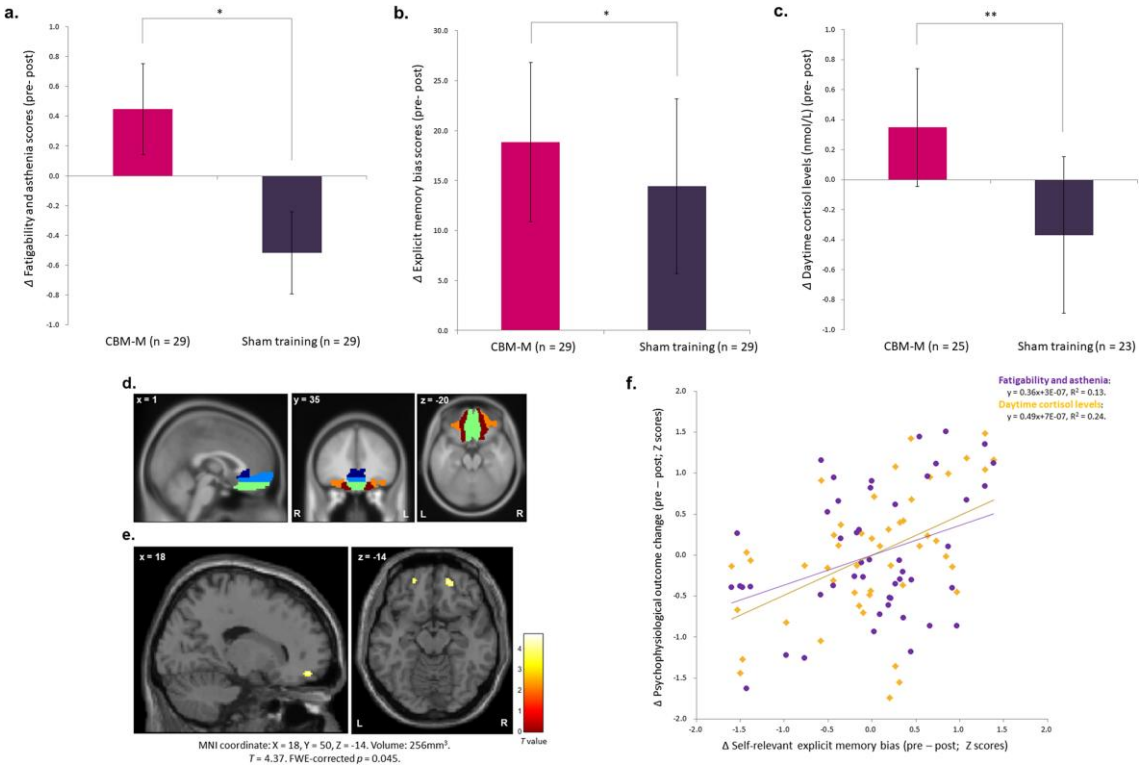
Brain imaging provided a potential neural mechanism for these effects. CBM-M specifically increased functional connectivity between the amygdala, a brain region central to emotional memory, and the anterior medial orbitofrontal cortex, which is involved in processing social reward and autobiographical memory. This suggests that the training may strengthen neural pathways supporting the retrieval of positive, personally meaningful memories, although the researchers caution that multiple mechanisms are likely involved.

"An intervention to ameliorate the nonconscious brain patterns that preferentially encode and retrieve emotionally negative information can lead to reductions in physical and psychological stress," says Prof. Hakamata.

However, the training did not consistently increase the vividness of positive autobiographical memories across all participants. Instead, participants in both groups tended to recall more neutral, factual details, likely because reduced psychological distress from the exercise helped the participants recall events more objectively. The effects also varied by personality profile: CBM-M helped maintain positive autobiographical memory specificity in participants with anxiety-predominant traits, but this effect was not observed in those with depression-predominant traits.

Given these differences, the researchers emphasize that responses to CBM-M might vary, and further studies are needed to identify who benefits most and to further clarify the mechanisms involved.

Image



Title: Effects of cognitive bias modification for memory (CBM-M) compared with sham training
Caption: Compared with sham training, CBM-M specifically lowered cortisol levels and stress vulnerability, whose magnitudes were correlated with reduced negative memory bias. Brain scans showed it also strengthened connectivity between the amygdala and the anteromedial orbitofrontal cortex, suggesting a neural mechanism for its benefits.
Credit: Professor Yuko Hakamata from the University of Toyama, Japan
Source link: https://www.cambridge.org/core/journals/psychological-medicine/article/effectiveness-and-neurobiological-actions-of-memory-bias-modification-a-randomized-controlled-trial/43EEF03276E6881710F68A22B52D71BE

Reference

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About University of Toyama, Japan
University of Toyama is a leading national university located in Toyama Prefecture, Japan, with campuses in Toyama City and Takaoka City. Formed in 2005 through the integration of three former national institutions, the university brings together a broad spectrum of disciplines across its 9 undergraduate schools, 8 graduate schools, and a range of specialized institutes. With more than 9,000 students, including a growing international cohort, the university is dedicated to high-quality education, cutting-edge research, and meaningful social contribution. Guided by the mission to cultivate individuals with creativity, ethical awareness, and a strong sense of purpose, the University of Toyama fosters learning that integrates the humanities, social sciences, natural sciences, and life sciences. The university emphasizes a global standard of education while remaining deeply engaged with the local community.

Website: https://www.u-toyama.ac.jp/en/

About Professor Yuko Hakamata from the University of Toyama, Japan
Dr. Yuko Hakamata is a Professor of Clinical and Cognitive Neuroscience at the University of Toyama School of Medicine, a position she has held since 2021. She earned her PhD from The University of Tokyo and completed research training at the U.S. National Institute of Mental Health. She is a licensed clinical psychologist and Beck Institute-certified CBT clinician; her work integrates psychology, neuroscience, endocrinology, immunology, and genetics to understand emotional dysregulation. Her research focuses on developing effective and accessible psychological interventions, including cognitive bias modification, cognitive training, and cognitive behavioral therapy for clinical and high-risk populations.

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