

Hypnosis study reveals brain's 'amnesia centers'

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Brain scans of hypnotized people that are taken as they forget and are triggered to remember have revealed neural circuitry that is key to the memory suppression and recall process. The researchers who conducted the study said their insights into the memory suppression and recall process may yield insight into the mechanisms underlying amnesia.

Yadin Dudai and colleagues published their findings in the January 10, 2008, issue of the journal *Neuron*, published by Cell Press.

In their experiments, the researchers identified two groups of volunteers—those who were susceptible to hypnotic suggestions and those who were not. They showed both groups a documentary depicting a day in the life of a young woman. A week later, they placed them in a magnetic resonance imaging scanner and induced them into a hypnotic state. In this state, the scientists gave the subjects a posthypnotic suggestion to forget the movie, also giving them a reversibility cue that would restore the memory.

Once the subjects had been brought out of the hypnotic state, the researchers tested their recall of the movie, then gave them the reversibility cue and tested their recall again. As expected, the hypnosis-susceptible group showed reduced recall of the movie, compared with the hypnosis-nonsusceptible group.

Analysis of the brain scans taken during posthypnotic amnesia and memory recovery revealed distinctive activity differences between the

hypnosis-susceptible group and -nonsusceptible group in specific occipital, temporal, and prefrontal areas of the brain. The researchers also detected telltale brain activity changes in the hypnosis-susceptible group as they forgot and recalled memory of the movie. In that group, activity in some brain regions was suppressed during memory suppression, while activity in other regions increased. And during reversal of the posthypnotic suggestion, the susceptible group showed recovery of activity in suppressed regions.

“The paralleled recovery of brain activity and memory performance strongly suggests that suppression was exerted at early stages of the retrieval process, thus preventing the activation of regions that are crucial for productive retrieval,” wrote the researchers. They wrote that their findings suggest that the amnesia induced by the posthypnotic suggestion “affects an executive preretrieval monitoring process, which produces an early decision on whether to proceed or not on retrieval, and in case of a [question about the movie], aborts the process.”

The researchers said that further studies will be needed to determine whether their findings apply to cases of functional amnesia seen in the clinic. However, they said that some forms of amnesia may be a consequence of the “preretrieval memory abort” mechanism their findings revealed. Thus, hypnosis may at least partially model such forms of amnesia, they said.

“All in all, our data identify brain circuits that subserve suppression of retrieval of long-term memory of a real-life-like extended episode in the course of posthypnotic FORGET suggestion,” they concluded. “Some of these regions are likely to play a role in normal retrieval. Others are likely to be engaged in dysfunctions that involve an executive decision to abort subsequent retrieval.”

Source: Cell Press

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