

Imaging the hypnotized brain: Neural mechanisms of suggested paralysis

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Although there is no doubt that hypnosis can impact the mind and behavior, the underlying brain mechanisms are not well understood. Now, new research provides fascinating insight into the specific neural effect of the power of suggestion. The study, published by Cell Press in the June 25 issue of the journal *Neuron*, uncovers the influence of hypnotic paralysis on brain networks involved in internal representations and self imagery.

Previous research has revealed suggestion-induced changes in brain activity underlying memory, pain perception, and voluntary movement and led to the suggestion that the effects of hypnosis may involve engagement of brain processes that mediate executive control and attention. However, none of these studies directly tested whether an inhibition or disconnection of executive control systems actually caused the observed changes in neural activity.

A group of researchers from the Neuroscience Center and Medical School at the University of Geneva designed an experiment to assess motor and inhibitory [brain circuits](#) during hypnosis-induced paralysis. "We used [functional magnetic resonance imaging](#) to directly test whether a hypnotic suggestion of paralysis activates specific inhibitory processes and whether these may or may not correspond to those responsible for inhibition in nonhypnotic conditions," explains lead study author Dr. Yann Cojan.

Specifically, subjects performed a task where they prepared to make a

hand movement in response to a cue and then, depending on the signal, did or did not execute the prepared movement. Some subjects were hypnotized with the suggestion that their left hand was paralyzed while others were instructed to simulate left hand paralysis. Dr. Cojan and colleagues found that hypnosis produced distributed changes in prefrontal and parietal areas involved in attention along with striking modifications in the functional connectivity of the [motor cortex](#) with other brain areas.

Importantly, despite the suggestion of paralysis, the motor cortex was normally activated during the preparation phase of the task. This suggests that hypnosis did not suppress activity in motor pathways or eliminate representation of motor intentions. Hypnosis was also associated with an enhanced activation of the precuneus, a brain region involved in memory and self imagery, and with a reconfiguration of executive control mediated by the frontal lobes.

The researchers conclude that hypnosis induces a disconnection of motor commands from normal voluntary processes under the influence of brain circuits involved in executive control and self imagery. "These results suggest that hypnosis may enhance self-monitoring processes to allow internal representations generated by the suggestion to guide behavior but does not act through direct motor inhibition," says Dr. Cojan. "These findings make an important new step towards establishing neurobiological foundations for the striking impact of hypnosis on the [brain](#) and behavior."

Source: Cell Press ([news](#) : [web](#))

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