

Tickling the brain with magnetic stimulation improves memory in schizophrenia

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Cognitive impairments are disabling for individuals with schizophrenia, and no satisfactory treatments currently exist. These impairments affect a wide range of cognition, including memory, attention, verbal and motor skills, and IQ. They appear in the earliest stages of the disease and disrupt or even prevent normal day-to-day functioning.

Scientists are exploring a variety of strategies to reduce these impairments including "exercising the brain" with specially designed computer games and medications that might improve the function of [brain circuits](#).

In this issue of [Biological Psychiatry](#), Dr. Mera Barr and her colleagues at University of Toronto provide new evidence that stimulating the brain using repetitive transcranial magnetic stimulation (rTMS) may be an effective strategy to improve cognitive function.

"In a [randomized controlled trial](#), we evaluated whether rTMS can improve working memory in schizophrenia," said Barr and senior author Dr. Zafiris Daskalakis. "Our results showed that rTMS resulted in a significant improvement in working memory performance relative to baseline."

[Transcranial magnetic stimulation](#) is a non-invasive procedure that uses magnetic fields to stimulate [nerve cells](#). It does not require sedation or anesthesia and so patients remain awake, reclined in a chair, while treatment is administered through coils placed near the forehead.

"TMS can have lasting effects on brain circuit function because this approach not only changes the activity of the circuit that is being stimulated, but it also may change the plasticity of that circuit, i.e., the capacity of the circuit to remodel itself functionally and structurally to support cognitive functions," explained Dr. John Krystal, Editor of *Biological Psychiatry*.

Previous work has shown that rTMS improves working memory in healthy individuals and a recent open-label trial showed promising findings for [verbal memory](#) in [schizophrenia patients](#). This series of findings led this study to determine if high frequency rTMS could improve memory in individuals with schizophrenia.

They recruited medicated schizophrenia patients who completed a working memory task before and after 4 weeks of treatment. Importantly, this was a double-blind study, where neither the patients nor the researchers knew who was receiving real rTMS or a sham treatment that was designed to entirely mimic the procedure without actually delivering brain stimulation.

rTMS not only improved working memory in patients after 4 weeks, but the improvement was to a level comparable to healthy subjects. These findings suggest that rTMS may be a novel, efficacious, and safe treatment for working memory deficits in schizophrenia.

In 2008, rTMS was FDA-approved to treat depression for individuals who don't respond to pharmacotherapy. The hope is that additional research will replicate these findings and finally provide an approved treatment for cognitive impairments in schizophrenia.

The authors concluded: "[Working memory](#) is an important predictor of functional outcome. Developing novel treatments aimed at improving these deficits may ultimately translate into meaningful changes in the

lives of patients suffering from this debilitating disorder."

More information: The article is "Can Repetitive Magnetic Stimulation Improve Cognition in Schizophrenia? Pilot Data from a Randomized Controlled Trial" by Mera S. Barr, Faranak Farzan, Tarek K. Rajji, Aristotle N. Voineskos, Daniel M. Blumberger, Tamara Arenovich, Paul B. Fitzgerald, and Zafiris J. Daskalakis ([doi: 10.1016/j.biopsych.2012.08.020](https://doi.org/10.1016/j.biopsych.2012.08.020)). The article appears in *Biological Psychiatry*, Volume 73, Issue 6 (March 15, 2013)

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