

Why electrical brain stimulation to enhance memory or relieve depression may not work

[S]cientists and hobbyists alike look for ways to change the activity of neurons without cutting into the brain and implanting electrodes. One popular set of techniques, called transcranial electrical stimulation (TES), delivers electrical current via electrodes stuck to the scalp, typically above the target brain area. In recent years a number of studies have attributed wide-ranging benefits to TES including [enhancing memory](#), [improving math skills](#), [alleviating depression](#) and even [speeding recovery from stroke](#).

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But little is known about how TES actually interacts with the brain, and some studies have raised serious doubts about the effectiveness of these techniques. A study published on February 2 in Nature Communications ups the ante, reporting that conventional TES techniques do not deliver enough current to activate brain circuits or modulate brain rhythms.

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In fact, in both rats and human cadavers, [researcher György] Buzsáki's team found about 75 percent of currents applied to the scalp never reach the brain, but instead are taken up by the skull, scalp and other external tissues.

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"Most TES approaches apply stimulation for tens of minutes," notes [Marom Bikson](#), a biomedical engineer at The City College of New York who was not involved with the study. Bikson suggests current TES practices could still exert subtle effects on neurons that accumulate over time to modulate brain function.

Read full, original post: [Brain Stimulation Is All the Rage—but It May Not Stimulate the Brain](#)