

Mental Improvement Through Magnetic Stimulation

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BACKGROUND

Many areas of the brain are involved in "higher cognitive functions" and the extensive connections of cortical circuits with limbic circuits add emotional complexity to our behaviors. Characterization of this "cognitive-emotive" profile may have new applications in light of two separate findings: 1) Neurofeedback has been used to temporarily induce "state-of-mind" changes for treating attention deficit disorders and epilepsy, 2) Modification of specific brain circuits via Transcranial Magnetic Stimulation (TMS) has been shown to induce an improvement in memory functions or a reduction/elimination of symptoms of an illness. The invention describes a means to combine characterization of bioelectric activity with magnetic field-brain stimulation techniques to produce adaptive and prolonged improvements in mental state.

TECHNOLOGY DESCRIPTION

The adaptive changes effected by the current invention are accomplished via combinatorial recording and stimulation with real-time, bi-directional feedback. A headset captures the user's bioelectric signals, provides direct feedback and includes controls, which can be used to adjust the stimulation via embedded magnetic field coils.

This system allows an individual to fine-tune the stimulation over time to produce a persistent change in his or her cognitive-emotive profile.

ADVANTAGES

The current invention consists of the following.

- ▶ State-of-the-art biological sensor technology, signal processing, pattern recognition, and computational algorithms.
- ▶ Real-time characterization of mental state combined with bi-directional feedback.
- ▶ Treatments that are iteratively "tuned" to the psychological response to an intervention.
- ▶ Utility as an alternative or adjunct therapy.

In sum, this may significantly improve treatments for many neurological conditions by improving individual wellness as opposed to simply reducing or eliminating symptoms.

RELATED MATERIALS

- ▶ Recent research related to this patent can be found at [UCSD Brain Computer Interface Home](#).
- ▶ Research interests can be found at [UCSD Cognitive Neuroscience Laboratory](#).
- ▶ A video demonstration that captures the "input" component of this technology (adapted to a gaming output) is found at [Game Prototype](#).

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,460,903	12/02/2008	2004-090

CONTACT

University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.



INVENTORS

- ▶ Pineda, Jaime A.

OTHER INFORMATION

KEYWORDS

cognition, emotion, interface, brain,
signal, neurologic, TMS, ADD,
epilepsy, wellness

CATEGORIZED AS

- ▶ [Medical](#)
- ▶ [Devices](#)

RELATED CASES

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