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Study Points at a Clear-Cut Way to Diagnose PTSD

By Mark Thompson / Washington

For all the attention focused on posttraumatic stress disorder (PTSD) in recent years, doctors have never had a clear-cut way to be certain a patient has it. But Minnesota scientists now believe they have found a long-sought PTSD fingerprint that confirms the disorder by measuring electromagnetic fields in the brain. The finding, detailed in the latest issue of the *Journal of Neural Engineering*, could help the 300,000 cases of PTSD that are anticipated among the 2 million U.S. troops who have gone to war in Afghanistan and Iraq.

"This shows that PTSD is a brain disease," says Dr. Apostolos Georgopoulos, who led the research along with Brian Engdahl and a team from the Brain Sciences Center at the Minneapolis VA Medical Center and University of Minnesota. "There have been questions that this is a made-up disorder and isn't a true brain disease, but it is." Just as importantly, he says, the magnetic-imaging biomarker shows changes over time in a brain's electrical activity, allowing mental-health workers to chart the effectiveness of various therapies. "It will be a tremendous tool in monitoring treatment," he says, "because these abnormal communication patterns will be normalized as the treatment works." ([See pictures of an Army town coping with PTSD.](#))

Up until now, more conventional diagnostic tools, including computed tomography, magnetic-resonance imaging and X-rays have not been able to detect evidence of PTSD because their snapshots of brain activity occur too slowly. The new diagnostic procedure uses magnetoencephalography (MEG), a way of monitoring the flow of electrical signals along the brain's neural pathways from cell to cell. By using a helmet with 248 noninvasive sensors arrayed around the head, scientists can map patterns of electrical activity inside the skull and detect abnormalities. The Minnesota researchers used MEG to assess 74 U.S. veterans believed to be suffering from PTSD, along with 250 subjects not thought to be suffering from the condition. Distinctive brain patterns indicating PTSD were found in 72 — or 97.3% — of the 74 people diagnosed with PTSD through the traditional interview process; false positives turned up in 31 of the 250 subjects (12.4%) without PTSD. (All the subjects were given "a simple fixation task ... to engage the brain in a stable condition.") ([See a TIME photo-essay on the effects of war at home.](#))

Still, outside experts aren't rushing to declare the challenge of diagnosing PTSD solved. Dr. Sally Satel, a psychiatrist affiliated with the American Enterprise Institute who has studied PTSD, says she's skeptical that there's "a fixed neural signature" for the condition. But she adds that the study "is a first step

toward a more thorough analysis that may or may not prove useful in diagnosing, treating and predicting outcomes." ([See how one military town deals with posttraumatic stress.](#))

While usually associated with combat, PTSD has been linked to many psychologically traumatic events. It generates severe anxiety along with flashbacks, nightmares and anger, and is generally treated with therapy and medication. As the U.S. military has become better at treating the physical wounds of its troops, the mental ailments are looming larger. For years, the Pentagon has been seeking better ways to diagnose PTSD, which has remained a largely subjective process involving mental-health workers conducting structured interviews with patients suffering PTSD-like symptoms.

The PTSD research builds on earlier work that showed MEG could be used to detect Alzheimer's and multiple sclerosis in infected brains. "These communication patterns are very different from disease to disease," Georgopoulos says. "So the different diseases create disturbances in the communication that can be used as a fingerprint, a signature, for the disease." He likens the MEG test for PTSD to the blood-glucose monitoring tests regularly done by diabetics to keep their disease under control. Such testing, he adds, could be done by PTSD patients to monitor their progress. "The test is totally safe — there are no magnets, no isotopes — you can do it as frequently as you want," Georgopoulos says, adding that it also doesn't require dredging up the traumatic events that generate PTSD. "The whole thing takes literally a minute." It will be a lot longer, however, and require several follow-up studies, if the use of MEG to track PTSD is to become widespread.

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