

Research moves a step closer to possibility of brain scan-assisted diagnosis for PTSD

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Florence, Italy: Preliminary research examining the difference in brain activity between soldiers with post-traumatic stress disorder and those without it moves scientists a step closer to the possibility of being able one day to use brain scans to help diagnose the condition.

The search for the footprints left in the [brain](#) by [psychiatric disorders](#) such as depression and [post-traumatic stress disorder](#) (PTSD) is a growing area of research. Scientists hope it will lead to the identification of brain patterns that could be used to improve diagnosis and track the effectiveness of treatment. The latest study was presented Friday at the World Psychiatric Association congress "Treatments in Psychiatry" by Dr. Florin Dolcos, an Assistant Professor of Psychiatry and Neuroscience at the University of Alberta in Edmonton, Canada.

"As technology improves, imaging research is increasingly providing insights into the brains of people with post-traumatic stress disorder, pointing to potential biological markers distinguishing the PTSD-affected brain," said Dolcos, a co-author of the study, performed at Duke University in Durham, USA. "The field is still in its infancy, but this raises the possibility that one day we may be able to see the disorder in the body as plainly as we now can see conditions such as heart disease and cancer."

Several studies have examined the brain patterns of emotion processing in PTSD by provoking symptoms, but very few have investigated the significant cognitive processing problems associated with the condition.

PTSD is as an anxiety disorder triggered by exposure to traumatic events. Symptoms include intrusive memories of the trauma, avoidant behaviour and hyperarousal, where those affected are more likely to perceive a threat in seemingly neutral situations or people. Impaired concentration is also characteristic. The disorder is currently diagnosed using an interview by a mental health professional.

The study involved 42 American soldiers (52% men) who had recently served in Iraq or Afghanistan. There were two groups with comparable levels of combat exposure. One group of 22 had developed PTSD and the other group of 20 had not. The scientists used functional magnetic resonance imaging scans (fMRI) to examine the brain patterns of each soldier while they performed a three-part short-term memory task that included distractions. The test is indicative of the ability to stay focused, which is reduced in PTSD.

In the first stage, the soldiers were shown photographs of three similar faces. After a delay period to give their brains time to retain the information, they were shown a single photograph of a face and had to press a button indicating whether the face was one of those they had seen earlier or whether it was new.

About two seconds into the delay period, the soldiers were randomly shown photos irrelevant to the faces - either two photos depicting combat scenes from Iraq or Afghanistan, two photos of non-combat (neutral) scenes such as a man playing the trombone, or two digitally scrambled pictures depicting nothing. After a break to allow [brain activity](#) to return to normal, the test was repeated 40 times, with no repetition in the photos.

In an area of the brain involved in the ability to stay focused (the dorsal lateral prefrontal cortex), the scientists observed that while the group without PTSD was far more distracted by the traumatic photos than by

the neutral ones, the PTSD group was equally affected by the two types of photos. The findings were reflected in the results of the memory test, with the PTSD group performing more poorly in identifying whether the final faces were new or old regardless of whether the photos that distracted them were traumatic or neutral.

"This sensitivity to neutral information is consistent with the PTSD symptom of hypervigilance, where those afflicted are on high alert for threats and are more distracted by not only threatening situations that remind them of the trauma, but also by benign situations," said the study's leader, Dr. Rajendra Morey, an Assistant Professor of Psychiatry at Duke University and director of the neuroimaging lab at Durham Veterans Administration Medical Center. "This has not been seen at the brain level before. If further research confirms this preliminary finding, this pattern could be useful in distinguishing the PTSD brain."

The researchers also found marked differences between the two groups in an area of the brain governing the sense of self. When the soldiers were shown the combat photos, this area, found in the medial prefrontal cortex, lit up remarkably in the PTSD group, but very little in the non-PTSD group.

"This is consistent with what we see behaviourally in PTSD, where people with the disorder are much more likely than others to connect traumatic triggers to events that have increased personal relevance, such as the combat situations in war veterans" Dolcos said. Previous findings by the same group indicate that activity in the medial prefrontal cortex also predicts the severity of PTSD symptoms. "Collectively, these findings raise the possibility of another brain pattern being potentially useful for distinguishing PTSD," Dolcos said.

Consistent with previous studies, the researchers also found that the combat photos produced much greater activity in the brain region

governing emotion processing (the amygdala) in the PTSD group than in the control group.

Morey said further research confirming the findings, as well as studies comparing brain patterns in PTSD with those in other psychiatric disorders such as depression, are necessary before brain scans can be used as an additional diagnostic tool for the disorder. Dolcos added it is also important to further investigate differences between individuals in the sensitivity to emotional challenge, to see whether brain scans can help flag increased susceptibility to conditions such as depression and anxiety-related disorders.

Source: World Psychiatric Association

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