

Revealing the wiring that allows us to adapt to the unexpected

January 31 2011

Wouldn't life be easy if everything happened as we anticipated? In reality, our brains are able to adapt to the unexpected using an inbuilt network that makes predictions about the world and monitors how those predictions turn out. An area at the front of the brain, called the orbitofrontal cortex, plays a central role and studies have shown that patients with damage to this area confuse memories with reality and continue to anticipate events that are no longer likely to happen.

The brain's ability to react adaptively, becomes crucial for survival, when faced with potential dangers, such as snakes and spiders, so to what extent does the harmfulness of an anticipated outcome affect our brain's event monitoring system? Not at all, reveals a new study published in the February 2011 issue of Elsevier's *Cortex*: the processes are the same, regardless how scary the anticipated event.

The team of researchers, supervised by Prof. Armin Schnider of the University Hospitals of Geneva in Switzerland, recorded functional magnetic resonance images (fMRI) while healthy volunteers performed a task in which they repeatedly saw a pair of faces and had to predict on which face a target was about to appear. The target could be a simple black disk (neutral stimulus) or a spider (potentially harmful stimulus). The researchers found a strong activation of the brain's visual areas whenever the spider appeared. However, irrespective of whether the disk or the spider was the target, its unexpected absence activated a cerebral network including the orbitofrontal cortex.



The findings show that, while the potential harmfulness of an event strongly affects <u>brain responses</u>, it does not influence the way the brain reacts when the expected event does not occur. The study supports the notion that the <u>orbitofrontal cortex</u> is "at the centre of a specific cerebral network which functions as a generic outcome monitoring system," says Louis Nahum, the first author of the study. "This capacity is probably as old in evolution as the instinctive reaction to threatening stimuli; its failure deprives the <u>brain</u> of the ability to remain in phase with reality," notes Armin Schnider.

More information: The article is "Neural response to the behaviorally relevant absence of anticipated outcomes and the presentation of potentially harmful stimuli: A human fMRI study" by Louis Nahum, Stéphane R. Simon, David Sander, François Lazeyras, and Armin Schnider, and appears in Cortex, Volume 47, Issue 2 (February 2010)

Provided by Elsevier

Citation: Revealing the wiring that allows us to adapt to the unexpected (2011, January 31) retrieved 2 May 2024 from <u>https://medicalxpress.com/news/2011-01-revealing-wiring-unexpected.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.