

Judgment and decision-making: Brain activity indicates there is more than meets the eye

October 2 2014, by Liz Banks-Anderson



(Medical Xpress)—People make immediate judgments about images they are shown, which could impact on their decisions, even before their brains have had time to consciously process the information, a study of brainwaves led by The University Of Melbourne has found.

Published today in *PLOS ONE*, the study is the first in the world to show that it is possible to predict abstract judgments from <u>brain waves</u>, even though people were not conscious of making such judgments. The study also increases our understanding of impulsive behaviours and how to



regulate it.

It found that researchers could predict from participants' brain activity how exciting they found a particular image to be, and whether a particular image made them think more about the future or the present. This is true even though the brain activity was recorded before participants knew they were going to be asked to make these judgments.

Lead authors Dr Stefan Bode from the Melbourne School of Psychological Sciences and Dr Carsten Murawski from the University of Melbourne Department of Finance said these findings illustrated there was more information encoded in brain activity than previously assumed.

"We have found that brain activity when looking at images can encode judgments such as time reference, even when the viewer is not aware of making such judgments. Moreover, our results suggest that certain images can prompt a person to think about the present or the future," they said.

The authors said the results contributed to our understanding of impulsive behaviours, especially where those behaviours were caused by 'prompts' in the world around us.

"For instance, consider someone trying to quit gambling who sees a gambling advertisement on TV. Our results suggest that even if this person is trying to ignore the ad, their brain may be unconsciously processing it and making it more likely that they will relapse," he said.

The researchers used electroencephalography technology (EEG) to measure the electrical activity of people's brains while they looked at different pictures. The pictures displayed images of food, social scenes or status symbols like cars and money.



After the EEG, researchers showed participants the same pictures again and asked questions about each image, such as how exciting they thought the image was or how strongly the image made them think of either the present or the future.

A statistical 'decoding' technique was then used to predict the judgments participants made about each of the pictures from the EEG <u>brain activity</u> that was recorded.

Co-author Daniel Bennett said just as certain prompts might cause <u>impulsive behaviour</u>, images could be used to prompt people to be more patient by regulating impulse control.

"Our results suggest that prompting people with images related to the future might cause processing outside awareness that could make it easier to think about the future. In theory, this could make people less impulsive and more likely to make healthy long-term decisions. These are hypotheses we will try to test in the future," he said. The research was done in collaboration with the University of Cologne, Germany.

The research article is available on the PLOS ONE website.

More information: Bode S, Bennett D, Stahl J, Murawski C (2014) "Distributed Patterns of Event-Related Potentials Predict Subsequent Ratings of Abstract Stimulus Attributes." *PLoS ONE* 9(10): e109070. DOI: 10.1371/journal.pone.0109070

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