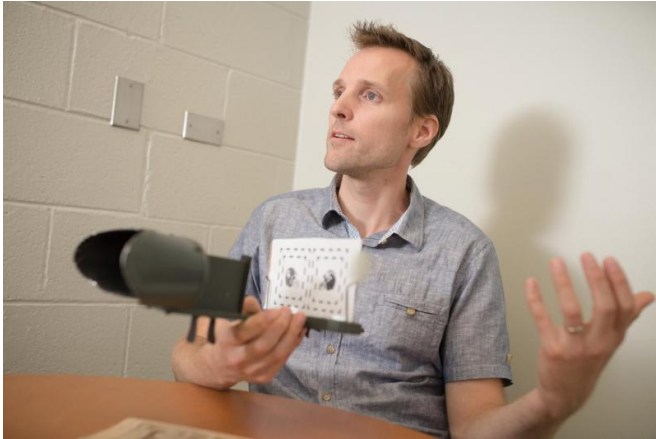


Surprise: Your visual cortex is making decisions

5 October 2015



Michigan State University neuroscientist Jan Brascamp led a study suggesting that the brain's visual cortex is more versatile than previously believed. Here, Brascamp describes the effect that looking at multiple images through a viewfinder can have on the brain. Credit: Michigan State University

The part of the brain responsible for seeing is more powerful than previously believed. In fact, the visual cortex can essentially make decisions just like the brain's traditional "higher level" areas, finds a new study led by a Michigan State University neuroscientist.

The findings, published in *Nature Neuroscience*, provide another piece of the puzzle in the relatively new quest to unlock the [brain](#)'s secrets. Jan Brascamp, MSU assistant professor of psychology and lead investigator of the study, noted that the first cognitive psychology textbook didn't come out until the late 1960s.

"As a field, we're only at the beginning of trying to figure out how the brain works, and the visual system is a very good place to start," said Brascamp. "In that light, the current findings, which show that the visual system has a capacity we

previously didn't expect, are an important step in the right direction."

Study [participants](#) were placed in an MRI scanner and shown two adjacent patterns of dots on a projection screen while their brain activity was monitored. By using a set of prisms, the researchers made sure that, unlike in normal situations, the participant's eyes were each looking at a different dot pattern, each presented on a different part of the screen.

The combination of differing patterns seen by the two eyes creates an optical illusion and perception switches between the two patterns as the brain tries to make sense of the contradictory information the eyes are providing. Previous research using MRI readings indicated the decision to switch perceptions is controlled by the association cortex, which is known for higher-level functions such as making choices, while the visual cortex handles the simpler task of processing visual information.

But in those past studies, participants knew the moment their perception changed because the illusion was obvious (such as the famous [duck-rabbit image](#), meaning they were surprised. And the areas of the brain known to be involved with surprise and those involved with making decisions are very similar.

So Brascamp and colleagues took away the element of surprise by assuring their participants weren't aware the two patterns of dots were different. Although participants' perception went back and forth between the two patterns, the participants didn't notice. Among these participants, the increase in [brain activity](#) in the association cortex was gone, indicating the [visual cortex](#) was making the choice between perceptions on its own.

"That is one sense in which our study is counterintuitive and surprising," Brascamp said. "The part of the brain that is responsible for seeing,

for the apparently 'simple' act of generating the picture in our mind's eye, turns out to have the ability to do something akin to choosing, as it actively switches between different interpretations of the visual input without any help from traditional 'higher level' areas of the brain."

More information: Negligible fronto-parietal BOLD activity accompanying unreportable switches in bistable perception, [DOI: 10.1038/nn.4130](https://doi.org/10.1038/nn.4130)

Provided by Michigan State University

APA citation: Surprise: Your visual cortex is making decisions (2015, October 5) retrieved 5 December 2022 from <https://medicalxpress.com/news/2015-10-visual-cortex-decisions.html>

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