

# Study offers evidence of unconscious thinking impacting conscious decision making

October 28 2014, by Bob Yirka

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Credit: Rice University

(Medical Xpress)—A trio of researchers with the University of New South Wales, has found evidence to support the notion that unconscious thinking does impact conscious thinking, without the person even knowing it. In their paper published in *Proceedings of the National Academy of Sciences*, Alexandra Vlassova, Chris Donkin, and Joel Pearson describe the many experiments they conducted with volunteers and why their findings are important.

Psychologists (and others) have debated for a long time whether the conscious decisions people make are influenced by unconscious information. Does some part of our brain hold information that somehow has a backdoor to our conscious thought-making process, without our knowing it? Some prior research has suggested that might be the case—it might explain, for example, why people make seemingly illogical decisions sometimes.

To better understand what might be going on, the researchers placed a dynamic dichoptic mask on each volunteer—it allowed for showing different imagery to each eye. Volunteers were shown images of moving dots and were asked to tell the researchers which direction they were moving—left or right. The catch was that the movement was nearly imperceptible at first, only growing more apparent over time. The earlier a volunteer could identify which way the dots were moving, the more accurate their score. During some experiments, colored dots moved randomly in front of one eye, while grey dots moving either left or right were shown to the other. The colored dots overwhelmed the brain with information causing the imagery from the grey dots to be obscured. Prior research has shown that when faced with such a setup, the human brain does in fact "see" what is going on with the grey dots—but only unconsciously, the person isn't aware of it. In this new study, the researchers tested whether offering some prior information unconsciously via the two types of exposure could cause changes to the accuracy of imagery presented afterwards. They found that indeed it

did—the volunteers more accurately figured out which way the grey dots were moving when they saw them beforehand while the colored dots were moving, but didn't know it. Thus, the unconscious information somehow helped improve their accuracy, which is an example, the team claims, of unconscious information impacting decision making.

Interestingly, the researchers also found that the degree of confidence in the accuracy by the volunteers wasn't changed regardless of whether they were being impacted unconsciously or not. They suggest that if similar processes are going on everyday for everyone it could have broad implications for interpreting how humans think in general.

**More information:** Unconscious information changes decision accuracy but not confidence, *PNAS*, Alexandra Vlassova, [DOI: 10.1073/pnas.1403619111](https://doi.org/10.1073/pnas.1403619111)

## Abstract

The controversial idea that information can be processed and evaluated unconsciously to change behavior has had a particularly impactful history. Here, we extend a simple model of conscious decision-making to explain both conscious and unconscious accumulation of decisional evidence. Using a novel dichoptic suppression paradigm to titrate conscious and unconscious evidence, we show that unconscious information can be accumulated over time and integrated with conscious elements presented either before or after to boost or diminish decision accuracy. The unconscious information could only be used when some conscious decision-relevant information was also present. These data are fit well by a simple diffusion model in which the rate and variability of evidence accumulation is reduced but not eliminated by the removal of conscious awareness. Surprisingly, the unconscious boost in accuracy was not accompanied by corresponding increases in confidence, suggesting that we have poor metacognition for unconscious decisional evidence.

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