

How your brain decides between knowledge and ignorance

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Credit: Human Brain Project

We have a 'thirst for knowledge' but sometime 'ignorance is bliss', so how do we choose between these two mind states at any given time?

UCL psychologists have discovered our brains use the same algorithm and neural architecture to evaluate the opportunity to gain information, as it does to evaluate rewards like food or money.

Funded by the Wellcome Trust, the research, published in the *Proceedings of the National Academy of Sciences*, also finds that people will spend money to both obtain advance knowledge of a good upcoming event and to remain ignorant of an upcoming bad event.

Senior author Dr. Tali Sharot (UCL Experimental Psychology) said: "The pursuit of knowledge is a basic feature of human nature, however, in issues ranging from health to finance, people sometimes choose to remain ignorant."

"Our research shows that the brain's [reward](#)

circuitry selectively treats the opportunity to gain knowledge about future favorable outcomes, but not unfavorable outcomes, as a reward in and of itself, explaining why knowledge may not always be preferred"

In the study 62 participants performed a computer task, and were asked whether they wanted to receive information or remain ignorant about the outcome of lotteries, which had a mixture of favourable (high probability of winning) or unfavourable (high probability of losing) odds. The [lottery](#) was played out regardless of whether the volunteers selected to know the outcome and they received the total payment of all lotteries at the end of the game.

In addition, the brains activity of 36 of the participants was scanned while they were performing the task. The researchers found that activity in the brain's reward system—the nucleus accumbens and ventral tegmental area—in response to the opportunity to receive information about good lotteries, but not about bad lotteries, displayed a pattern similar to what is observed in response to material rewards. This brain signal was independent from the brain response observed when participants found out whether they won or lost the lottery and predicted their preference for information.

"When participants were told they were about to gain information, the more likely information was to convey good news, the more likely we were to observe a neural signature typical of reward processing," Dr. Sharot added.

"The findings may help explain why people are more likely to check their bank accounts when they believe their value has gone up and less likely to do so when they suspect it has gone down."

Lead author, Dr. Caroline Charpentier, (formerly UCL Psychology, now at the California Institute of

Technology), said: "Our findings are consistent with the theory that beliefs have utility in and of themselves. This means believing that something will happen has the power to affect us in positive and negative ways, similar to how actual events affect us," says lead author

"It therefore follows that people are motivated to seek information that can create positive beliefs and avoid [information](#) that can create negative beliefs, which can explain why people avoid medical screenings even in cases when those tests can save them."

More information: Caroline J. Charpentier et al., "Valuation of knowledge and ignorance in mesolimbic reward circuitry," *PNAS* (2018). www.pnas.org/cgi/doi/10.1073/pnas.1800547115

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