Brain scans reveal why we are more likely to take risks if we see others doing so

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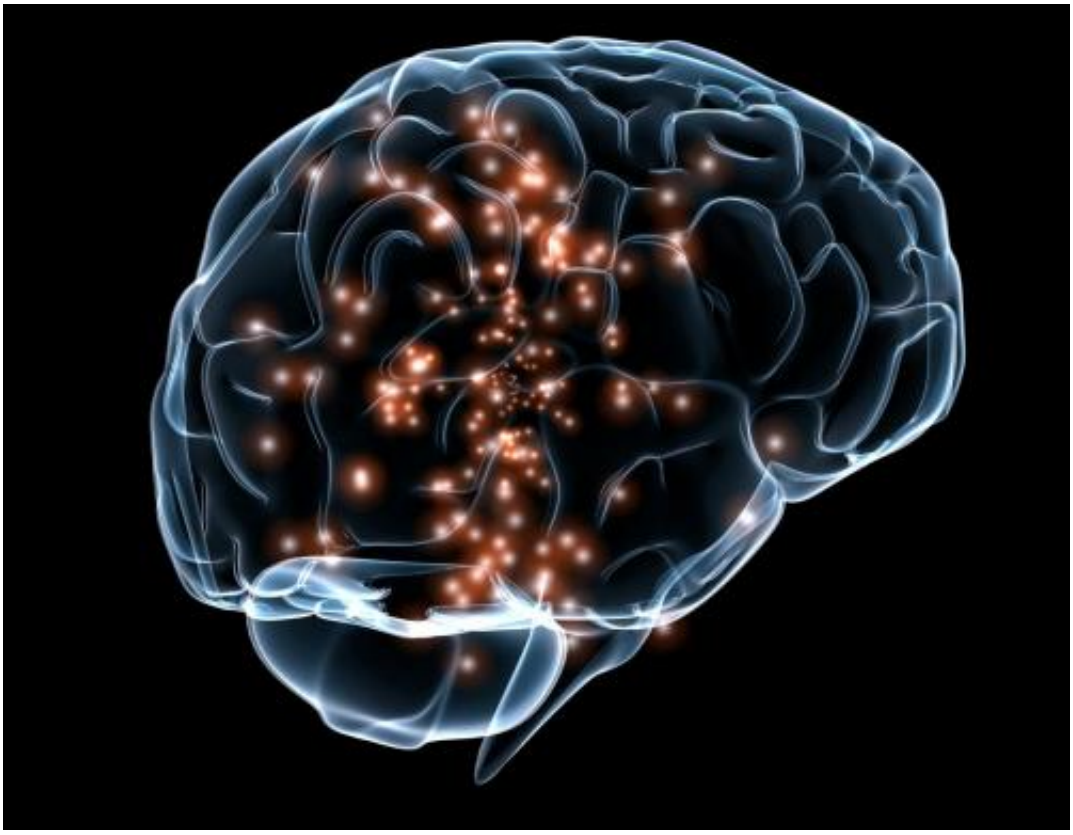

Credit: Wikimedia Commons

(Medical Xpress)—A combined team of researchers from the University of Melbourne and the California Institute of Technology has located a part of the brain involved in behavior contagion, by conducting a study involving volunteers engaging in risky behavior and brain scans. In their

paper published in *Proceedings of the National Academy of Sciences*, the team describes the nature of their study and what they learned when they looked at brains scans of the volunteers.

People are known to copy some behaviors of the people around them, yawning for example, when someone else yawns, or laughing when others laugh regardless of whether they are in on a joke. Now, the researchers with this new effort have found that people have a tendency to be more likely to engage in risky behavior if they see someone else doing it. They made this finding by enlisting the assistance of 24 volunteers who were asked to take part in a gambling situation. Each was given just four seconds to respond with 'yes' or 'no' to a guarantee of a $10 reward or pass on it for a chance at a higher reward. In some of the exercises, volunteers were able to see others playing the same game beforehand, some of whom played with reckless abandon. In looking at the results, the researchers found that those volunteers who watched others play the same game in a risky fashion, were more likely to play in a more risky fashion themselves, than volunteers who did not view other players playing in risky ways.

Adding another dimension to the experiments, the volunteers were all asked to play while wearing brain monitors that were able to measure neural levels. That allowed the researchers to see increased levels of neural activity already known to be involved in learning and observation—but they also saw an increase in activity in the caudate nucleus, which prior research has found to be associated with risk assessment, in the brains of volunteers who watched others engage in risky behavior, which suggested the impetuous for their own increase in risky behavior.

The results of the study are just one single part of the story of course, and likely will be used in future studies meant to understand risky behavior in general.

More information: Shinsuke Suzuki et al. Behavioral contagion during learning about another agent's risk-preferences acts on the neural representation of decision-risk, *Proceedings of the National Academy of Sciences* (2016). DOI: 10.1073/pnas.1600092113

Abstract

Our attitude toward risk plays a crucial role in influencing our everyday decision-making. Despite its importance, little is known about how human risk-preference can be modulated by observing risky behavior in other agents at either the behavioral or the neural level. Using fMRI combined with computational modeling of behavioral data, we show that human risk-preference can be systematically altered by the act of observing and learning from others' risk-related decisions. The contagion is driven specifically by brain regions involved in the assessment of risk: the behavioral shift is implemented via a neural representation of risk in the caudate nucleus, whereas the representations of other decision-related variables such as expected value are not affected. Furthermore, we uncover neural computations underlying learning about others' risk-preferences and describe how these signals interact with the neural representation of risk in the caudate. Updating of the belief about others' preferences is associated with neural activity in the dorsolateral prefrontal cortex (dlPFC). Functional coupling between the dlPFC and the caudate correlates with the degree of susceptibility to the contagion effect, suggesting that a frontal–subcortical loop, the so-called dorsolateral prefrontal–striatal circuit, underlies the modulation of risk-preference. Taken together, these findings provide a mechanistic account for how observation of others' risky behavior can modulate an individual's own risk-preference.