

The neuroscience of choosing: Can we understand how the brain makes decisions?

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Although still a young field, research in "decision neuroscience" has exploded in the last decade, with scientists beginning to decipher what exactly is happening in our brains when we are making choices, whether big or small.

In fact, early findings suggest it is possible to parse out the complexity of thinking into its individual components, and in the process determine how they are integrated as we ponder and decide.

Recently, researchers in decision neuroscience participated in a discussion about their work and the genesis of this cutting-edge field. During the dialogue, they discussed how decision neuroscience hopes to greatly advance our understanding of the brain, and in turn our understanding of mental disorders ranging from depression to schizophrenia.

"For many [psychiatric disorders](#), patients that are symptomatic are frequently making [poor decisions](#) about numerous things throughout the day, such as how they handle their anxiety and other emotional states," said C. Daniel Salzman, MD, PhD., Department of Psychiatry and Neuroscience and Kavli Institute for [Brain Science](#), Columbia University School of Medicine. "If you've ever had a friend or family member with depression, you can see they are not making decisions the way they normally do. So there clearly has to be dysfunction in the neurocircuits of [psychiatric patients](#) affecting their decisions, and we need to understand this better in order to come up with better treatments for

[mental disorders](#)."

As pointed out by another participant in the dialogue, this research is already deepening understanding of these disorders.

"Our new knowledge about the cellular and circuit mechanisms of [working memory](#) and decision processes in the brain has already had a significant impact on clinical studies of mental illness," said Xiao-Jing Wang, PhD., Department of Neurobiology, Physics and Psychology; Director, Swartz Program in Theoretical Neurobiology; Kavli Institute of Neuroscience, Yale University School of Medicine. "For instance, addiction is fundamentally a problem of making bad choices, resulting from impaired reward signaling and decision-making circuits in the brain. Understanding these circuits has become key to linking genes and molecules with behavior in clinical studies."

Daeyeol Lee, PhD., Department of Neurobiology and Kavli Institute for Neuroscience, Yale University School of Medicine, stated one important goal is understanding the neurobiological basis for individual variability in decision making.

"When people face the same decision, they tend to make different choices," said Lee. "Some of that is due to their different experiences and learning environment. There are also fundamental genetic differences that give rise to different decision making styles. Getting a better [understanding](#) of the neurobiological basis for those individual differences in decision making will have enormous implications. It can explain a lot of problems in our society, including differences in the tendency to develop psychiatric illnesses."

More information: The complete dialogue is available at: www.kavlifoundation.org/science-of-decision-making

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