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Personality and mood affect brain response to personal choice

A study in Biological Psychiatry: Cognitive Neuroscience and Neuroimaging reports relationships between personality, depression, and value placed on personal control

Philadelphia, November 20, 2018 – Personality traits and mental health affect how people value personal control in decision making, according to a new [study](#) in [Biological Psychiatry: Cognitive Neuroscience and Neuroimaging](#). Our brain's reward and motivation systems show higher activity when we feel personal control in a situation and when we receive rewards that we've earned, rather than been given—but this activity was dampened in people with passive personalities or with symptoms of depression. The connections between personality, choice, and depression may help guide researchers to understand how to protect healthy people from developing the illness.

“This study, which used computational models of reward behaviors and functional MRI, represents an advance in our understanding of how rewards shape choices in the brains of healthy individuals,” said Cameron Carter, MD, Editor of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*.

In the study, the researchers used an MRI scanner to measure the brain activity of 122 healthy participants while the participants played a computer game to earn rewards. “We were interested to see how people value rewarding outcomes based on their own personally-driven decisions, versus those that are decided for them by the computer,” said first-author Liana Romaniuk, PhD, University of Edinburgh.

“We found that an area that is important for motivation and learning by trial-and-error—the ventral striatum—was especially active when people were told they were going to get to make a decision,” said Dr. Romaniuk.

Although all of the participants in the study were considered healthy, the researchers looked for relationships between the brain activity and symptoms of depression. Activation in the ventral striatum was reduced in people with some symptoms of depression, which may help explain why people with depression lose their motivation.

“Since these brain networks were differentially active in the presence of subclinical depressive symptoms, it suggests a future role for functional brain imaging in understanding individual differences in mental wellness and in informing early intervention and prevention of mood disorders,” said Dr. Carter.

The findings also provide clues as to how personality might make a person susceptible to depression. “People who were more self-motivated had stronger responses to personally-earned rewards in a region of cortex called the insula, whereas more passive people showed the opposite,” said Dr. Romaniuk, adding that “The insula is important because we know its function is altered in people with depression.”

Notes for editors

The article is "The neurobiology of personal control during reward learning and its relation to mood," by Liana Romaniuk, Anca-Larisa Sandu, Gordon D. Waiter, Christopher J. McNeil, Shen Xueyi, Matthew A. Harris, Jennifer A. Macfarlane, Stephen M. Lawrie, Ian J. Deary, Alison D. Murray, Mauricio R. Delgado, J Douglas Steele, Andrew M. McIntosh, and Heather C. Whalley (<https://doi.org/10.1016/j.bpsc.2018.09.015>). It appears in *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, published by [Elsevier](#).

Copies of this paper are available to credentialed journalists upon request; please contact Rhiannon Bugno at BPCNNI@UTSouthwestern.edu or +1 214 648 0880. Journalists wishing to interview the authors may contact Liana Romaniuk at liana.romaniuk@ed.ac.uk or +44 131 537 6502.

The authors' affiliations and disclosures of financial and conflicts of interests are available in the article.

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