Monetary gain and high-risk tactics stimulate activity in the brain

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Monetary gain stimulates activity in the brain. Even the mere possibility of receiving a reward is known to activate an area of the brain called the striatum. A team of Japanese researchers report in the January 2010 issue of *Cortex*, published by Elsevier, the results of a study in which they measured striatum activation in volunteers performing a monetary task and found high-risk/high-gain options to cause higher levels of activation than more conservative options. They also found levels of activation to increase with the amount of money owned.

Dr. Tadashi Ino and colleagues, from the Department of Neurology at the Rakuwakai-Otowa Hospital and the Research Center for Nano Medical Engineering at Kyoto University, used functional magnetic resonance imaging (fMRI) to study hemodynamic changes in the brains of 17 healthy volunteers performing a monetary task.

The volunteers were given an initial stock of money and then required repetitively to press one of two buttons, which resulted in either an increase or decrease of the money stock, depending on whether their choice agreed or disagreed with a number that appeared randomly after the button had been pressed. One button was a low-risk option and the other involved high-risk, so that more money was gained or lost when choosing the high-risk option. The volunteers were also able to keep track of the total money stock throughout the task.

They found higher levels of activation in volunteers when choosing high-risk/high-gain options, compared to low-risk/low-gain, and when gaining

money, compared to losing money. It did not matter how much money was gained, since small gains stimulated the volunteers' striatum as much as large gains. They also found that overall striatum activity increased with the total amount of money in stock.

According to the authors, these results show that "risky tactics and pleasure of monetary gain are correlated with activation of the striatum" and that this finding demonstrates "the concept of the striatum as a major reward-related brain structure".

More information: The article is "Differential activation of the striatum for decision making and outcomes in a monetary task with gain and loss" by Tadashi Ino, Ryusuke Nakai, Takashi Azuma, Toru Kimura and Hidenao Fukuyama and appears in Cortex, Volume 46, Issue 1 (January 2010), published by Elsevier.
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