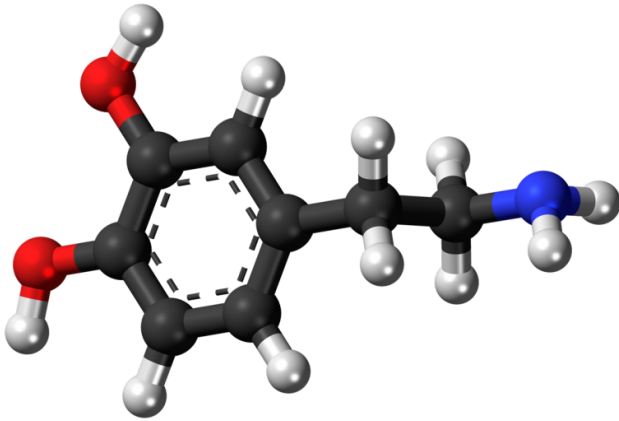


High levels of dopamine may lead to increased risk-taking

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Ball-and-stick model of the dopamine molecule, a neurotransmitter that affects the brain's reward and pleasure centers. Credit: Jynto/Wikipedia

Boosting levels of the neurotransmitter dopamine can lead to increased risk-taking, according to research published July 8 in the *Journal of Neuroscience*. Dopamine is involved in reward learning, and previous research has linked dopamine drugs such as L-DOPA with compulsive gambling problems in people with Parkinson's disease. This study, led by Robb Rutledge at University College London, found that increasing dopamine levels in healthy adults led participants to choose more risky options in a gambling task.

Thirty healthy adults performed a gambling task on two separate occasions, once after receiving L-DOPA and once after receiving a placebo. The task required subjects to choose between safe and risky options that led to monetary gains and losses. Sometimes, the subjects could choose between a small reward or a gamble where there were equal chances of winning a larger reward or getting nothing. Other times, subjects could accept a small loss or choose a gamble where there were equal

chances of losing a larger amount or losing nothing. During the testing, subjects were repeatedly asked, "How happy are you at this moment?" The researchers found that:

- Subjects took more risks to try to get bigger rewards after receiving L-DOPA but not placebo. However, L-DOPA did not affect how often subjects took risks when there were potential losses.
- After receiving L-DOPA, subjects chose more risky options regardless of how much larger the potential reward was compared to the safe alternative.
- Subjects were happier after winning a small reward while on L-DOPA than they were winning the same reward while on a placebo. On a [placebo](#), happiness was higher after large rewards than after small rewards, but on L-DOPA subjects were as happy about small rewards as they were about large rewards.

The researchers proposed that L-DOPA made potential rewards more appealing but did not affect subjects' perception of potential losses. They also speculated that, while on L-DOPA, subjects might experience similar [dopamine](#) release for all reward levels, which would explain why they were similarly happy after small and large rewards.

This study sheds light on dopamine's effects on decision-making and emotion, said Nathaniel Daw, a neuroscientist at New York University who was not involved in the study. The results "may help to explain some kinds of gambling and impulse control problems, and also aspects of mood disorders."

Provided by Society for Neuroscience

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