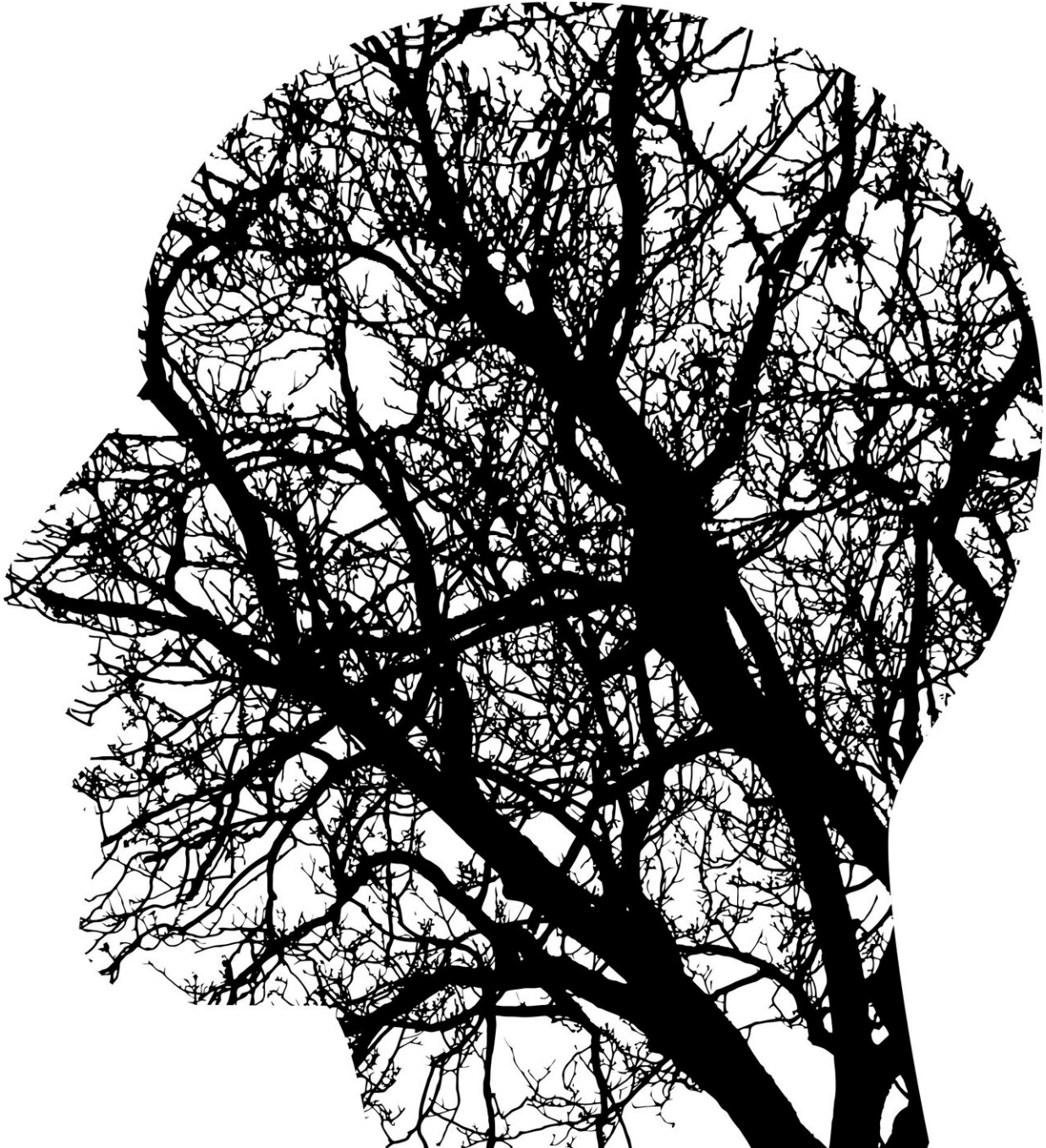


How the brain processes rewards

January 23 2020



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Researchers from HSE University, Skoltech and the University of Toronto analyzed data from 190 fMRI studies and found out that food, sex and money implicate similar brain regions whereas different types of reward favor the left and right hemispheres differently. The paper is to be published in *Brain Imaging and Behavior*.

Food is a reward when we are hungry, a primary reward. Erotic images are also considered a primary reward because mating is an essential obligation to our species. Money is a resource that affords our survival in society, but it is a secondary reward, because it is a human creation. In any decision-making process, the [brain](#) assesses potential profit—i.e., size of reward that can be received for an action. Reactions to various types of rewards are processed by various brain structures. A key brain region associated with all reward types is the [basal ganglia](#)—a cluster of gray matter nuclei located at the base of the forebrain, originally known for its implication in motor and regulatory function.

However, it has been unclear as to how the activity of basal ganglia varies depending on the type of reward offered. To find the answer to this question, the researchers conducted a series of meta-analyses of 190 fMRI ([functional magnetic resonance imaging](#)) studies, which observed activities in different brain areas in response to information on a reward—food, sexual, or monetary. A total of 5,551 participants took part in these studies.

The analyses indicate that all reward types engaged the basal ganglia nuclei differently. "Food rewards favor the left hemisphere of the brain; erotic rewards favour the right lateral globus pallidus and the left caudate

body. Money rewards engage the basal ganglia bilaterally, including its most anterior part—the nucleus accumbens. The connection between these nuclei and other areas of the brain also depend on the reward type," says Marie Arsalidou, Assistant Professor at the HSE School of Psychology. Based on the data generated, the researchers drew up and put forth a model of common reward processing via the basal [ganglia](#) and separate models for money, sexual, and food rewards.

Understanding the involvement of brain structures in processing different reward types can help us understand human decision-making mechanisms, from one's choice of a chocolate bar instead of a healthy breakfast, to attraction to potential mates and certain investment plans.

More information: Marie Arsalidou et al, Basal ganglia lateralization in different types of reward, *Brain Imaging and Behavior* (2020). [DOI: 10.1007/s11682-019-00215-3](#)

Provided by National Research University Higher School of Economics

Citation: How the brain processes rewards (2020, January 23) retrieved 25 April 2024 from <https://medicalxpress.com/news/2020-01-brain-rewards.html>

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