Memories influence choice of food

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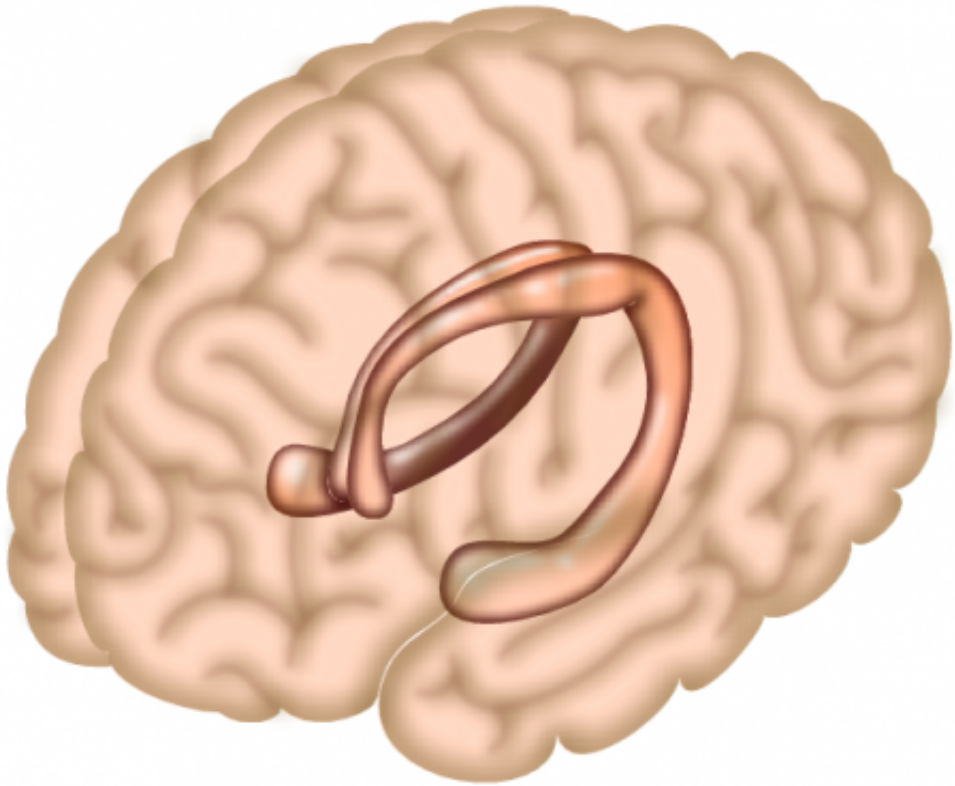

The hippocampus is a region of the brain largely responsible for memory formation. Credit: Salk Institute

The stronger our memory is of a certain food, the more likely we are to choose it - even if it is the more unattractive option. Psychologists at the University of Basel conducted a study on how memory influences our

choices by offering various foods and using scans to track brain activity. The researchers were able to show that the influence of memory is mediated by increasing communication between the relevant brain areas. The study has been published in the scientific journal *Neuron*.

Many of our everyday decisions such as "What present should I give my girlfriend?" or "Where shall we go to eat?" are based on the retrieval of relevant information from memory. The neural and cognitive mechanism of this decision-making process had not been studied in depth until now. What is known is that these brain processes involve the hippocampus, a classic memory region, and the ventromedial prefrontal cortex in the frontal lobe, a decision-making region.

Choice of snacks

In the study, a team of psychologists at the University of Basel asked 30 hungry young people to rate 48 snacks - such as crisps, chocolate bars, pretzels and wine gums - in order of preference. The snacks were presented on a computer screen in association with a particular location. The subjects then went into a magnetic resonance image scanner and were asked to choose repeatedly between two snacks, for which only the location was shown. The subjects were thus forced to recall the snack associated with the location.

The results showed that the subjects tended to prefer the snacks that they were able to recall better. Furthermore, they chose the snacks they could recall better even if they had rated them lower in the initial task and therefore considered them less attractive. Only extremely unattractive snacks were rejected even if they were remembered. The control group of 30 subjects was shown the snacks directly on the screen and its choices corresponded with the initial ratings.

Model and brain scans

The research team used functional magnetic resonance imaging (fMRI) to examine the neural mechanisms of memory-based decisions and developed a mathematical model to represent the decision-making process and the influence of memory. This model enabled the team to determine the strength of memory-based activation during storage in the hippocampus. An analysis of the activation during the decision-making process showed an increase in communication between the hippocampus and the ventromedial prefrontal cortex.

"Our study builds a bridge between two central research fields of psychology, that is, memory and decision-making research," says Dr. Sebastian Gluth, lead author of the study. The combination of mathematical modeling and brain scans also provides an accurate understanding of how the areas of the brain are linked to the psychological sub-processes and how these areas interact with one another.

The study was conducted in cooperation with Prof. Jörg Rieskamp (University of Basel, Faculty of Psychology, Economic Psychology) and Dr. Tobias Sommer and Dr. Christian Büchel from the Institute of Systems Neuroscience at the University Medical Center Hamburg-Eppendorf.

More information: Sebastian Gluth, Tobias Sommer, Jörg Rieskamp and Christian Büchel, Effective connectivity between hippocampus and ventromedial prefrontal cortex controls preferential choices from memory, *Neuron*, 2015.

Provided by University of Basel