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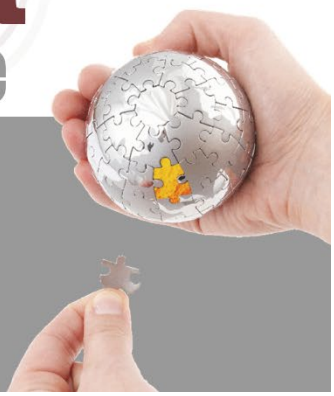

A neuroimaging study of the density of dopamine transporters in people with gambling disorder

What this research is about

The neurotransmitter dopamine has been proposed to play a role in gambling disorder (GD). Dopamine is involved in the experience and anticipation of rewards. A possible role of dopamine in GD lies in the dopamine transporter (DAT). In brain imaging studies, low density of DAT in the brain has thought to be a marker of damage in neurons that release neurotransmitters. Some studies have found that people with substance use disorders have lower density of DAT, but other studies have not found this result. Lower density of DAT could result from chronic use of a substance/addictive behaviour, or from recent use of the substance/addictive behaviour.

This study examined DAT density in people with GD and compared it to people without GD. To assess whether DAT density is related to chronic or recent gambling, the researchers distinguished between recent and chronic gambling behaviour, as well as between expecting and not expecting to gamble. The authors proposed that there would be no differences in DAT density between people with and without GD. However, they thought that DAT density would be greater in people with GD who had recently gambled.

What the researchers did

The researchers recruited 15 people with GD who were attending an outpatient treatment centre for GD. These participants had to be diagnosed with GD according to the DSM-5, have gambled once per week for the past four weeks, and be at least 18 years old. The researchers recruited 15 participants for the control group through media advertisements. Participants in the control group did not gamble and had never been diagnosed with a substance use disorder or serious mental illness (e.g., schizophrenia). Women in this group could not be pregnant, breastfeeding, or on contraceptives. The GD and control groups were matched for gender, age, education, and right handedness.

Participants completed the Beck Anxiety Inventory and the Beck Depression Inventory for symptoms of anxiety and depression. People with GD were asked to give details about their gambling history. Chronic gambling was determined from their current age, total years gambling and total years of problematic gambling. People with GD also filled out the Gambling Follow-Up Scale, which assessed frequency of gambling episodes, time spent gambling, and money spent gambling in the past four weeks. This scale also assessed craving for gambling. The Gambling Abstinence Self-Efficacy Scale assessed if participants

What you need to know

Dopamine is a neurotransmitter involved in the experience of rewards. Dopamine likely plays a role in gambling disorder (GD). The density of dopamine transporters (DAT) might be an important area of research. The researchers did a neuroimaging study on people with and without GD. They compared the DAT density between these two groups and did not find any differences. However, DAT density was associated with gambling-related factors in people with GD. Greater DAT density in the left striatum was related to greater gambling cravings and more time spent gambling. Greater DAT density in the right striatum was related to lower expectation to be able to stay away from gambling.

thought they could stay away from gambling if they were in a gambling situation.

Neuroimaging scans were performed using a single-photon emission computed tomography (SPECT). This was done to determine DAT density in the striatum, a region of the brain involved in the experience of rewards. The striatum can be further subdivided into the caudate nucleus and the putamen.

What the researchers found

The researchers found that there were no differences in DAT density between people with and without GD. People with GD had more symptoms of anxiety and depression compared to people without GD.

There were differences in DAT density amongst people with GD. In people with GD, the more educated a person was and the more time they had spent gambling in the past month, the greater the density of DAT in the left striatum. People who thought that they would not be able to abstain from gambling if given the opportunity also tended to have greater DAT density in the left striatum. Further, time spent gambling, gambling cravings, and age accounted for 74.1% of the DAT density differences in the left striatum amongst people with GD.

The researchers also found that the younger a person was and the lower expectation one had about being able to abstain from gambling, the higher the density of DAT in the right striatum. Lower expectation that one would be able to abstain from gambling accounted for 38.9% of the DAT density differences in the right striatum amongst people with GD.

Next, the researchers looked at differences in the subregions of the striatum: the caudate nucleus and the putamen. The more years of problem gambling, the greater the density of DAT in the right caudate nuclei. The more money spent on gambling, the greater the density of DAT in the right putamen.

How you can use this research

This research could be useful for gambling researchers interested in the role of dopamine in GD. This study showed that there were no differences in DAT density between people with and without GD. However, DAT density was related to recent gambling activity and gambling expectation in people with GD.

About the researchers

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Citation

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