

Brain Biology and Gambling Disorder written by
Jon E. Grant, JD, MD
Professor of Psychiatry & Behavioral Neuroscience at the University of Chicago

Published by State of Connecticut
Department of Mental Health and
Addiction Services Problem
Gambling Services

Brain Biology And Gambling Disorder

1-800-BETS OFF

WWW.1800BETSOFF.ORG
OUTSIDE IOWA, CALL 1-800-522-4700

Problem Gambling Treatment, Prevention and Recovery Services

Iowa Department of Health and Human Services
Lucas State Office Building
Des Moines, IA 50319-0075



© 2017 State of CT
DMHAS
PROBLEM GAMBLING SERVICES

November 2022

Jon E. Grant, JD, MD

Gambling Disorder Is...

a serious condition. People are not able to stop or control their gambling even when they know it hurts them, their families and friends, and their wallets. People with gambling disorder are also called compulsive or addictive gamblers. They spend a lot of time thinking about gambling and often experience overwhelming urges to gamble. They risk more money and spend more time gambling than they intend to. Gambling interferes with their ability to maintain friendships and meet the responsibilities at home and work.

Many people with gambling disorder do not believe that gambling is responsible for their problems. Even those who recognize how gambling affects their lives find it difficult or impossible to stop, no matter how hard they try.

People with gambling disorder may become depressed or anxious. Sometimes, but not always, they abuse alcohol and/or other drugs, and struggle with smoking. Many people with gambling disorder also experience poorer overall health, such as difficulties with hypertension, obesity, and insomnia. Families affected by gambling disorder can also experience problems, especially in the areas of personal responsibility, finances, and trust.

Gambling Disorder Is Not...

a sign of poor moral character or an indication that the person is lazy, greedy, or bad.

What Causes Gambling Disorder?

There is growing evidence that the interaction of a number of factors, such as psychological needs, social pressure, developmental issues, and the biological functions of the brain, contribute to the development of gambling disorder.

For some people, gambling disorder runs in families. This suggests that vulnerability to developing gambling disorder may be inherited as well as learned. That is not the only cause of gambling disorder however.

It is clear that other factors, such as financial problems, changes in a family related to divorce or death, or even living near a casino or other gambling venue, may contribute to the disorder.

Studies show that people with gambling disorder are three to eight times more likely than recreational gamblers to have a parent with gambling disorder. In some families of people with gambling disorder, a greater-than-average number of people struggle with alcohol, other drugs, or depression. However, gambling disorder also occurs in people who have no family history of these problems.

The Biology of the Brain

The brain consists of billions of nerve cells organized by region and function. These cells communicate with one another through chemicals called neurotransmitters.

Research suggests that individuals with gambling disorder have changes in the levels of neurotransmitter activity in parts of their brains.

It is not clear, however, that these changes cause gambling disorder – they could also be the effects of gambling disorder – but further exploration of such changes could lead to new treatments.

Changes in the concentrations of some neurotransmitters are associated with a range of psychiatric illnesses such as depression, anxiety, and obsessive-compulsive disorder. In terms of gambling disorder, researchers are not yet certain which neurotransmitter changes may provide more understanding of and better treatments for the disorder. However, there are neurotransmitters, especially those listed here, that are good candidates for more study.

Dopamine is involved in learning, motivation, and reward. If doing something makes a person feel good, they usually want to do it again and again. Dopamine dysfunction appears to make people vulnerable to addictive behaviors.

Glutamate appears to play a role in reinforcing our behavior when we find something pleasurable. Dysfunction in this neurotransmitter may play a large role in why people relapse after they try to stop gambling.

Endorphins, chemicals made in the body, have the same effects on the brain that morphine and heroin do. Endorphins create a feeling of pleasure, well-being and relieve pain. Several activities release endorphins, including meditation and aerobic exercise. That is the usual explanation for the “runner’s high.” Exciting and risky activities, such as mountain climbing, also produce endorphins. Endorphin production in the brains of gamblers may be one explanation for their addiction. Medicines that block the euphoria endorphins have been helpful to some gamblers.

Serotonin appears to help people control their impulses and need for excitement. A reduced concentration of serotonin in the brain is associated with a decrease in the ability to control impulses, which in turn may lead to risky behaviors such as gambling. Medications that raise serotonin levels are effective treatments for depression. They can sometimes also help gamblers exercise more self-control.

Norepinephrine, or noradrenalin, affects energy, concentration, alertness, and sensation-seeking. Gamblers have been found to have increased levels of norepinephrine during gambling, and those levels stay elevated for extended periods – even after the gambling stops for the day. These findings suggest that gamblers may experience heightened levels of arousal while gambling, which, in turn, leads to wanting to gamble more.

What Do These Findings Mean?

Learning about the brain biology of people with gambling disorder gives researchers a way to understand why gamblers have such difficulty stopping. Perhaps the excitement and risk involved in gambling produce chemical changes that result in addiction. If that is true, good intentions and willpower may not be enough. It is reasonable to hope that in the future, the benefits of psychosocial treatments for gambling disorder – individual and group therapy, family interventions, and Gamblers Anonymous – may be enhanced more often with medication.

