What this article is about

This article reviews evidence about brain regions that may be involved in cognitive control and impulsivity in gambling disorder (GD). Cognitive control is a person’s ability to control their urges and make decisions that help them achieve their goals. Impulsivity is a tendency to act without thinking about the consequences. GD is when a person cannot control their urges to gamble even after they experience negative consequences from gambling. Past studies have suggested that people with GD have poor cognitive control and impulsivity. However, only a few studies have investigated the brain processes that bring about poor cognitive control and impulsivity. Cognitive control has four different processes: response inhibition, conflict monitoring, decision-making, and cognitive flexibility. Response inhibition refers to a person’s ability to control automatic actions. Gamblers who have poor response inhibition are more likely to suffer from severe gambling problems. Conflict monitoring refers to a person’s ability to ignore irrelevant details when processing what is going on in the environment. Gamblers who have poor conflict monitoring tend to have more difficulty controlling their gambling behaviour. Decision-making is the process of making a reasonable choice from different options. People with GD often have problems making choices that will lead to long-term gains. Cognitive flexibility is a person’s ability to respond to changes in the environment. People with GD usually have poor cognitive flexibility and make poor choices as a result.

By reviewing functional magnetic resonance imaging (fMRI) studies, the authors describe which areas of the brain are affected by poor cognitive control and impulsivity in GD patients. They also suggest interventions that could be used to improve cognitive control in GD.

Why is this article important?

Although past studies have shown connections between poor cognitive control, impulsivity, and gambling disorder (GD), only a few studies have investigated the brain processes underlying these connections. This article is a review of functional magnetic resonance imaging (fMRI) studies on cognitive control and impulsivity in GD. The reviewed studies were all published before August 2016. The authors identify impaired activity in the prefrontal cortex among GD patients. They also suggest interventions that could be used to help gamblers regain cognitive control.

What was done?

The authors searched several online databases for studies using fMRI to investigate GD and cognitive control. All identified studies were published before August 2016 and focused on adult patients with GD. The authors found 14 studies that met their criteria. All of the selected studies are described in a table. The table includes the following information: the authors, the country where the study took place, participant characteristics (number, gender, and age), the tool used to diagnose GD or problem gambling, as well as the fMRI methods and cognitive task methods used. Since the selected studies used different tasks to measure cognitive control and impulsivity, the authors also grouped and summarized the articles by the four cognitive control processes and impulsivity.
What you need to know

Because of the limited number of fMRI studies investigating cognitive control in GD, the authors could not make definitive conclusions about the neural mechanisms of cognitive control in GD. The selected studies suggested that the prefrontal areas of the brain in GD patients have increased and/or decreased activity during various cognitive control tasks. This suggests that the prefrontal cortex works abnormally in those with GD. The improper functioning of the prefrontal cortex may be responsible for poor cognitive control and contribute to the loss of control over gambling urges. More research is needed to understand how cognitive control affects the emotions and motivations of people with GD.

Based on their review, the authors suggest drug and brain stimulation therapies that could be used to improve cognitive control in GD patients. Drug therapies could include opiate receptor antagonists, such as naltrexone and nalmefene, which regulate dopamine activity in the brain. Mood stabilizing drugs, such as lithium, may regulate prefrontal cortex activity and reduce impulsive choice. A brain stimulation therapy called repetitive transcranial magnetic stimulation (rTMS) has shown promise to reduce risky behaviour and the urge to gamble. More research is needed to improve rTMS effectiveness at reducing GD symptoms and understand how the therapy works.

Who is it intended for?

This review is intended to provide treatment providers with a better understanding of the brain processes involved in poor cognitive control and impulsivity seen in GD patients. It also suggests possible therapies for improving cognitive control in GD patients. The review offers researchers insights into cognitive control processes and treatment areas that require future research.

About the researchers

Lorenzo Moccia, Mauro Pettorruso, Franco De Crescenzo, Luisa De Risio, Luigi di Nuzzo, Luigi Janiri, and Marco Di Nicola are affiliated with the Institute of Psychiatry and Psychology at Gemelli University Hospital in Rome, Italy. Giovanni Martinotti is affiliated with the Department of Neuroscience and Imaging in the Institute of Psychiatry at the University of Chieti in Pescara, Italy. Angelo Bifone is affiliated with the Center for Neuroscience and Cognitive Systems in Revereto, Italy. For more information about this research, please contact Marco Di Nicola at marcodinicola.md@gmail.com.

Citation


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