

# knowledge snapshot



## Sensitivity to cues underlying the co-occurrence of gambling, substance use, and anxiety disorders

### What this article is about

Many people gamble but a subset of people become addicted to it. Those individuals may develop gambling disorder (GD), which leads to serious negative consequences. Moreover, people with GD tend to be vulnerable to other mental health conditions. In particular, GD is often comorbid with substance use and anxiety disorders. However, little research has investigated the mechanisms underlying the co-occurrence between these disorders.

This article reviews evidence surrounding the mechanisms that underline gambling, anxiety, and substance use. Evidence points to dopamine in the mesolimbic pathway of the brain. This neural pathway is thought to be responsible for why some people are more sensitive to cues related to gambling, substance use, and stress. Thus, these individuals are at greater risk for developing the disorders. The authors highlight the Incentive Sensitization Theory as a framework for advancing current understanding.

### What was done?

The authors reviewed the literature on gambling, anxiety, and substance use disorders. They based their review on the Incentive Sensitization Theory. The authors focused on human and animal studies examining neural pathways involved in sensitivity to rewards and stress cues. The authors then offered the notion of cross-sensitization to explain why these disorders tend to co-occur.

### What you need to know

Evidence suggests that the co-occurrence of gambling and substance use disorders is bi-directional. This means that people with one condition are more likely to develop the other condition. Anxiety disorders,

### Why is this article important?

Gambling often co-occurs with substance use and anxiety disorders. The Incentive Sensitization Theory can help advance current understanding of the underlying mechanisms. It provides a framework to understand the neurobiological and psychological processes for why some people are more sensitive to rewards and their cues. The authors point to evidence suggesting the relevance of incentive sensitization for gambling, substance use, and anxiety disorders. They propose that uncertainty in rewards, as seen in gambling, increases the release of dopamine in the mesolimbic system of the brain. This leads to a greater sensitivity to rewards and their cues. Stress, along with drugs or gambling and their associated cues, may trigger intense cravings. As a result, people are at greater risk for the disorders.

however, tend to occur before the onset of gambling and substance use disorders. People with anxiety disorders often report that they gamble or use drugs to help them cope with their negative moods. Furthermore, the co-occurrence of these disorders may influence their severity. For example, people with substance use disorders tend to have more severe gambling behaviours. Similarly, those with gambling disorders tend to have more severe symptoms of substance use.

The Incentive Sensitization Theory distinguishes between the “liking” and “wanting” of rewards to understand how people respond to reward cues. “Liking” refers to the pleasurable response people experience to rewards. On the other hand, “wanting”, also known as incentive salience, is the process by

which rewards and their cues generate motivation. “Wanting” is associated with an increased release of dopamine in the mesolimbic system of the brain, and heightened craving or “wanting” for the rewards. Repeated exposure to excessive levels of dopamine in this system, as can be the case when repeatedly taking drugs, can render this system hyperreactive. This can result in excessive desire for rewards and stronger responses to reward cues (e.g., gambling cues). In turn these cues can generate intense cravings and promote compulsive reward-seeking.

Evidence suggests that the presence of reward uncertainty, such as in gambling, may be another reason why this neural system becomes sensitive to rewards and their cues. Studies have shown that uncertainty of rewards is very attractive to individuals with GD.

Sensitivity to cues may also increase the risk of anxiety disorders. People with anxiety disorders may be particularly sensitive to cues related to stress and uncertainty. Past research has shown that stress can predispose people to gambling and substance use. People at risk for anxiety disorders may overly attend to cues related to stress and uncertainty. As a result, they become motivated to focus on cues related to gambling or substance use through incentive sensitization. Evidence suggests a strong role for stress and trauma in early life and adolescence to lead to permanent changes in neural sensitivity to rewards and cue “wanting”.

The authors offered the notion of cross-sensitization to explain the co-occurrence of the disorders. Cross-sensitization occurs when people who are sensitive to one reward have greater activity in the mesolimbic dopamine pathway to another related reward. Exposure to chronic or acute episodes of stress may render a person more vulnerable to gambling and substance use. Together, stress, drugs, gambling, and their associated cues may trigger intense cravings to use drugs and to gamble.

### Who is it intended for?

This information could be useful to service providers in the development of prevention or treatment. For

instance, service providers could target cue sensitivity and attraction to uncertainty to minimize one’s vulnerability to gambling. This might help improve treatment outcomes. This article is also useful for researchers as a guide to areas where future study and evaluation is needed.

### About the researchers

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