Differences in heart rate and stress responses in male pathological gamblers and healthy controls

What this research is about

Cardiovascular problems are common among pathological gamblers and people at risk of pathological gambling. Stress from negative consequences associated with gambling, including financial, social and mental health problems, may contribute to these problems. Engaging in gambling activity can also lead to increased heart rate and cortisol levels since gambling has unpredictable outcomes and rewards. Cortisol is a hormone released by the body in response to stress. Thus, gambling leads to bodily responses associated with both reward and stress. The effects are similar to taking a low dose of amphetamine (AMPH), a prescription drug that stimulates the brain and is used to treat a variety of conditions.

The researchers compared heart rate, blood pressure, and cortisol levels of male pathological gamblers to healthy men who did not have gambling problems before and after they took a low dose of AMPH. The low dose of AMPH was used to stimulate bodily responses similar to an episode of gambling. The researchers also compared how the two groups did on a task that measured impulsive tendency and ability to control response to a signal.

What the researcher did

The researchers recruited 12 men who were pathological gamblers and 11 men without gambling problems as the control group. The participants were asked about alcohol and drug use, depression, gambling problems, impulsive tendency, extraversion and desire to act in a socially desirable manner. A Stop Signal Task was used to measure impulsive tendency and ability to control response to a signal. In this task, the participants had to press a key as soon as possible when they saw the letters X or O on the computer screen (Go signal). They had to

What you need to know

Male pathological gamblers and healthy men without gambling problems were given a low dose of amphetamine (AMPH) to stimulate bodily responses similar to an episode of gambling. Pathological gamblers were found to have irregular responses as measured by heart rate, blood pressures and cortisol levels. Pathological gamblers had lower cortisol levels than the control group before taking AMPH. Their cortisol levels became similar to those of the control group after taking AMPH. But they had lower heart rate and higher blood pressures. Among the pathological gamblers, those with lower heart rate in response to AMPH had more severe gambling problems, poorer ability to control their response to a stop signal and more impulsive tendency. These effects in pathological gamblers were similar to effects seen in chronic drug users, who became tolerant and had less response to a drug after repeated exposure.
stop themselves from pressing if a tone (Stop signal) was sounded after the Go signal. The researchers measured the time that the participants waited before pressing the key, and the number of errors they made.

The participants received a single oral dose of AMPH on a separate day. Their heart rate, blood pressures, and cortisol levels were measured at baseline before they took AMPH and at regular time intervals after they took AMPH.

What the researcher found

Pathological gamblers were more dependent on smoking than the control group. They also had more depressive symptoms, although not at a clinical level that required psychological treatment. They made more mistakes on the Stop Signal Task, and had more difficulty stopping their response when the Stop signal appeared.

Pathological gamblers had irregular responses to AMPH as measured by heart rate, blood pressures and cortisol levels. Before taking the low dose of AMPH, pathological gamblers had lower cortisol levels than the control group. After taking AMPH, the cortisol levels of both groups increased to similar levels. This indicated that AMPH helped the pathological gamblers restore their cortisol levels. But pathological gamblers had lower heart rate and higher blood pressures after taking AMPH. In the control group, those with higher heart rate in response to AMPH did worse on the Stop Signal Task. They had poorer ability to control their response and more impulsive tendency. In the pathological gambler group, the opposite effects were found. Pathological gamblers with lower heart rate in response to AMPH did worse on the Stop Signal Task and had more severe gambling problems. These effects in pathological gamblers were similar to effects seen in chronic drug users, who became tolerant and had less response to a drug after repeated exposure.

How you can use this research

Treatment providers can use this study to understand the physiological effects of gambling. Researchers can also use this study to further examine the role of stress responses in the development of pathological gambling.

About the Researcher

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