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University of Cambridge (UK) Research News

Near misses are like winning to problem gamblers

May 4, 2010

The brains of problem gamblers react more intensely to near misses than casual gamblers, new research from the University of Cambridge has found. The results could help explain what keeps problem gamblers betting even though they keep losing.

The study involved scanning the brains of 20 gamblers using functional magnetic resonance imaging while they played a computerised slot machine. Participants' gambling habits ranged from regular, social gamblers to those with severe problem gambling.

Dr Luke Clark of the University of Cambridge, who led the study, found that the parts of the brain involved in reward processing – the so-called dopamine centres – were more active in problem gamblers than in social gamblers.

During the experiment, volunteers played a computerised slot machine with two spinning wheels of icons and won 50p when the two icons matched. An icon mismatch was a loss, but when the wheels stopped within one icon of a match, the outcome was considered a "near miss."

Dr Clark found that near misses activated the same brain pathways as wins, even though no reward was given, and that this reaction was stronger in those gamblers who had more symptoms of problem gambling.

In particular, the study found strong responses in the midbrain, an area that is packed with dopamine-releasing brain cells. The dopamine system is associated with addiction and targeted by drugs of abuse. The study also found the near misses were linked with increased activity in a brain region called the ventral striatum, an area associated with reward and learning.

The results help explain why problem gamblers find it hard to give up.

According to Dr Clark: "These findings are exciting because they suggest that near-misses may elicit a dopamine response in the more severe gamblers, despite the fact that no actual reward is delivered. If these bursts of dopamine are driving addictive behaviour, this may help to explain why problem gamblers find it so difficult to quit."

Dopamine, a neurotransmitter, plays an important role in signalling "rewards" such as money and chocolate, and the dopamine system is also targeted by drugs of abuse.

“The results highlight some of the links between problem gambling and drug addiction, and have implications for both psychological and drug treatment for problem gamblers,” Dr Clark says.

The findings are published in the new issue of The Journal of Neuroscience.