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Discovery opens up new treatments for problem gamblers

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After looking at images of slot machines and roulette, problem gamblers experience increased activity in the same part of the brain that lights up when drug addicts have cravings, according to a new UBC psychology study.

The findings, published today in *Translational Psychiatry*, suggest that this part of the brain, called the insula, is also involved in behavioural addictions, and that treatments targeting the insula could be helpful in treating people with gambling problems.

"This mysterious and poorly understood part of the brain has been identified as a key hub for craving in past research. For example, smokers who have sustained brain injuries affecting their insula have been found to be more likely to quit smoking," said lead author Eve Limbrick-Oldfield, postdoctoral research fellow at the UBC department of psychology and Centre for Gambling Research. "Our study builds on those findings, showing that the insula is also involved in behavioural addictions like problem gambling."

Researchers had 19 people with gambling disorder, a psychiatric term for serious gambling problems, undergo an MRI brain scan while looking at a series of gambling-related photos and neutral photos. A control group of 19 healthy volunteers were shown the same photos.

After participants rated their craving level, researchers compared the problem gamblers' brain responses to the gambling photos with their

brain responses to the neutral photos. They found the gamblers reported a higher level of craving after seeing the gambling photos.

For problem gamblers, the gambling cues also increased brain activity in parts of the frontal cortex and insula, areas linked to craving and self-control in drug addiction. The level of craving was closely linked to brain activity in the insula, suggesting neurobiological similarities between problem gambling and drug addiction.

Study co-author Luke Clark, psychology professor and director of the Centre for Gambling Research at UBC, said the findings reveal the powerful effect of cues in triggering cravings for problem gamblers.

"Everything from the lights and the sounds of the slot machines to the smell of the casino are cues that, even after years of abstinence from gambling, can trigger a craving," said Clark. "Being able to control one's response to these cues is a crucial part of avoiding relapse."

Clark said the findings also highlight the potential for treating gambling disorder by targeting the insula, and for testing new treatments by looking at their ability to tone down these responses. The researchers are now looking at the effectiveness of naltrexone, a medication used to treat alcohol and heroin addiction, in changing these brain responses in problem gamblers.

More information: E H Limbrick-Oldfield et al, Neural substrates of cue reactivity and craving in gambling disorder, *Translational Psychiatry* (2017). DOI: 10.1038/tp.2016.256

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