



research reveals...

an update on gambling research in ALBERTA

About The Alberta Gaming Research Institute

The Alberta Gaming Research Institute is a consortium of the Universities of Alberta, Calgary, and Lethbridge. Its primary purpose is to support and promote research into gaming and gambling in the province. The Institute's identified research domains include bio-psychological and health care, socio-cultural, economic, and government and industry policy and practice. The Institute aims to achieve international recognition in gaming-related research. It is coordinated by a Board of Directors working in collaboration with the Alberta Gaming Research Council. The Institute is funded by the Alberta government through the Alberta Lottery Fund.

OUR MISSION:

To significantly improve Albertans' knowledge of how gambling affects society

Your comments and queries are welcome either by e-mail abgaming@ualberta.ca or phone 780.492.2856.

Alberta Gaming Research Institute Board of Directors, 2003

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Measuring brain function in pathological gamblers

IS THERE A MEASURABLE physiological difference between pathological gamblers and those who gamble but do not develop an addiction? This is a question that intrigued Dr. David Crockford, Assistant Professor in the Department of Psychiatry in the University of Calgary's Faculty of Medicine. When Dr. Crockford arrived at the University of Calgary in 1994 to do his residency in Psychiatry, he began to work with Dr. Nady el-Guebaly, Professor and Head of the University's Substance Abuse Division (and current Chair of the Alberta Gaming Research Institute Board of Directors). Dr. el-Guebaly suggested that he examine pathological gambling as an area of research. From it emerged a paper on "psychiatric comorbidity" (in this context meaning the presence of two or more illnesses in a patient) associated with pathological gambling.

"Less than 8% of pathological gamblers seek treatment."

The research behind the paper furthered David Crockford's interest in determining why it is that the majority of people in Alberta gamble in one form or another, but few develop pathological gambling or problem gambling characteristics. "Answering this question and others like it," he says, "was one of the reasons why I entered psychiatry in the first place." After earning his MD at the University of Alberta, David did residence training in internal medicine at the University of British Columbia before arriving in Calgary to specialize in psychiatry.

David had difficulty understanding why patients would come to believe and act sometimes in very irrational ways, even though they could speak directly to and obviously understand the irrationality of the belief and behaviour. The question then came to be as to whether or not some individuals have a neurobiological basis for persisting in their behaviours, specifically with respect to pathological gambling.

"Neurobiology" is defined as a "branch of the life sciences that deals with the anatomy, physiology and pathology of the nervous system" (Merriam-Webster Dictionary). Foothills Hospital in Calgary, notes David, has a powerful Magnetic Resonance Imaging (MRI) instrument, and recently recruited Dr. Bradley Goodyear, a researcher who specializes in functional MRI's (fMRI). fMRI had been used to study patients with chemical addictions, and had indicated differences in brain blood flow patterns between healthy subjects (controls) and addicted patients. fMRI's potential fitted David's research proposal ideally. "We then decided," said David, "that it may be a reasonable means to study pathological gamblers" to see if in fact they displayed similar differences as observed in chemical addictions.

The goals of the project, funded by the Alberta Gaming Research Institute, were to see if the brain function of pathological gamblers differed from a healthy "control" group when exposed to an audiovisual cue meant to evoke cravings for gambling. The researchers felt that cravings were important to the perpetuation of gambling behaviour. If in fact there were differences, a number of benefits would result. For example, it would potentially further de-stigmatize pathological gambling and promote help-seeking behaviour (David points out that less than 8% of pathological gamblers seek treatment). It would also identify a potential neurobiological basis for pathological gambling and the gamut of addictions, and thus potentially open up novel treatment options for pathological gambling and other addictions.

The Seaman Family MR Research Centre at the Foothills Hospital, where Dr. Goodyear works, was the site of the research. David says that without the Centre's donating the time for the project, it would never have been possible. For the study, 10 male pathological gamblers were recruited and compared to 10 healthy "control" members who were matched for age,

ethnicity, handedness, smoking, and general health status, among other things. The pathological gamblers were all long-time gamblers with an average of 14.1 years of problem behaviour. After an interview with Dr. Crockford, all subjects in both groups underwent an fMRI of the brain. They were repeatedly exposed to a nature video alternating with a video intended to induce craving for gambling. The design (repetition of the videos) ensured that the findings were reliable and not just due to novelty or other factors. fMRI records brain blood flow changes. Specific locations of brain flow changes were evaluated, as these alterations correspond with alterations in brain activity—it increases with more activity and decreases with less

activity. Reaction is relatively swift: blood flow changes occur within three to five seconds of an alteration in activity.

The images from the fMRI's were then compiled, and any significant differences between the pathological gamblers and the control group were identified. The core finding, says David, was that the pathological gamblers displayed increased brain activity in comparison with the healthy control group. The brain areas activated were the frontal and medial temporal aspects of the brain, responsible for memory, recognition of importance of visuospatial images, and planning for behaviour re-enactment. But significantly, the researchers noted that the differences appeared to be acquired through exposure to the stimuli "rather than being representative of a specific neurobiologic deficit." In other words, the physiologic differences in the brains of pathological gamblers develop likely as a consequence of gambling rather than being present beforehand.

David hopes that the research undertaken for this study will increase our understanding of why some people persist at gambling despite obviously negative consequences and, beyond gambling, persist at certain behaviours in general. The results suggest that, with respect to pathological gambling, limiting exposure, avoidance, negatively reinforcing the importance of recollected gaming events and developing alternate memories of greater emotional significance will be important to the treatment of pathological gambling.

Future research in this area is planned, says David, and will likely focus on individuals with a variety of exposure levels to gambling (social, problem, pathological, abstinence) and also examine where in the brain conscious interpretation of the importance of gambling-related cues are decided on.

The following scholarly works relate to the research undertaken by Dr. David Crockford:

Crockford D., Goodyear B., Tavares H., & el-Guebaly N. (2003, November). *Functional magnetic resonance imaging of pathological gamblers – a pilot study*. Presented at the 53rd Annual meeting of the Canadian Psychiatric Association, Halifax, NS.

Crockford D., Goodyear B., Tavares H., Quickfall J., & el-Guebaly N. (2002, December). *Functional magnetic resonance imaging of pathological gamblers*. Presented at the 13th Annual Meeting & Symposium of the American Academy of Addiction Psychiatry, Las Vegas, NV.

Crockford, D.N., & el-Guebaly, N. (1998). *Psychiatric comorbidity in pathological gambling: A critical review*. Canadian Journal of Psychiatry, 43(1), 43-50.

Crockford, D.N., & el-Guebaly, N. (1998). *Naltrexone in the treatment of pathological gambling and alcohol dependence*. Canadian Journal of Psychiatry, 43(1), 86.

3rd Annual Conference on Gambling Research

Treatment of Problem Gambling: A Vision for the Future

Thursday, May 20 – Saturday, May 22, 2004
The Banff Centre, Banff, Alberta

The Alberta Gaming Research Institute is co-sponsoring, with the University of Calgary, a special interest conference focusing on *The Treatment of Problem Gambling: A Vision for the Future*. Following a Welcome Reception, the evening of Thursday, May 20, the two-day conference will be held on Friday and Saturday. Foremost researchers in the field will present the most recent research results in various types of treatment. It will appeal to academics and those involved in treatment of and intervention in problem gambling, as well as to students in related fields of study and the general public.

December 2003/January 2004 issue of 'Research reveals...' featured an overview of the conference program. Since that issue was produced, a fourth workshop has been added to the program. The 'Treatment Resources for Problem Gamblers in Alberta' will be jointly presented by a representative of AADAC and Dr. Nady el-Guebaly, Director, Addiction Centre, Foothills Medical Centre, Calgary.

For the most current program information or to register (online registration only) see www.abgaminginstitute.ualberta.ca/Events/2004_Conference/. Early registration deadline is April 5, 2004.

Institute-funded report analyzes video lottery terminal gambling in Alberta

On February 12th, the Institute released the much anticipated Institute-funded report entitled "VLT Gambling in Alberta: A Preliminary Analysis" (2004, January) by Dr. Garry J. Smith, Gambling Research Specialist, Faculty of Extension, University of Alberta, and Dr. Harold J. Wynne, Wynne Resources, Edmonton.

Key issues covered in the report include an analysis of the Alberta government's video lottery terminal (VLT) program, the problem gambling prevalence rate among Alberta's VLT players, and factors that distinguish between problem and non-problem VLT gamblers.

The full report is available from the Institute website:

http://www.abgaminginstitute.ualberta.ca/documents/research/VLT_Gambling_Alberta.pdf

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