



Published in final edited form as:

Addiction. 2009 June ; 104(6): 1016–1017. doi:10.1111/j.1360-0443.2009.02619.x.

Non-substance and substance addictions

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Keywords

DSM; ICD; addiction; gambling; dependence; neurocognition

A recent area of debate has involved the extent to which non-substance-related disorders like pathological gambling that share clinical, phenomenological, and biological features with substance abuse or dependence might be considered together as addictions. This question has gained increasing relevance over the past few years as preparations for the next editions of the Diagnostic and Statistical Manual (DSM) (1) and International Statistical Classification of Diseases (ICD) (2) are being undertaken and the most appropriate categorizations of pathological gambling and other impulse control disorders are being deliberated (3,4).

Pathological gambling represents an important disorder to study for multiple reasons. First, it can have a significant and devastating impact on affected individuals, their families and others (e.g., victims of embezzlement schemes related to securing funds for excessive gambling). Second, as an “addiction without the drug” (5), pathological gambling can provide insight into the pathophysiology of addiction without the potentially confounding influence of drug-on-brain-substrate. That is, drugs like cocaine (6) and alcohol (7) have been shown to influence brain structure and function, and these influences may be of greater or lesser relevance to the core features of addiction. By comparing and contrasting specific aspects of substance use disorders with those of pathological gambling, improved insight into the core features of addiction may be obtained.

The manuscript by Lawrence and colleagues (8) describes similarities and differences between alcohol dependent and problem gambling subjects on measures of neurocognitive functioning in the domains of decision-making, impulsivity and working memory. A broad conclusion from the manuscript is the finding of ventral prefrontal cortical abnormalities in problem gambling and alcohol dependence, consistent with prior brain imaging and neurocognitive findings (9,10). The current study suggests largely intact dorsal prefrontal cortical or executive function in the problem gambling group, contrasting somewhat with prior studies in which executive functions have been reported to be compromised in individuals with pathological gambling (11,12). The extent to which these differences reflect the subject populations studied, neurocognitive tasks employed, or other features requires additional investigation. As performance on specific neurocognitive tasks have been linked to treatment outcome for drug dependence (13,14), additional investigation is needed to identify the clinical relevance of the identified deficits in individuals with gambling problems.

A unique contribution of this manuscript comes from the specific tasks used to assess the domains of decision-making and impulsivity, as assessed by the Cambridge Gamble and Information Sampling Tasks, respectively. These two tasks help to dissect aspects of each domain further to provide further insight into the pathophysiology of the disorders. In the case of the Cambridge Gamble Task, this helps to identify both similar abnormalities in the problem gambling and alcohol dependent groups (e.g., in bankruptcies) and differences (e.g., in decision latency, which was uniquely abnormal in the alcohol dependent group). These

findings resonate with those from studies of drug dependence in which response latency and disadvantageous decisions on a gambling task showed unique relationships (15).

Although the current findings represent an important contribution, there exist, as the authors note, limitations (e.g., small and heterogeneous samples). In addition, while the findings suggest ventral prefrontal dysfunction underlies the shared neurocognitive deficits in problem gambling, brain imaging was not employed to verify this possibility empirically. As such, direct brain imaging studies comparing problem gambling and alcohol dependent subjects are currently lacking and needed. In addition, the problem gambling group in the current study consumed more alcohol than did the control group, raising the possibility that alcohol consumption might be contributing to some of the deficits in the problem gambling group. Recent animal data suggest that alcohol consumption during critical periods of development (e.g., adolescence) enhances choice impulsivity in adults (16). Thus, careful longitudinal studies are needed to dissect more fully specific contributions of substance use on addiction, even amongst non-substance addictions like pathological gambling. With the information gained from such studies, we will be better informed in decisions regarding how best to categorize, prevent and treatment multiple types of addictions.

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