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Hardwired for Risk: The Clinical Utility of Exploring Evolutionary Aspects of Gambling

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Introduction

Evolutionary perspectives increasingly inform the research on addiction. As this knowledge base advances, an increasing corresponding need to translate these understandings into a manner that promotes clinical innovation has consequently emerged. The purpose of this article is to provide a brief overview of emerging perspectives on evolutionary and neurobiological aspects of gambling and to consider how such perspectives can inform and enhance clinical practice.

Over the past several decades, the neurobiological understanding of substance use disorders and addictive behaviours has expanded significantly (Koob, Arends, & Le Moal, 2014; Koob & Simon, 2009). This shift has correspondingly led such bodies in the United States as the National Institute on Drug Abuse (NIDA) and the American Society of Addictive Medicine (ASAM) to emphasize the role of the brain and the effect of addictive substances on neuroanatomy and neurophysiology. These brain changes and their behavioural consequences are especially noticeable concerning the role of motivation and reward (ASAM, 2011; NIDA, 2016).

The primary brain circuitry indicated in addiction is the limbic system. This system is generally responsible for regulating drives, priorities towards which an organism is generally oriented because they promote survival and success. These priorities include the satisfaction of hunger and thirst, the keeping of oneself safe and alive, and the maintenance of hygiene, as well as parental commitment, social affiliation, and reproduction. In the middle of the limbic system is the reward pathway, made up primarily of the ventral tegmental area (VTA) and the nucleus accumbens (NAc). The reward pathway is also referred to as a motivational or *wanting system* because it encourages seeking out biological priorities. This area is rich in receptor sites for the neurotransmitter dopamine, which plays a key role in reinforcement. When the organism moves towards something seen as a priority or satisfies a drive, the reward circuitry comes alive with dopamine, producing a reinforcing experience. This not

only provides an incentive for the current behaviour, but also encourages further repetition of the behaviour in the future (Chambers, 2018; Erickson, 2018).

From an evolutionary perspective, this brain circuitry encourages adaptation by rewarding an organism for engaging in behaviours that help it to adapt, survive and thrive. Unfortunately the drugs of addiction all act upon this reward pathway, generating a degree of motivation and reinforcement that far surpasses that experienced by normal reinforcers. The motivation to seek out the addictive substance starts to become the main priority of the system, overtaking the other drives in its priority ranking. The commandeering of the brain's priority and reward circuitry, necessary for promoting the survival and success of both individual organisms and the species, by the drugs of addiction, has led to the development of an evolutionary explanation for addictions (Durrant, Adamson, Todd, & Sellman, 2009).

Evolutionary perspectives on gambling

This exploration into neurobiological and evolutionary aspects of addiction has now also expanded to include consideration of the process addictions, most notably gambling. The expanding understanding of gambling as an addiction led to its renaming as Gambling Disorder in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–5*; APA, 2013). The *DSM-5* also now classifies Gambling Disorder alongside the substance use disorders in the newly renamed section of *Substance-Related and Addictive Disorders* (APA, 2013). Investigators have discovered similar neurobiological characteristics, including common brain regions, circuitry and neurochemical dysregulations implicated for both the drug-based and process addictions generally (Leeman & Potenza, 2013), and for gambling addiction specifically (Clark et al., 2013). Recent neuroimaging demonstrates that the same meso-limbic brain regions and areas of the reward pathway active for individuals addicted to alcohol and other drugs (especially concerning the experience of craving and reactivity to cues) are active in those persons with an addiction to gambling. This further supports the neurobiological conceptualization of Gambling Disorder as an addiction (Limbrick-Oldfield et al., 2017).

Given the activation of the same brain regions and pathways implicated from an evolutionary perspective in biological drives and priorities promoting survival and success by both gambling and the ingesting addictions, it is easy to question how, from an evolutionary viewpoint, gambling could contribute to the survival and success of a species. To date, Anselme and associates have offered the most specific evolutionary explanations for gambling behaviour (Anselme, 2013; Anselme & Robinson, 2013). These explanations emphasize the role of dopamine, the reward pathway, and their connection to the evolutionary development of foraging and survival strategies that favour a sense of risk.

The compensatory hypothesis suggests that in response to limited, uncertain resources and environments beyond the ability of the organism to predict or control

that it is evolutionary adaptive to encourage, favour and reward seemingly low probability foraging strategies (i.e., taking risks) with high potentials for payoff. Strengthening these connections are findings that unpredictable reinforcement and experiencing losses, especially ones that appear close in proximity to wins (i.e., near misses) seem to be powerful motivators for behaviour, and at times are even more motivating than wins. This process of being motivated more by unpredictable reinforcement and losses in the form of near misses than by payoff has led to the suggestion that gambling behaviour resembles the foraging strategies suggested by the compensatory hypothesis (Anselme, 2013; Anselme & Robinson, 2013).

While most assume that money and winnings solely drive gambling behaviour (consistent with a learning model of gambling that emphasizes respondent and operant conditioning, especially intermittent reinforcement), researchers have found that problem gamblers, especially when compared to non-problem gamblers, show an increased reward response in the brain to staying in contact with the process of uncertain payoff and potential loss. This act of staying engaged in the act of unpredictable payoff (i.e., "foraging") appears in addition to the payoff of winning (i.e., reinforcement) to be a primary motivator for problem gamblers. Certain researchers suggest that this sustained engagement in the act might provide more reinforcement for problem gamblers than even winning does, especially given observations that those with Gambling Disorder can become depressed or aggressive once they actually finally do win (Anselme, 2013; Anselme & Robinson, 2013).

Treatment implications

Understanding the role of evolutionary influences on behaviour offers an ever-growing clinical applicability. While therapeutic responses validating client feelings and experiences have always been an important clinical skill, they have received increased attention in the past several years. This change is especially true for approaches emerging from the cognitive-behavioural tradition that are now commonly referred to as the third-wave contextual behaviour therapies, including Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), and Compassion-Focused Therapy (CFT), among others. In addition to traditional cognitive and behavioural techniques they also emphasize interventions focused on mindfulness, acceptance, and values-based behaviour change. These approaches are increasingly utilized in the treatment of addictive disorders (Hayes & Levin, 2012), including gambling (Toneatto, 2012).

DBT makes validation an essential part of the clinical interaction and encourages clinicians to acknowledge the adaptive intent and function of certain behaviours in which the person engages to cope, even if these strategies ultimately do not or no longer serve the person well, such as engaging in substance use or addictive behaviours. DBT-informed clinicians assume that clients are genuinely attempting to address and alleviate heir distress, and that for now clients are doing the best they can with what they have and with what they know (Linehan, 1993; Van Dijk, 2012).

ACT also emphasizes recognizing the reasonable and understandable nature of many behaviours, such as drastic and inflexible attempts to escape and avoid unwanted outer and inner experiences, while also exploring how such strategies ultimately are not workable and do not move one towards what they truly value in life (Hayes, Strosahl, & Wilson, 2012).

Of these approaches, CFT has most specifically placed an intentional emphasis on reducing or eliminating shame through addressing the evolutionary role of certain regulatory systems on behaviour, including ones that facilitate protective, soothing, and social affiliative responses. This is especially true for what CFT refers to as the drive system, which energizes the person to anticipate and seek out needed and desired resources. This system also plays a role in the experience of pleasure and gratification (Gilbert, 2009, 2017).

CFT emphasizes the role of the brain in guiding behaviour and that that these various regulatory systems have certain default wiring passed done through heredity and evolution, processes over which the individual had little say or control. This view, however, neither excuses harmful behaviours nor suggests that people are incapable of controlling, affecting or modifying these processes. Instead, CFT suggests that emphasizing the inherited role of these tendencies helps clients to see that they did not necessarily choose these reactions and that they share them with a common human family. This process helps to decrease shame and personalization so that one can successfully develop more adaptive coping strategies so that they might be able to address issues more effectively and productively (Gilbert, 2009; Kolts, 2016).

Many individuals struggling with addiction often wonder how their use and behaviour could have become so unmanageable. They experience a great deal of shame for seemingly allowing it to do so and see this as evidence that they are somehow inherently broken, weak or bad. Clinicians serving individuals with gambling disorder can utilize psychoeducation and validation skills, especially guided by an evolutionary perspective, to universalize the appeal of gambling behaviour. The clinicians can highlight the link to inherited foraging strategies that create tendencies that the person did not choose and over which they have little control. This evolutionary perspective normalizes the nature of taking risks and how doing so helped early humans to survive and thrive. While these tendencies might be default settings, default does not mean destiny. Clinicians working from a CBT perspective generally and utilizing CFT specifically can help individuals manage their struggles by encouraging the development of mindfulness skills, compassionate imagery and other relaxation and soothing strategies to reduce arousal and increase a sense of contentment, safety and supportive connection to others (Gilbert, 2009, 2017). While CFT and related third-wave approaches offer promise to the treatment of problematic gambling, more work needs to be done on more specifically developing and adapting these models to gambling and on integrating these approaches and skills into already established treatment protocols for Gambling Disorder.

Conclusion

The evolutionary perspective is enhancing the understanding of addiction, including gambling. This increased understanding can better inform and educate individuals struggling with gambling, and therapeutic modalities that utilize an evolutionary perspective, such as CFT, can offer new treatment possibilities. The clinical implications of an evolutionary understanding of gambling are that it can help both clinicians and clients to see that, while taking risks can be, from an evolutionary perspective, necessary and beneficial, this adaptive strategy can also work to create significant problems. Such a view allows clients both to understand better and validate this dynamic while also developing new skills and strategies managing their behaviour. The hope is that coming to see and appreciate increasingly the influence of evolution on gambling will help those persons suffering to reduce their sense of shame and recover from their struggles.

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