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The Biopsychosocial Con
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sequences of gambling

Pathological gambling is a disorder that can have many diverse and unintended consequences. From a medical perspective, pathological gamblers are at increased risk to develop stress-related conditions, such as hypertension, sleep deprivation, cardiovascular disease, and peptic ulcer disease. Common psychiatric sequelae of pathological gambling include exacerbation and initiation of major depressive episodes, anxiety disorders, or substance use disorders. Unintended psychological consequences may also include intense levels of guilt and shame, deceptive practices, and heightened impulsivity/ impaired decision-making. Finally, the social consequences of pathological gambling can be enormous, often ranging from involvement with the legal system to lost productivity at work to strained interpersonal relationships. This article reviews the consequences of pathological gambling and will familiarize mental health clinicians with this psychiatric disorder.

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INTRODUCTION

Over the last 20 years, legalized gambling in the United States has expanded to the point where it is available in every state except Hawaii and Utah.¹ As a result, American society has transformed gambling into one of the largest forms of entertainment in today's popular culture. The American Gaming Association reports that the casino industry generated approximately \$72 billion in gross revenues during the fiscal year of 2003–2004, a dramatic increase from the \$25 billion generated in 1995.² In comparison to other recreational activities, cigarette sales generated \$22 billion per year while sales of digital video discs (DVDs) totaled \$25 billion. Gambling participation rates over the last year have been reported to be close to 80 percent of the adult general population.³ With the increase in availability of gambling, there has been a concurrent upswing in gambling's acceptance. In 2004, gambling became part of mainstream America through the popularity of televised poker tournaments, fantasy sports, and Internet gambling. One of the most popular selling holiday gift ideas during the 2004 holiday season was gambling-related merchandise, namely poker chips and home casino games.

Gambling has been defined in a variety of ways but can be best described as "putting something of value at risk on an outcome that is due to chance."⁴ Traditional forms of gambling include casino games, sports betting, card playing, and lotteries. Current concepts of gambling describe a spectrum of gambling-related behaviors, from recreational to pathological. The majority of adults who gamble do so on a social basis and do not incur long-term or permanent problems related to gambling. Gambling lasts for a limited amount of time, and there are predetermined acceptable losses. This type of gambling behavior, known as social gambling, is

thought to represent 80 to 85 percent of people who ever gamble.³

The next level of gambling involvement can be described as problem gambling: those who gamble despite problems in their lives caused by gambling. These may include gamblers who lose more money than intended, who spend a significant amount of time gambling, or who may choose gambling as their primary form of recreation, often at the expense of other alternative activities (e.g., only taking vacations at gambling destinations). Conceptually, this category is akin to alcohol abuse and is thought to represent gamblers who are at risk to becoming pathological gamblers. Current epidemiological research suggests that 2 to 3 percent of the U.S. adult population fit into this category, although formal criteria remain to be developed.⁵

The most destructive form of gambling involvement is pathological gambling, thought to comprise approximately 1 to 3 percent of the general population, a prevalence rate similar to bipolar disorder and schizophrenia.⁶ Pathological gambling, also known as compulsive

gambling or disordered gambling, is a recognized mental disorder characterized by a pattern of continued gambling despite negative physical, psychological, and social consequences.⁷ It is listed in the DSM-IV as an impulse control disorder and has 10 separate criteria, some of which are similar to substance dependence, such as tolerance, withdrawal, and the repeated inability to cut down on the behavior (Table 1). To meet criteria for pathological gambling, 5 out of 10 criteria must be met in addition to the gambling not being directly caused by a substance and not occurring during the midst of a manic episode. In addition to DSM-IV criteria, there are several psychometrically valid screening instruments that can assist the clinician in identifying patients with at-risk gambling behaviors. These include the South Oaks Gambling Screen and the Lie/Bet questionnaires.^{8,9} Both can be easily employed in any mental health treatment setting and have been shown to be highly sensitive in detecting problems related to gambling. Despite this, pathological gamblers are often not recog-

TABLE 1. DSM-IV TR Criteria for Pathological Gambling

A. PERSISTENT AND RECURRENT MALADAPTIVE GAMBLING BEHAVIOR AS INDICATED BY FIVE (OR MORE) OF THE FOLLOWING:

- 1. Preoccupation with gambling (e.g., preoccupation with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)**
- 2. A need to gamble with increasing amounts of money in order to achieve the desired excitement**
- 3. Repeated unsuccessful efforts to control, cut back, or stop gambling**
- 4. Restlessness or irritability when attempting to cut down or stop gambling**
- 5. Use of gambling as a way to escape from problems or relieve a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)**
- 6. After losing money gambling, one often returns another day to get even ("chasing" one's losses)**
- 7. Lying to family members, therapist, or others to conceal the extent of involvement with gambling**
- 8. Committing illegal acts, such as forgery, fraud, theft, or embezzlement, to finance gambling**
- 9. Jeopardizing or losing a significant relationship, job, or educational or career opportunity because of gambling**
- 10. Relying on others to provide money to relieve a desperate financial situation caused by gambling.**

B. THE GAMBLING BEHAVIOR IS NOT BETTER ACCOUNTED FOR BY A MANIC EPISODE.

nized in general mental health treatment, and even when they are seeking treatment, there are only a limited number of gambling treatment specialists available.¹⁰ Given its increased availability and the amount of attention gambling is being given by the media, legislatures, and industry, researchers have just recently started to examine gambling in a formal fashion.



[Pathological gambling] can create conditions of chronic stress that **will lead to physical consequences**, such as hypertension, cardiovascular disease, peptic ulcer disease, and exacerbation of baseline medical problems.

The consequences of pathological gambling stretch across the biopsychosocial perspective and may include financial losses, worsening of emotional and physical health, legal problems, and interpersonal difficulties. Some of these consequences may be permanent while others tend to resolve as the gambling behavior is controlled. This article will review these consequences highlighting the direct and indirect effects of pathological gambling. Clinicians need to be aware of these consequences in order to be able to prevent, identify, and manage problems that arise due to continued gambling.

This is the first installment of three articles that will focus on pathological gambling; the second will describe the clinical populations that are most vulnerable to becoming pathological gamblers; and the third will describe psychotherapeutic approaches to pathological gamblers.

BIOLOGICAL CONSEQUENCES OF PATHOLOGICAL GAMBLING

Recent studies have begun to examine the impact of pathological gambling on the brain and body and have shown altered neurobiological processes. What remains unclear is whether these biological changes are a direct consequence of gambling or whether they existed before the onset of gambling. Nevertheless, research into the biological components of pathological gambling will lead to a better understanding of the process of addictive

behaviors because there are no neurotoxic substances, such as cocaine or methamphetamine, to confound interpretations or explain abnormal behaviors.

Neuroimaging work by Potenza suggests that the brain regions involved in pathological gambling, namely anterior cingulate, orbitofrontal cortex, and the mid-brain reward circuitry, are similar to the one involved in substance use disorders.^{11,12} Neurochemical studies have implicated alterations in the dopamine, serotonin, and norepinephrine systems of pathological gamblers.¹³ Bergh reported that concentrations of dopamine were lower in the cerebrospinal fluid of pathological gamblers as compared with controls, but that levels of its metabolites 3,4-dihydroxyphenylacetic acid and homovanilic acid were higher, suggesting increased release of dopamine in the brain.¹⁴ The results of studies on serotonin in pathological gamblers have been mixed, with some studies showing increased levels and others showing decreased metabolism.¹⁵ Roy found increased noradrenergic activity in pathological gamblers through increased levels of the metabolite of noradrenaline, 3-methoxy-4-hydroxyphenylglycol, in the CSF of pathological gamblers.^{14,15} Exactly how these neurochemical differences contribute to pathological gambling behavior requires further study, but they are thought to affect individual responses to reward, impulsivity, learning, and self control.

In addition to biochemical alterations, pathological gambling can affect general health status. Pathological gamblers often report prolonged gambling sessions that can last anywhere from several hours up to two or three days straight, often without sleep or food. The impact of this kind of physical and emotional stress can be dramatic. One study on the cause of deaths in New Jersey's Atlantic City casinos reported that the majority were cardiac related, suggesting and implicating stress as a precipitating factor. In this study, casino-related deaths (number of pathological gamblers were not reported) from 1982 to 1986 were reviewed: 398 people died inside casinos and of these, 330 were sudden cardiac deaths.¹⁷ In many pathological gamblers, elevated stress levels are not confined to the casino, especially as the course of pathological gambling progresses. As a result of escalating debt, there will be an increasing urgency to gamble along with spending more time and energy involved with the gambling—all together, this can create conditions of chronic stress that will lead to physical consequences, such as hypertension, cardiovascular disease, peptic ulcer disease, and exacerbation of baseline medical problems.¹⁷

In addition to chronic stress, pathological gamblers have been shown to have an abnormal response to acute stress. Meyer has

demonstrated that within casinos, pathological gamblers are more likely to have a higher level of stress hormones (cortisol and increased HPA-activation) as compared to non-pathological gamblers.^{18,19} This indicates that pathological gamblers may have biological differences in stress responses to gambling and to the gambling environment. Further studies need to examine the consequences of prolonged and heightened stress responses in pathological gamblers, particularly their role in relapse.

Sleep deprivation is another common consequence of gambling. This is often created through 24-hour access to casinos and environmental controls that hide the passage of time. The effects of sleep deprivation on medical and psychiatric well-being is extensively documented elsewhere and commonly include motor and cognitive impairment, mood lability, and immunological dysregulation.²⁰ Pathological gamblers may be particularly sensitive to the effects of sleep deprivation as they may become more impulsive or more likely to gamble without paying close attention to basic strategies. To date, there has been a paucity of research on the effects of sleep deprivation in pathological gamblers. One preliminary study on pathological gamblers reported that an average of 32 hours of sleep were lost per month due to late gambling (gambling past the usual bedtime) and that the mean number of hours of sleep lost to gambling was 69 hours per month.²¹

Another indirect consequence of pathological gambling is the increased risk to developing substance use disorders, which in turn would increase the likelihood of medical problems. Rates of alcohol dependence and nicotine dependence are noted to be much higher in pathological gamblers as compared to the general population.^{22,23} Casino environments may be contributing to these increased rates

due to the availability of free alcohol and second-hand smoke, but this association has not been established. These factors, along with traits of impulsivity, stressful situations, and personalities that seek high rewards, are risk factors to developing a substance use disorder. Comorbidity is an important clinical issue because these patients are likely to be more difficult to treat and harder to retain in treatment. Petry demonstrated that daily smokers who entered gambling treatment were much more likely to have more severe gambling problems as well as more psychosocial difficulties, demonstrating the potency of comorbid conditions.²⁴

One consequence of pathological gambling that requires more study is its impact on nutritional status, eating patterns and rates of obesity. Binge eating has been associated with traits of impulsivity and eating to cope with life stressors.²⁵ There are similar clinical features seen in pathological gamblers, especially the loss of inhibitory control and the continued behavior despite adverse consequences suggesting that there may be some shared etiological components. At this point though, there are no known studies examining the weight or eating patterns of pathological gamblers. Still, one could theorize that pathological gamblers would be more likely to have engaged in binge eating and have higher-than-expected obesity rates based on availability of food (buffets and free meals), traits of impulsivity, and a predisposition to seek immediate rewards. Secondly, since gambling is a sedentary activity, prolonged gambling is likely to

further contribute to the risk of obesity.

In addition to the medical consequences of pathological gambling, there is ongoing work to understand the effect of pathological gambling on neuropsychological performance. Ruge demonstrated that pathological gamblers are more likely to have deficits in attention and frontal lobe functioning.²⁶ Cavedini showed that pathological gamblers did worse on the Bechara Gambling Task as compared to non-pathological gamblers, suggesting impairment in the ventromedial prefrontal cortex.²⁷ Together, these studies demonstrate that there is an association between impaired neurocognitive performance and pathological gambling.

They do not, however, establish a causal relationship of patho-



logical gambling worsening brain functioning.

There is little debate about the neurotoxic effects of substances of abuse on the brain; methamphetamine, marijuana, and cocaine repeatedly have been shown to have neurotoxic effects on animal and human performance.²⁸ An essential question to examine is whether or not gambling behaviors can be neurotoxic to the brain. Current neuroimaging studies of pathological gamblers demonstrate involvement of the midbrain reward

circuitry—the same pathway implicated in substance use disorders.²⁹ Could it be that overuse of this circuit may have direct neuronal toxicities? Again, unraveling whether these neuropsychological deficits were present before or after the onset of pathological gambling will be an intriguing area of future research.

In summary, pathological gamblers are more likely to smoke, drink alcohol, possibly overeat, be sleep-deprived, and suffer from higher levels of acute and chronic stress. Together, these consequences of pathological gambling may dramatically impact the morbidity and mortality of pathological gamblers. Future studies need to look at health profiles of pathological gamblers and how they are affected by prevention and early treatment efforts.

PSYCHIATRIC CONSEQUENCES OF PATHOLOGICAL GAMBLING

Winning, losing, and the arduous process of continuing to find ways

of self-medication. Depressive symptoms that arise within the context of problems created by gambling may resolve with the cessation of gambling. Either way, as the course of pathological gambling progresses, it is likely that gamblers will express escalating symptoms of hopelessness, guilt, shame, and desperation.³² One of the most sobering consequences of pathological gambling is an increased rate of suicidal ideation and attempts. Seventeen to 24 percent of pathological gamblers will attempt suicide during their lives, most likely occurring immediately after sustaining a large loss.^{33,34} Furthermore, close to 80 percent of gamblers calling a gambling helpline reported feeling suicidal at the time of calling³⁵ and nearly two-thirds of attendees to Gamblers Anonymous have contemplated suicide.³⁶ Repeatedly, Las Vegas and Atlantic City have been shown to have the highest suicide rates in the nation, although a direct link to pathological gambling has not been confirmed.²⁰ Suicidal ideation and

Others report that gambling is a way of reducing generalized anxiety by providing an escape from reality and a temporary avoidance from life stress and responsibility. Thus, for some, gambling can initially have an anxiolytic effect. Further epidemiological data is needed to establish the comorbidity rates of generalized anxiety disorder, post-traumatic stress disorder, and social phobia in pathological gamblers but existing data suggests that there is an increased risk.³⁸ As with mood disorders, more work is needed to demonstrate how continued gambling can impact and worsen the morbidity of anxiety disorders. In contrast, pathological gambling can have direct, anxiogenic consequences, especially seen with “chasing” behaviors. Chasing refers to a gambler who will repeatedly return to recoup losses, usually within the same day. There is a desperate urgency to recover losses immediately; to not do so results in a feeling of intense anxiety, fear, and worry.³⁹ In turn, this creates even

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to gamble can have a dramatic impact on mental health. Pathological gambling can directly trigger or worsen symptoms of depression, generalized anxiety, obsessions, and personality disorders.

Mood disorders are frequently seen in pathological gamblers with comorbidity rates as high as 75 percent for unipolar depression and 30 percent for bipolar disorder.^{30,31} Distinguishing primary depression from secondary and situational depression caused by ongoing gambling is an important area to clarify. Depression that exists prior to the onset of gambling behaviors suggests that gambling serves as a form

attempts in pathological gamblers have been shown to be related to a combination of heightened impulsivity, increased gambling severity, the presence of a mood disorder, depression, alcohol use, perceived insurmountable financial debt, and having had a dissociative experience while gambling.^{33,37}

In addition to dramatically impacting depressive symptoms, pathological gambling has a direct effect on anxiety. Many pathological gamblers report increasing periods of tension before gambling that can only be relieved through gambling. Some report anticipatory anxiety that may be reported as either pleasurable, fearful, or unpleasant.

more generalized anxiety, creating a cycle where the gambler is focused entirely on relieving this anxiety through more gambling.

Pathological gambling can also directly affect certain personality constructs, such as impulsivity. Pathological gamblers have been shown to be more impulsive as compared to healthy controls,^{40,41} and this quality is thought to be a significant risk factor in the development of pathological gambling. Impulsivity, although variously defined, has been thought to contain both state and trait features, and as a result, its expression can vary, similar to mood or thresholds of pain. Continued gambling can

worsen impulsivity as financial situations become more desperate and as options become more limited, leaving the gambler to see gambling as the only means of escape. Managing features of impulsivity then becomes a critical task for clinicians because impulsivity can spill over into multiple arenas, such as substance abuse, and social relations, and it may impact factors in treatment, such as medication adherence and treatment retention.

In addition to exacerbating psychiatric symptomatology, pathological gambling can directly influence the expression of primitive defense mechanisms. These include avoidance, acting out, rationalization, denial, minimization, and intellectualization.³² Although some of these defenses may have been present before the onset of gambling, they clearly dominate one's schema when criteria for problem gambling is met. Guilt and shame are one of the reasons why these defense mechanisms are expressed, and as the gambling progresses, self worth and self esteem are likely to deteriorate along with healthy coping skills. This process is similar to the one seen in substance use disorders and is a critical psychodynamic issue that patients must learn to deal with in the recovery process.

A final psychological consequence of pathological gambling is the creation and maintenance of cognitive distortions related to gambling. These distortions about gambling explain, in part, why pathological gamblers continue to play despite obviously negative results.⁴² These often include fantasies of success, control, and an internal need to prove one's self-worth by beating the competition. Unfortunately, one of the consequences of pathological gambling is that cognitive distortions are reinforced as gamblers often hold onto the false hope that gambling will solve all problems through the "big win."

SOCIAL CONSEQUENCES OF PATHOLOGICAL GAMBLING

The social consequences of pathological gambling, such as financial loss, increased crime, lost time at work, bankruptcies, and emotional hardships faced by the families of gambling addicts, are the most concrete and obvious. Similar to other psychiatric disorders, most notably addictive disorders, nearly every aspect of a pathological gambler's social life can be affected by continued gambling. The National Gambling Impact Study Commission reports that close to \$5 billion per year and an additional \$40 billion in lifetime costs are lost due to pathological gambling in terms of money, legal expenses, and lost productivity.^{1,20} Other economists have put this number much higher, close to \$54 billion annually, which translates to an average cost of \$20,000 a year per individual pathological gambler.⁴³ Another study by Politzer suggests that problem gamblers negatively affect 10 to 17 people significantly in their lives.⁴⁴

Financial losses and accumulating debt are the most obvious and visible consequence of pathological gambling. Unlike other addictive disorders, pathological gambling can devastate a financial portfolio in a matter of hours. It is not uncommon to hear reports of gamblers losing their life savings in a single gambling session. Financial consequences are particularly relevant to senior gamblers who do not have the resources or time to stabilize incurred debts that younger, working gamblers might be able to recoup. As expected, pathological gamblers have higher rates of bankruptcy compared to the general population (nearly five times higher and one in five pathological gamblers) and are more likely to use loan sharks and illegal tactics to fund ongoing gambling.²⁰ One study found that the average debt of pathological gamblers is close to \$40,000.²⁰ Even for those gamblers who do not become bankrupt, credit ratings often suffer and the free-

dom to open new bank accounts or secure loans is limited. Because of this, financial counseling is often recommended to be part of any treatment program for pathological gamblers.

The effects of pathological gambling on family dynamics and functioning can be devastating. Pathological gamblers have higher rates of divorce (53.5%) as compared to non-pathological gamblers (18.2%), and this is probably due to a combination of deception, financial debt, and emotional absenteeism.²⁰ Further problems in the family often include enabling behaviors, such as bailing the gambler out of debt, covering for lost time, and denying the extent of the problem. Ironically, many families, especially parents of adolescents, are relieved to find out that the behavioral problems were due to gambling and not drug abuse. In terms of domestic violence, pathological gamblers' families have been shown to have higher rates of spousal and child abuse.⁴⁵ This is most likely tied into the chaotic situations created by gambling perhaps coupled with substance abuse, comorbid psychiatric conditions, and impulsive personality traits and mood lability. Finally, family members of problem gamblers themselves experience substantially more physical and psychological difficulties.⁴⁶

In addition to dramatically impacting family functioning, pathological gamblers may unintentionally also be contributing to the development of future problem gamblers and pathological gamblers. Most pathological gamblers were exposed to gambling growing up and often are taught early on how to gamble by their family members. Family studies have shown that the risk of developing pathological gambling is much higher than expected, possibly due to a combination of the environment and hereditary factors.⁴⁷ Genetic studies of pathological gamblers have found associations between pathological gamblers and allele variants of polymor-

phisms at dopamine receptor genes, the serotonin transporter gene, and the monoamine-oxidase A gene.⁴⁸ This area of research is expanding but provides enough evidence to show that pathological gambling can be passed onto succeeding generations.

By definition, pathological gamblers spend large amounts of time gambling, thinking about gambling, or covering up the consequences of gambling. In terms of overall costs to society, lost productivity and time are thought to be even more significant consequences than financial losses. Lost productivity at work will lead to lost opportunities to advance and also to difficulties in securing future employment because of the damage sustained by prior gambling problems. Employers are not likely to notice gambling problems when they are in the early stages, but they are likely to notice the problems associated with ongoing gambling: lateness, absenteeism, decreased productivity, and even embezzlement. Past-year job loss rates have been reported to be twice as high in pathological gamblers as compared to non-pathological gamblers (10% vs. 5%).^{20,36}

Legal consequences of pathological gambling usually arise after the onset of financial problems. Researchers have estimated that close to 30 to 40 percent of many of the white-collar crimes are somehow tied to pathological gambling.¹ Desperate gamblers have been known to resort to stealing, prostitution, embezzlement, insurance

fraud, and the use of loan sharks to finance ongoing gambling.³⁶ In a survey of Gambler's Anonymous, nearly 57 percent admitted to stealing in order to finance gambling.³⁶ Although there is a high frequency of criminal acts, the rate of violence by pathological gamblers has not been reported to be higher than expected, but there are a few reports of impulsive acts of violence committed to cover the damage from pathological gambling.²⁰

A final and often overlooked consequence of pathological gambling is its effect on homelessness. Several cities have completed surveys showing that gambling was a contributing factor to homelessness.³⁶ One formal study by Shaffer reported a pathological gambling prevalence rate of 5.5 percent among homeless individuals in Boston.⁴⁹ These data suggest that future research is needed to understand this relationship and that cli-

nicians who work with a homeless population should screen for this disorder.

CONCLUSION

Pathological gambling is a psychiatric disorder that has many unintended consequences, many of which could be prevented with early recognition, intervention, and treatment. Most people who gamble will be able to do so without permanent consequences, yet for the vulnerable population who do become pathological gamblers, the consequences are intense and destructive. In order to reduce the morbidity of pathological gambling from its medical to psychiatric to social consequences, clinicians are urged to screen for gambling problems in every patient that presents to treatment. Unlike substances of abuse, gambling behavior cannot be detected by a laboratory test, and if patients are not asked about the



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extent of their gambling behaviors, they will most likely not report them. Outcomes of pathological gamblers who enter treatment are optimistic; many recover on their own and many can be treated with brief interventions. Those who do not respond to initial treatments should be referred to a gambling treatment specialist. Left unrecognized or untreated, pathological gambling can take on devastating consequences in a rapid fashion, highlighting the critical need for early intervention and prevention efforts.

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