Experimental and Clinical Psychopharmacology
2002, Vol. 10, No. 3, 184–192

1064-1297/02/$5.00 DOI: 10.1037//1064-1297.10.3.184

How Treatments for Pathological Gambling Can Be Informed by Treatments for Substance Use Disorders

Nancy M. Petry
University of Connecticut Health Center

Substance use disorders and pathological gambling share similarities in terms of diagnostic criteria, epidemiology, and clinical course. However, relatively few studies have evaluated the efficacy of treatments for gambling disorders. As interest in pathological gambling grows, adaptation of effective treatments from the field of substance abuse may advance the study of treatment for pathological gambling. This article reviews the similarities and differences between pathological gambling and substance use disorders. It describes psychotherapeutic and pharmacological treatments for substance use disorders and their translation to pathological gambling. Future research should consider investigating the onset and course of pathological gambling within the context of other psychiatric disorders, biological abnormalities associated with gambling, and combined effects of psychotherapy and pharmacotherapy in the treatment of this disorder.

Pathological gambling is defined by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [*DSM–IV*]; American Psychiatric Association, 1994) as "persistent and recurrent maladaptive gambling behavior" (p. 618) that disrupts personal, family, or vocational pursuits. This condition affects about 1.8% of the general adult population (Shaffer, Hall, & Vander Bilt, 1999). The lifetime prevalence rate of pathological gambling exceeds that of cocaine and opioid use disorders (Regier et al., 1990), but relatively little is known regarding the onset, course, or treatment of pathological gambling.

In this article I describe the similarities and differences between pathological gambling and substance use disorders, and I provide a brief review of psychotherapies for treatment of substance use disorders. I describe the adaptation of these techniques for use in the treatment of pathological gambling, with an emphasis on the few controlled clinical trials that have been published. I then detail pharmacotherapies for substance use disorders as well as medications used in treating pathological gamblers. After reviewing the advantages and disadvantages of each approach, I provide suggestions for future research into the treatment of pathological gambling.

Overlap Between Substance Use Disorders and Pathological Gambling

Pathological gambling is classified as an impulse control disorder, and some similarities exist between these disorders (see Blanco, Moreyra, Nunes, Sáiz-Ruíz, & Ibáñez, 2001, for review). Nevertheless, the parallels between substance use disorders and pathological gambling are quite pronounced. In terms of diagnostic criteria (American Psychiatric Association, 1994), substance dependence is characterized by tolerance, withdrawal, and a narrowing of interests to drug seeking and drug ingestion. Pathological gamblers also develop tolerance to the amounts of money wagered, as they place larger and larger bets to experience the optimal level of arousal (Griffiths, 1993). When unable to gamble or when ceasing gambling, about 30% to 40% of pathological gamblers report a mild withdrawal syndrome that is characterized by irritability, psychomotor agitation, concentration difficulties, and psychosomatic complaints (Wray & Dickerson, 1981). Just like substance abusers, pathological gamblers give up or jeopardize work, social, and family responsibilities to gamble. For example, troubled family relationships are prevalent (Lorenz & Yaffee, 1986), and large debts and bankruptcies are common (National Research Council [NRC], 1999; Smart & Ferris, 1996). Up to 60% of pathological gamblers commit illegal acts to support their gambling (Rosenthal & Lorenz, 1992). Despite the adverse consequences, the pathological gambler, similar to the substance abuser, continues to engage in the activity that causes harm (Lesieur & Rosenthal, 1991).

Comorbidity between substance abuse and pathological gambling also points to a link between them (Spunt, Dupont, Lesieur, Liberty, & Hunt, 1998). Two large studies have evaluated the comorbity of the two disorders in national samples, and both reveal a strong association between pathological gambling and substance abuse. Welte, Barnes, Wieczorek, Tidwell, and Parker (2001) found that 28% of individuals identified as pathological gamblers were currently alcohol dependent, compared with rates of 1.2% for alcohol dependence among the nonpathological gamblers. The National Opinion Research Center (1999) study found that pathological gamblers had approximately seven times the rate of drug or alcohol dependence found among nongamblers or recreational gamblers. Among treatment-seeking pathological gamblers, 30% to 50% suffer from a substance use disorder (Lesieur, Blume, & Zoppa, 1986;

Correspondence concerning this article should be addressed to Nancy M. Petry, Department of Psychiatry, University of Connecticut Health Center, 263 Farmington Avenue, Farmington, Connecticut 06030-3944. E-mail: petry@psychiatry.uchc.edu

Ramírez, McCormick, Russo, & Taber, 1983). Studies of treatment-seeking substance abusers likewise found high rates of gambling, with between 9% and 30% of treatment-seeking substance abusers having a gambling disorder (Feigelman, Kleinman, Lesieur, Millman, & Lesser, 1995; Hall et al., 2000; Petry, 2000b; Steinberg, Kosten, & Rounsaville, 1991).

Similar comorbid psychiatric conditions are noted in the two conditions as well. Rates of depression, anxiety, and attention-deficit disorders are higher in both pathological gamblers and substance abusers than they are in the general population (McCormick, Russo, Ramírez, & Taber, 1984; Petry, 2000b; Ramírez et al., 1983; Rugle & Melamed, 1993; Specker, Carlson, Christenson, & Marcotte, 1995). Antisocial personality disorder occurs in up to 40% of male substance abusers (Kelley & Petry, 2000) and pathological gamblers (Blaszczynski, Steel, & McConaghy, 1997).

Substance use disorders and pathological gambling may be mediated by similar physiological mechanisms. Dopamine and endorphins seem to be involved in many of the reinforcing effects of abused drugs. Some studies suggest that the excitement associated with gambling may be similar to the highs of stimulants or opioids (Hickey, Hoertzen, & Henningfield, 1986). Abnormalities in β-endorphin levels (Blaszczynski, Wintor, & McConaghy, 1986), dopamine levels (Bergh, Eklund, Sodersten, & Nordin, 1997), and monamine oxidase activity (Carrasco, Sáiz-Ruíz, Hollander, César, & López-Ibor, 1994) are implicated in substance use as well as gambling disorders.

Genetic studies of pathological gambling are still in their infancy, but they suggest that a genetic predisposition for alcohol dependence increases the likelihood of development of gambling problems (Slutske et al., 2000). Variants at the dopamine D2 receptor gene may be associated with substance use disorders (Blum et al., 1995) as well as pathological gambling (Comings et al., 1996). Some data also indicate genetic variants at the MAO-A gene may be associated with both disorders (Ibáñez, Pérez de Castro, Fernández-Piqueras, Blanco, & Sáiz-Ruíz, 2000). Finally, a polymorphism on the serotonin transporter gene has been associated with alcohol dependence and with pathological gambling (Parsian, Cloninger, & Zhang, 1998; Pérez de Castro, Ibáñez, Sáiz-Ruíz, & Fernández-Piqueras, 1999).

In addition to these putative genetic and physiological correlates, some common sociological risk factors also are noted. Men develop gambling disorders at about two to three times the rate of women (NRC, 1999; Welte et al., 2001), and a similar gender difference exists in substance abuse diagnoses (Warner, Kessler, Hughes, Anthony, & Nelson, 1995). Adolescents and young adults seem to develop both disorders at higher rates than middle age or older adults (e.g., NRC, 1999; Proimos, DuRant, Pierce, & Goodman, 1998; Shaffer et al., 1999). An overrepresentation of minorities and members of the lower socioeconomic status also is noted for both substance abuse and pathological gambling (Cunningham-Williams, Cottler, Compton, & Spitznagel, 1998; NRC, 1999; Volberg, 1994).

Finally, availability and cost seem to influence the development of both disorders. Making the sale of alcohol illegal in a community, for example, resulted in a 85% reduction in alcohol-related emergency room visits (Chiu & Pérez, 1998). Conversely, the rates of disordered gambling seem to be growing with increased access to legalized gambling, especially casino gambling, throughout the United States since the late 1980s. In a meta-analysis of prevalence studies, Shaffer et al. (1999) found a significant increase in rates of pathological gambling in studies conducted after 1994, compared with those conducted before 1994. Research finds that the price of drugs influences their consumption (Petry, 2001a; Silverman & Spruill, 1977; van Ours, 1995). Similarly, much of the lure of gambling may be related to its low response cost, $0.25 for a slot machine or $1 for a lottery ticket (Petry & Roll, 2001).

Despite these similarities between pathological gambling and substance use disorders, a number of differences also exist. One obvious distinction is that no substance is ingested in gambling. Objective verification of abstinence is more difficult in pathological gamblers, as physiological detection of gambling is not possible. Any physiological manifestations of tolerance and withdrawal symptoms seem relatively minor in gamblers compared with substance abusers, and relatively little research has been conducted on tolerance and withdrawal in pathological gamblers (Griffiths, 1993; Wray & Dickerson, 1981). Finally, studies of treatment-seeking pathological gamblers generally indicate that pathological gamblers have higher socioeconomic status and ages compared with substance abusers. These demographic differences, however, may be associated with the paucity of treatment programs for gamblers (NRC, 1999).

In sum, despite some obvious differences between the disorders, pathological gambling and substance use disorders share many similarities. Presentation and clinical manifestations are comparable between the disorders. Similar comorbid psychiatric disorders and risk factors have been recognized. Related genetic and physiological substrates are identified. Therefore, knowledge gained from research on the treatment of substance abuse may be applicable to treatment of pathological gambling.

Psychotherapies

Substance Use Disorders

A number of psychotherapies have been evaluated for treating substance use disorders. Miller et al. (1995) reviewed studies of treatments for alcohol dependence. After weighting the studies on the basis of methodological rigor, sample size, and effect size, they found that the following treatments were most often associated with beneficial effects: brief interventions, social skills training, motivational enhancement, community reinforcement approach, and behavior contracting. In another review, DeRubeis and Crits-Christoph (1998) found general agreement for possibly efficacious psychotherapies for alcohol dependence, but they also added cue exposure therapy. For other substance use diagnoses, supportive–expressive therapy, cognitive–behavioral relapse prevention, and contingency management behavioral therapy had the most evidence of efficacy. Their

review concluded that abstinence rates, even in the best of studies, were not impressive, especially when the high dropout rates were considered.

Other studies and reviews of the literature have pointed out that various forms of psychotherapies exert similar effects in reducing substance use (Miller & Hester, 1986). For example, many studies have found particular psychotherapies to be more efficacious than no-treatment or wait-list controls, but few studies have demonstrated superiority of one type of treatment over another (Carroll, Donovan, Zweban, & Rounsaville, 1994). The lack of differential effects among psychotherapies may be related to common factors, such as therapeutic alliance and supportive listening, that transgress the various forms of psychotherapies (Rounsaville & Carroll, 1992). Given these similar effects of psychotherapies in treating substance use disorders, different forms of psychotherapies are unlikely to exert differential beneficial effects in the treatment of gambling disorders.

Pathological Gambling

Few randomized clinical trials of psychotherapies have been published for pathological gambling, but a variety of treatments have been described (Petry & Armentano, 1999).

Gamblers Anonymous (GA). GA, modeled after Alcoholics Anonymous, seems to be the most commonly used intervention among pathological gamblers. The NRC (1999) reported that GA meetings increased 36% between 1995 and 1998, and more than 1,000 chapters now exist. Although few efficacy studies of GA exist, one study (Stewart & Brown, 1988) found that less than 10% of 232 consecutive attendees at GA meetings became actively engaged in this fellowship and were abstinent a year later.

Although data do not support the efficacy of GA on its own, combining GA with professionally delivered treatments may improve outcomes of pathological gamblers, as seems to be the case in the treatment of substance use disorders (Tonigan, Miller, & Connors, 2000). Russo, Taber, McCormick, and Ramírez (1984) conducted an evaluation of 124 patients who went through a Veterans Administration program that combined individual and group psychotherapy and GA. Of the 60 participants who completed the follow-up evaluation, 33 (27% of the full sample) reported complete abstinence from gambling. Taber, McCormick, Russo, Adkins, and Rámirez (1987) reported on 6-month outcomes for 57 of 66 consecutive admissions to the same facility. Gambling abstinence was reported by 56% of the patients at follow-up. In both these studies, attendance at GA was associated with gambling abstinence at the follow-up. In a recent study of GA attendance among 342 pathological gamblers seeking treatment in Connecticut, 51% attended GA during the first 2 months of professionally delivered therapy (Petry, in press). Individuals who went to GA were more likely to be abstinent from gambling 2 months after treatment initiation, with about 50% of GA attendees achieving total abstinence from gambling.

These studies indicated that a sizable proportion of pathological gamblers who received combined professional and GA treatment were able to maintain abstinence from gambling. However, these studies did not demonstrate the efficacy of either professional treatment or GA in reducing gambling because random assignment procedures were not used. These outcome data simply suggest that gamblers who choose to attend GA (and professional treatment) do better than those who present for professional treatment but do not become actively engaged in it. More information is needed on possible beneficial effects of 12-step approaches for gambling, similar to information that is emerging in the field of alcohol dependence (Weiss et al., 2000).

Cognitive and cognitive–behavioral therapies. Cognitive and cognitive–behavioral therapies also have been described for the treatment of pathological gambling, and some of these treatments have been tested in controlled trials. The first randomized trial of psychotherapies for pathological gambling (McConaghy, Armstrong, Blaszczynski, & Allcock, 1983) compared aversion therapy (in which pathological gamblers were shocked when reading individualized descriptions of the positive effects of gambling) with imaginal desensitization (in which gamblers were taught relaxation techniques and then to imagine nongambling responses when encountering an opportunity to gamble). Twenty pathological gamblers were randomly assigned to one of these two treatments, both of which were provided on an inpatient basis. Participants receiving imaginal desensitization reported significantly less gambling and fewer urges to gamble at 1 month and up to 9 years after treatment (Blaszczynski, McConaghy, & Frankova, 1991; McConaghy, Blaszczynski, & Frankova, 1991). Across these studies, about 70% of participants responded favorably to the cognitive therapy, compared with about 30% in the aversion therapy conditions. Nevertheless, the efficacy of imaginal desensitization has not been replicated in any subsequent published studies, and its effectiveness in less structured settings has not been demonstrated.

Sylvian, Ladouceur, and Boisvert (1997) randomly assigned 29 pathological gamblers to a wait-list control condition or cognitive therapy, which focused primarily on restructuring cognitive distortions associated with gambling. Compared with participants in the control group, participants assigned to the cognitive therapy condition evidenced significant reductions in gambling and increased perceived control over gambling, with more than half of the treated participants responding favorably. A follow-up study with a larger sample size was conducted by this same group. Ladouceur et al. (2001) randomly assigned 88 pathological gamblers to this cognitive treatment or a wait-list control. Slightly more than half (59%) of those assigned to the cognitive therapy condition attended at least 3 sessions. These patients who engaged in treatment were significantly more likely than those in the wait-list group to reduce gambling sessions and amounts spent gambling, and 86% of treated patients no longer met *DSM* criteria for pathological gambling following treatment.

Another study (Echeburúa, Fernández-Montalvo, & Báez, 2000) evaluated the effects of relapse prevention delivered in different modalities. After successful response to cognitive–behavioral therapy, 69 pathological gamblers

were randomly assigned to no further treatment or relapse prevention therapy delivered in an individual or group format. The two active conditions reduced the percentage of patients who relapsed to gambling throughout a 12-month period. Thus, continued support after gambling cessation seems useful in preventing relapse, but whether this support is provided by means of an individual or group format does not appear to affect outcomes.

Motivation enhancement therapy. A study from Australia (Dickerson, Hinchy, & England, 1990) randomly assigned 29 gamblers to a self-help manual provided alone or in conjunction with a single motivational interview. Both conditions resulted in significant reductions in gambling days and amount spent gambling compared with pretreatment periods, but no differences between the manual-only and manual plus motivational interview conditions were noted. In a larger study, an advantage in motivational enhancement techniques was noted. Hodgins, Currie, and el-Guebaly (2001) randomly assigned 102 participants to a wait-list control condition, a self-help workbook alone, or the same workbook plus a motivational enhancement telephone interview. Those who received the motivational interview demonstrated reduced gambling relative to those in the wait-list condition and to those in the workbook-only condition. Relative to the workbook-only condition, the beneficial effects of the interview endured for a 6-month period. Therefore, even minimal treatments seem efficacious in reducing gambling behaviors, similar to minimal treatment of heavy drinking (e.g., Babor, 1994).

In sum, these studies seem to suggest that, similar to substance use disorders, psychotherapies for pathological gambling tend to reduce the problem behavior compared with wait-list control conditions. Many of the same modalities of treatment seem efficacious for both disorders. With the exception of the use of aversion therapy as the comparison condition, little data support differential effects of other active treatments. In other words, some treatment is likely to be better than no treatment (Babor, 1994; Bien, Miller, & Tonigan, 1993), but the modality (group, individual, or even telephone) and type (cognitive, cognitive–behavioral, or motivational) may not influence outcomes.

Pharmacotherapies

Four types of pharmacotherapies exist for the treatment of substance use disorders: those that abate withdrawal symptoms from the abused substance, those that mimic the effects of the abused drug, those that prevent consumption of the abused drug by blocking its reinforcing effects or by exerting aversive effects when combined with the abused substance, and those that alleviate a common comorbid condition and thereby reduce drug abuse indirectly. These classifications are not mutually exclusive, and several medications may be classified in more than one of the above categories.

Medications for Withdrawal

Medications that reduce withdrawal symptoms include benzodiazepines for alcohol withdrawal, nicotine replacement therapy for nicotine dependence, and clonidine, benzodiazepines, or tapering doses of opioids for reducing opioid withdrawal (Kosten, 1992). Drugs that do not induce significant physiological dependencies, such as cocaine and marijuana, do not necessitate such medications. Because pathological gambling is associated with only a mild withdrawal syndrome (Wray & Dickerson, 1981) and no physical dependence, this type of medication is unlikely to be useful for the treatment of gambling. No such medication has been described for pathological gambling.

Maintenance Drugs

The second category of medications for treating substance use disorders are those that exert similar effects of the abused drug, and these medications are sometimes referred to as maintenance or substitution drugs. Examples include methadone, levomethadyl acetate hydrochloride, or buprenorphine for the treatment of opioid dependence (Kreek, 2000). These drugs are longer acting than the abused substance, thereby permitting the patient to function without experiencing withdrawal symptoms. No such medications have been demonstrated efficacious in treating cocaine, marijuana, or alcohol dependence. Because pathological gambling does not exert a significant physiological dependence syndrome, such medications are unlikely to be useful for pathological gambling.

Blockade Agents

Another category of medications is that which prevents the person from consuming the abused drug, either by blocking its effects directly or by making drug consumption aversive. For treatment of opioid use disorders, naltrexone is the classic example. A detoxified heroin addict maintained on naltrexone cannot experience the effects of opioids because naltrexone prevents opioids from binding. Naltrexone also has been approved for the treatment of alcohol dependence, and it is thought to work by blocking some of the reinforcing effects of alcohol (O'Malley et al., 1992; Volpicelli, O'Brien, Alterman, & Hayashida, 1992). Finally, disulfiram can be used for treating alcohol dependence (Fuller et al., 1986). Rather than blocking the effects of alcohol on receptor systems, this drug works by preventing the degradation of acetaldehyde, a toxic by-product of alcohol. Although much research has been devoted to investigating drugs that block cocaine, no medications have yet been found reliably efficacious for cocaine dependence (Warner, Kosten, & O'Connor, 1997).

A couple of drugs that seem to fit into this category have been applied to the treatment of pathological gambling. Beneficial effects of apomorphine (Salzmann, 1982) to induce conditioned aversion to gambling were reported in a single case report. Naltrexone also may be of use to block gambling urges or endorphins released during gambling (Hickey et al., 1986). Two case reports (Crockford & el-Guebaly, 1998; Kim, 1998) and one randomized trial of naltrexone (Kim, Grant, Adson, & Shin, 2001) also have been published. In the double-blind trial, Kim et al. ran-

domly assigned 89 pathological gamblers to placebo or naltrexone, which was titrated up to 250 mg/day, and an average dose of 188 mg was administered. Beneficial effects in the medication group were noted among the study completers. Naltrexone was purported to blunt positive effects or decrease urges associated with gambling. Future studies will need to confirm the efficacy of opioid antagonists for treating pathological gambling and uncovering its mechanism of action.

Medications for Concomitant Disorders

A fourth category of medications for treatment of substance use disorders includes pharmacotherapies that treat concomitant psychiatric symptoms. The rationale for this approach comes from the self-medication hypothesis. For example, high rates of depression are noted in alcohol-dependent patients, and some theories posit that individuals drink to mask symptoms of depression (Khantzian, 1975). Antidepressants improved outcomes in some studies with cocaine (Ziedonis & Kosten, 1991) and methadone patients (Kleber, Weissman, Rounsaville, Prusoff, & Wilber, 1983; Nunes, Quitkin, Brady, & Stewart, 1991). In other studies, however, antidepressants seem more efficacious than placebo in treating depression symptoms but have no beneficial effect on reducing substance use (Kranzler et al., 1995).

In the treatment of pathological gambling, several pharmacotherapies that may reduce concomitant psychiatric symptoms have been used. A case report demonstrated the use of lithium (Moskowitz, 1980) for a pathological gambler with bipolar symptoms. Selective serotonin re-uptake inhibitors (SSRIs) also have been tested with pathological gamblers, although the mechanisms behind their actions are unclear. In one case report, clomipramine (Hollander, Frenkel, DeCaria, Trungold, & Stein, 1992) was used to treat a pathological gambler who also presented with social phobia and obsessive–compulsive personality features. In a single-blind study (Hollander et al., 1998), fluvoxamine also showed beneficial effects. In a subsequent double-blinded trial, Hollander et al. (2000) randomly assigned 15 pathological gamblers to placebo or fluvoxamine. A crossover design was used, such that conditions were switched after 8 weeks, and all participants received both active medication and placebo for 8 weeks. In the initial 8 weeks of treatment, patients responded equally well to placebo and drug. A beneficial effect of medication emerged in the final 2 to 3 weeks of the second 8-week phase. However, in a larger study ($n = 32$) conducted by another group of investigators (Blanco, Petkova, Ibáñez, & Sáiz-Ruíz, 2001), no beneficial effect of fluvoxamine over placebo was noted in the primary analyses. Across these studies, medication compliance was rather poor, with only slightly more than half of the participants completing the trials.

Other studies of paroxetine (Paxil), citalopram (Celexa), and fluoxetine (Prozac) have been described, but results are not yet published (see Kim et al., 2001). In none of these studies, or in the fluvoxamine study by Hollander et al. (2000), were the results thought to be mediated entirely by reductions in depression, because depression scores at baseline were not clinically elevated. It is interesting that higher doses of the SSRIs were administered to the gamblers, compared with the use of SSRIs in depressive disorders.

Although mechanisms of action and clinical utility of SSRIs in the treatment of pathological gambling remain to be determined, the development of pharmacological treatments for pathological gambling may be guided by research in the pharmacological treatment of substance use disorders. Only substance use disorders with significant physiological dependence syndromes have thus far been effectively managed by means of pharmacotherapy. These disorders include nicotine, alcohol, and opioid dependence as well as acute withdrawal from barbiturates and benzodiazepines (Carroll, 1997). In contrast, cocaine and marijuana dependence, both of which induce relatively mild forms of withdrawal, have not yet been treated reliably by means of pharmacotherapies. One could argue that pathological gambling more closely resembles these latter disorders, as its withdrawal syndrome is relatively modest. Therefore, the most fruitful area for investigation in terms of pharmacological treatments of pathological gambling may be related to management of concomitant psychological symptoms, such as abatement of gambling cravings or urges, or associated depressive symptoms.

Advantages and Disadvantages of Psychotherapies and Pharmacotherapies

Initial results of both pharmacology and psychotherapy treatments of pathological gambling are encouraging, but more research is needed to evaluate the short- and long-term efficacy of interventions. As more treatments for pathological gambling are developed and tested in controlled trials, some issues should be considered. Both pharmacological and psychotherapeutic treatment modalities have some unique beneficial effects as well as some drawbacks.

Pharmacotherapies

Presuming that an effective medication for pathological gambling can be found, pharmacotherapies can decrease stigma by medicalizing addictions. Medications sometimes can be inexpensive, and in some cases, they can engender beneficial effects in very rapid time frames.

The rates of long-term favorable response to many medications, however, are generally modest in the field of substance abuse (Kranzler, Amin, Modesto-Lowe, & Oncken, 1999). Relapse rates are high. Moreover, pharmacotherapies exert effects over a narrow band of symptoms. Pharmacotherapies, in general, and antagonist medications, in particular, suffer from a lack of compliance, which limits their clinical utility in the treatment of substance abuse disorders (Elkin, Pilkonis, Docherty, & Sotsky, 1988; Greenstein, Fudala, & O'Brien, 1992; Kranzler, Escobar, Lee, & Meza, 1986). Thus far, in the treatment of pathological gambling, medication compliance has been generally poor as well (Blanco et al., 2001; Hollander et al., 1998; Kim et al., 2001). Unlike in the treatment of substance use disorders, strong placebo effects have been reported in

pathological gamblers (Hollander et al., 1998, 2000; Kim et al., 2001). Some medications (e.g., naltrexone) are also associated with significant side effect profiles (King, Volpicelli, Gunduz, O'Brien, & Kreek, 1997). Finally, pharmacotherapies do not address the psychosocial difficulties common in substance abusers and pathological gamblers.

Psychotherapies

Psychotherapies have the advantage of addressing problems beyond just the primary diagnosis. For example, psychotherapies often address the strained family relationships, interpersonal difficulties, and employment and legal problems that are associated with both substance abuse and gambling. Psychotherapy also can be delivered across modalities, from inpatient to residential and outpatient settings, and in individual or group format. The effects of psychotherapies may be of a long duration, with some studies showing a delayed emergence of effects up to 1 or even 3 years posttreatment (Carroll, Rounsaville, et al., 1994). In some cases, as few as one to three sessions may engender positive effects (Babor, 1994; Bien, Miller, & Tonigan, 1993). Psychotherapies generally induce fewer side effects than pharmacotherapies, and few preexisting conditions exist to limit their effectiveness.

Some of the disadvantages of psychotherapies are similar to those reported with pharmacotherapies. These include high rates of attrition and relapse. Up to half of substance abusers initiating treatment withdraw prematurely (Carroll, 1997), and similarly high drop-out rates are noted in gambling treatment programs (Stinchfield & Winters, 1996). In addition, some of the beneficial effects of psychotherapy may take weeks, or even months, to emerge (Carroll, Rounsaville, et al., 1994).

Some studies find additive beneficial effects when pharmacotherapies and psychotherapies are combined (for reviews, see Carroll, 1997; Petry, 2001b). The addition of psychotherapy along with medication may enhance retention rates and simultaneously abate urges or cravings as well as psychosocial difficulties. Although such combined approaches have yet to be evaluated systematically in the field of pathological gambling, they may provide a more comprehensive approach toward treatment. More research is needed to evaluate interventions in large and diverse samples of pathological gamblers and to understand the mechanisms of action.

Guidelines for Future Research

In sum, much more research is necessary to better understand and treat pathological gambling. First, greater knowledge of the onset and course of pathological gambling is needed. In the field of substance use disorders, early onset of use is associated with propensity to develop dependence (Hawkins et al., 1997). Because gambling initiates during or even prior to adolescence (Proimos et al., 1998), studies investigating early prevention efforts directed at high-risk populations may be useful. Numerous studies of substance abusers demonstrate an association between other psychiatric disorders and drug abuse. Similarly, for gamblers, more research is needed to assess whether affective and substance use disorders develop prior or subsequent to pathological gambling. Perhaps antidepressant treatment may be useful in the subset of gamblers whose depression preceded, rather than developed subsequent to, the gambling. Given the high rates of pathological gambling in treatment-seeking substance abusers, future studies should be directed at investigating treatments for dual diagnosis patients.

Second, better understanding of the physiology of pathological gambling also is needed. In particular, more studies characterizing withdrawal and tolerance may help inform whether medications may be useful during early stages of gambling cessation. If gambling results in physiological responses, identification of specific neurotransmitters may assist in suggesting blockading, or even maintenance-type medications, that may reduce gambling or gambling urges.

Third, pathological gambling, like substance use disorders, is a chronic relapsing condition (NRC, 1999), and engagement in treatment may be one of the greatest challenges. Fewer than half of substance abusers receive treatment for their problems (Ball & Ross, 1991). Data from the National Gambling Impact Study Commission (1999) suggest even lower rates of treatment engagement among pathological gamblers, with less than 10% receiving professional treatment. As in treatment of substance use disorders, early attrition rates appear to be high (Petry, in press). Therefore, continued research into motivational enhancement techniques may be useful.

Contingency management interventions, which provide tangible rewards on objective indication of drug abstinence, are very effective in enhancing retention rates and reducing drug use in substance abusers (e.g., Higgins et al., 1994). Although no objective indicator of gambling abstinence is available, these techniques could be adapted to reinforce attendance at therapy sessions, compliance with medication, or development of nongambling social networks and activities (Petry, 2000a). Ultimately, the availability of multiple treatment options, including both psychotherapies and pharmacotherapies, may enhance participation in treatment and reduce the negative personal and societal consequences of pathological gambling.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Babor, T. F. (1994). Avoiding the horrid and beastly sin of drunkenness: Does dissuasion make a difference? *Journal of Consulting and Clinical Psychology, 62*, 1127–1140.

Ball, J. C., & Ross, A. (1991). *The effectiveness of methadone maintenance treatment*. New York: Springer-Verlag.

Bergh, C., Eklund, T., Sodersten, P., & Nordin C. (1997). Altered dopamine function in pathological gambling. *Psychological Medicine, 27*, 473–475.

Bien, T. H., Miller, W. R., & Tonigan, J. S. (1993). Brief interventions for alcohol problems: A review. *Addiction, 88*, 315–336.

Blanco, C., Moreyra, P., Nunes, E. V., Sáiz-Ruíz, J., & Ibáñez, A. (2001). Pathological gambling: Addiction or compulsion? *Seminars in Clinical Neuropsychiatry, 6*, 167–176.

Blanco, C., Petkova, E., Ibáñez, A., & Sáiz-Ruíz, J. (2001). *A pilot placebo-controlled study of fluvoxamine for pathological gambling*. Manuscript submitted for publication.

Blaszczynski, A. P., McConaghy, N., & Frankova, A. (1991). A comparison of relapsed and non-relapsed abstinent pathological gamblers following behavioral treatment. *British Journal of Addiction, 86*, 1485–1489.

Blaszczynski, A., Steel, Z., & McConaghy, N. (1997). Impulsivity in pathological gambling: The antisocial impulsivist. *Addiction, 92*, 75–87.

Blaszczynski, A. P., Wintor, S. W., & McConaghy, N. (1986). Plasma endorphin levels in pathological gambling. *Journal of Gambling Behavior, 2*, 3–14.

Blum, K., Sheridan, P. J., Wood, R. C., Braverman, E. R., Chen, T. J., & Comings, D. E. (1995). Dopamine D2 receptor gene variants: Association and linkage studies in impulsive–addictive–compulsive behaviour. *Pharmacogenetics, 5*, 121–141.

Carrasco, J. L., Sáiz-Ruíz, J., Hollander, E., César, J., & López-Ibor, J. J. Jr. (1994). Low platelet monoamine oxidase activity in pathological gambling. *Acta Psychiatrica Scandinavica, 90*, 427–431.

Carroll, K. M. (1997). Integrating psychotherapy and pharmacotherapy to improve drug abuse outcomes. *Addictive Behaviors, 22*, 233–245.

Carroll, K. M., Donovan, D. M., Zweben, A., & Rounsaville, B. J. (1994). Implementing treatment and protecting the validity of the independent variable in treatment matching studies. *Journal of Studies on Alcohol, 12*, 149–155.

Carroll, K. M., Rounsaville, B. J., Niche, C., Gordon, L. T., Wirtz, P. W., & Gawin, F. (1994). One-year follow-up of psychotherapy and pharmacotherapy for cocaine dependence: Delayed emergence of psychotherapy effects. *Archives of General Psychiatry, 51*, 989–997.

Chiu, A. Y., & Pérez, P. E. (1998). The effect of an alcohol ban on the number of alcohol-related hospital visits in Barrow, Alaska. *International Journal of Circumpolar Health, 57*(1), 439–442.

Comings, D. E., Rosenthal, R. J., Lesieur, H. R., Rugle, L. J., Muhleman, D., Chiu, C., et al. (1996). A study of the dopamine D2 receptor gene in pathological gambling. *Pharmacogenetics, 6*, 223–234.

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

Cunningham-Williams, R. M., Cottler, L. B., Compton, W. M., & Spitznagel, E. L. (1998). Taking chances: Problem gamblers and mental health disorders—Results from the St. Louis Epidemiologic Catchment Area study. *American Journal of Public Health, 88*, 1093–1096.

DeRubeis, R. J., & Crits-Christoph, P. (1998). Empirically supported individual and group psychological treatments for adult mental disorders. *Journal of Consulting and Clinical Psychology, 66*, 37–52.

Dickerson, M. G., Hinchy, J., & England, S. (1990). Minimal treatments and problem gamblers: A preliminary investigation. *Journal of Gambling Studies, 6*, 87–102.

Echeburúa, E., Fernández-Montalvo, J., & Báez, C. (2000). Relapse prevention in the treatment of slot-machine pathological gambling: Long-term outcome. *Behavior Therapy, 31*, 351–364.

Elkin, I., Pilkonis, P. A., Docherty, J. P., & Sotsky, S. M. (1988). Conceptual and methodological issues in comparative studies of psychotherapy and pharmacotherapy: II. Nature and timing of treatment effects. *American Journal of Psychiatry, 145*, 1070–1076.

Feigelman, W., Kleinman, P. H., Lesieur, H. R., Millman, R. B., & Lesser, M. L. (1995). Pathological gambling among methadone patients. *Drug and Alcohol Dependence, 39*, 75–81.

Fuller, R. K., Branchey, L., Brightwell, D. R., Derman, R. M., Emrick, C. D., Iber, F. L., et al. (1986). Disulfiram treatment for alcoholism: A Veterans Administration cooperative study. *Journal of the American Medical Association, 256*, 1449–1455.

Greenstein, R. A., Fudala, P. J., & O'Brien, C. P. (1992). Alternative pharmacotherapies for opiate addiction. In J. H. Lowinsohn, P. Ruiz, & R. B. Millman (Eds.), *Comprehensive textbook of substance abuse* (2nd ed., pp. 562–573). New York: Williams & Wilkins.

Griffiths, M. (1993). Tolerance in gambling: An objective measure using the psychophysiological analysis of male fruit machine gamblers. *Addictive Behaviors, 18*, 365–372.

Hall, G. W., Carriero, N. J., Takushi, R. Y., Montoya, I. D., Preston, K. L., & Gorelick, D. A. (2000). Pathological gambling among cocaine-dependent outpatients. *American Journal of Psychiatry, 157*, 1127–1133.

Hawkins, J. D., Graham, J. W., Maguin, E., Abbott, R., Hill, K. G., & Catalano, R. F. (1997). Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse. *Journal of Studies on Alcohol, 58*, 280–290.

Hickey, J. E., Hoertzen, C. A., & Henningfield, J. E. (1986). Simulation of gambling responses on the Addiction Research Center Inventory. *Addictive Behaviors, 11*, 345–349.

Higgins, S. T., Budney, A. J., Bickel, W. K., Foerg, F. E., Donham, R., & Badger, G. J. (1994). Incentives improve outcome in outpatient behavioral treatment of cocaine dependence. *Archives of General Psychiatry, 51*, 568–576.

Hodgins, D. C., Currie, S. R., & el-Guebaly, N. (2001). Motivational enhancement and self-help treatments for problem gambling. *Journal of Consulting and Clinical Psychology, 69*, 50–57.

Hollander, E., DeCaria, C. M., Finkell, J. N., Begaz, T., Wong, C. M., & Cartwright, C. (2000). A randomized double-blind fluvoxamine/placebo crossover trial in pathologic gambling. *Biological Psychiatry, 47*, 813–817.

Hollander, E., DeCaria, C., Mari, E., Wong, C. M., Mosovich, S., Grossman, R., & Begaz, T. (1998). Short-term single-blind fluvoxamine treatment of pathological gambling. *American Journal of Psychiatry, 155*, 1781–1783.

Hollander, E., Frenkel, M., DeCaria, C., Trungold, S. & Stein, D. J. (1992). Treatment of pathological gambling with clomipramine. *American Journal of Psychiatry,* 149, 710–711.

Ibañez, A., Pérez de Castro, I., Fernández-Piqueras, J., Blanco, C., & Sáiz-Ruíz, J. (2000). Genetic association study between pathological gambling and DNA polymorphic markers at MAO-A and MAO-B genes. *Molecular Psychiatry, 5*, 105–109.

Kelley, J. L., & Petry, N. M. (2000). A comparison of HIV risk behaviors in male substance abusers with and without antisocial personality disorder. *Journal of Substance Abuse Treatment, 9*, 59–66.

Khantzian, E. J. (1975). Self-selection and progression in drug dependence. *Psychiatry Digest, 10*, 19–22.

Kim, S. W. (1998). Opioid antagonists in the treatment of impulse-control disorders. *Journal of Clinical Psychiatry, 59*, 159–164.

Kim, S. W., Grant, J. E., Adson, D. E., & Shin, Y. C. (2001). Double-blind naltrexone and placebo comparison study in the treatment of pathological gambling. *Biological Psychiatry, 49*, 914–921.

King, A. C., Volpicelli, J. R., Gunduz, M., O'Brien, C. P., & Kreek, M. J. (1997). Naltrexone biotransformation and incidence of subjective side effects: A preliminary study. *Alcoholism: Clinical and Experimental Research, 21*, 906–909.

Kleber, H. D., Weissman, M. M., Rounsaville, B. J., Prusoff, B. A., & Wilber, C. H. (1983). Imipramine as treatment for depression in opiate addicts. *Archives of General Psychiatry, 40*, 649–653.

Kosten, T. R. (1992). Pharmacotherapy of drug dependence. *4th Triennial Report to Congress.*

Kranzler, H. R., Amin, H., Modesto-Lowe, V., & Oncken, C. (1999). Pharmacologic treatments for drug and alcohol dependence. *Psychiatric Clinics of North America, 22*, 401–423.

Kranzler, H. R., Burleson, J. A., Korner, P., Del Boca, F. K., Bohn, M. J., Brown, J., & Liebowitz, N. (1995). Placebo-controlled trial of fluoxetine as an adjunct to relapse prevention in alcoholics. *American Journal of Psychiatry, 152*, 391–397.

Kranzler, H. R., Escobar, R., Lee, D. K., & Meza, E. (1986). Elevated rates of early discontinuation from pharmacotherapy trials in alcoholics and drug users. *Alcoholism: Clinical and Experimental Research, 20*, 16–20.

Kreek, M. J. (2000). Methadone-related opioid agonist pharmacotherapy for heroin addiction: History, recent molecular and neurochemical research and future in mainstream medicine. *Annals of the New York Academy of Sciences, 909*, 186–216.

Ladouceur, R., Sylvain, C., Boutin, C., Lachance, S., Doucet, C., LeBlond, J., & Jacques, C. (2001). Cognitive treatment of pathological gambling. *The Journal of Nervous and Mental Disease, 189*, 774–780.

Lesieur, H. R., Blume, S. B., & Zoppa, R. (1986). Alcoholism, drug abuse and gambling. *Alcoholism: Clinical and Experimental Research, 10*, 33–38.

Lesieur, H. R., & Rosenthal, R. J. (1991). Pathological gambling: A review of the literature. *Journal of Gambling Studies, 7*, 5–39.

Lorenz, V. C., & Yaffee, R. A. (1986). Pathological gambling: Psychosomatic, emotional and marital difficulties as reported by the gambler. *Journal of Gambling Behavior, 2*, 40–49.

McConaghy, N., Armstrong, M. S., Blaszczynski, A., & Allcock, C. (1983). Controlled comparison of aversive therapy and imaginal desensitization in compulsive gambling. *British Journal of Psychiatry, 142*, 366–372.

McConaghy, N., Blaszczynski, A., & Frankova, A. (1991). Comparisons of imaginal desensitization with other behavioral treatments of pathological gambling: A two- to nine-year follow-up. *British Journal of Psychiatry, 159*, 390–393.

McCormick, R. A., Russo, A. M., Ramírez, L. F., & Taber, J. I. (1984). Affective disorders among pathological gamblers seeking treatment. *American Journal of Psychiatry, 141*, 215–218.

Miller, W. R., Brown. J. M., Simpson. T. L., Handmaker, N. S., Bien, T. H., Luckie, L. F., et al. (1995). A methodological analysis of the alcohol treatment outcome literature. In R. K. Hester & W. R. Miller (Eds.), *Handbook of alcoholism treatment approaches*. (pp. 12–44). Boston: Allyn & Bacon.

Miller, W. R., & Hester, R. K. (1986). The effectiveness of alcoholism treatment: What research reveals. In W. R. Miller & R. K. Hester (Eds.), *Treating addictive behaviors: Processes of change* (pp. 121–174). New York: Plenum.

Moskowitz, J. A. (1980). Lithium and lady luck: Use of lithium carbonate in compulsive gambling. *New York State Journal of Medicine, 80*, 785–788.

National Gambling Impact Study Commission. (1999). *Final report*. Washington, DC: U.S. Government Printing Office.

National Opinion Research Center. (1999). *Gambling impact and behavior study*. Chicago: University of Chicago.

National Research Council. (1999). *Pathological gambling: A critical review*. Washington, DC: National Academy Press.

Nunes, E. V., Quitkin, F. M., Brady, R., & Stewart, J. W. (1991). Imipramine treatment of methadone maintenance patients with affective disorder and illicit drug use. *American Journal of Psychiatry, 148*, 667–669.

O'Malley, S. S., Jaffe, A. J., Chang, G., Schottenfeld, R. S., Meyer, R. E., & Rounsaville, B. J. (1992). Naltrexone and coping skills therapy for alcohol dependence: A controlled study. *Archives of General Psychiatry, 49*, 881–887.

Parsian, A., Cloninger, C. R., & Zhang, Z. H. (1998). Association studies of polymorphisms of CYP2E1 gene in alcoholics with cirrhosis, antisocial personality, and normal controls. *Alcoholism: Clinical and Experimental Research, 22*, 888–891.

Pérez de Castro, I., Ibáñez, A., Sáiz-Ruíz, J., & Fernández-Piqueras, J. (1999). Genetic contribution to pathological gambling: Association between a functional DNA polymorphism at the serotonin transporter gene (5-HTT) and affected males. *Pharmacogenetics, 9*, 397–400.

Petry, N. M. (2000a). A comprehensive guide for the application of contingency management procedures in standard clinic settings. *Drug and Alcohol Dependence, 58*, 9–25.

Petry N. M. (2000b). Psychiatric symptoms in problem gambling and non-problem gambling substance abusers. *American Journal on Addictions, 9*, 163–171.

Petry, N. M. (2001a). A behavioral economic analysis of polydrug abuse in alcohol abusers: Asymmetrical substitution of alcohol and cocaine. *Drug and Alcohol Dependence, 62*, 31–39.

Petry, N. M. (2001b). The need for combined pharmacotherapy and psychotherapy in treating substance use and gambling disorders. *Drug Benefit Trends, 13*, 4–11.

Petry, N. M. (in press). Patterns and correlates of Gamblers Anonymous attendance in pathological gamblers seeking professional treatment. *Addictive Behaviors*.

Petry, N. M., & Armentano, C. (1999). Prevalence, assessment and treatment of pathological gambling: A review. *Psychiatric Services, 50*, 1021–1027.

Petry, N. M., & Roll, J. M. (2001). A behavioral approach to understanding and treating pathological gambling. *Seminars in Clinical Neuropsychiatry, 6*, 177–183.

Proimos, J., DuRant, R. H., Pierce, J. D., & Goodman, E. (1998). Gambling and other risk behaviors among 8th- to 12th-grade students. *Pediatrics, 102*(2), 1–6.

Ramírez, L. F., McCormick, R. A., Russo, A. M., & Taber, J. I. (1983). Patterns of substance abuse in pathological gamblers undergoing treatment. *Addictive Behavior, 8*, 425–428.

Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: Results from the Epidemiologic Catchment Area (ECA) Study. *Journal of the American Medical Association, 264*, 2511–2518.

Rosenthal, R. J., & Lorenz, V. C. (1992). The pathological gambler as criminal offender. *Clinical Forensic Psychiatry, 15*, 647–660.

Rounsaville, B. J., & Carroll, K. M. (1992). Individual psychotherapy for drug abusers. In J. H. Lowinsohn, P. Ruiz, & R. B. Millman (Eds.), *Comprehensive textbook of substance abuse* (2nd ed., pp. 496–508). New York: Williams & Wilkins.

Rugle, L., & Melamed, L. (1993). Neuropsychological assessment of attention problems in pathological gamblers. *Journal of Nervous and Mental Disease, 181*, 107–112.

Russo, A. M., Taber, J. I., McCormick, R. A., & Ramírez, L. F.

(1984). An outcome study of an inpatient treatment program for pathological gamblers. *Hospital and Community Psychiatry, 35*, 823–827.

Salzmann, M. M. (1982). Treatment of compulsive gambling. *British Journal of Psychiatry, 141*, 318–319.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89*, 1369–1376.

Silverman, L. P., & Spruill, N. L. (1977). Urban crime and the price of heroin. *Journal of Urban Economics, 4*, 80–103.

Slutske, W. S., Eisen, S., True, W. R., Lyons, M. J., Goldberg, J., & Tsuang, M. (2000). Common genetic vulnerability for pathological gambling and alcohol dependence in men. *Archives of General Psychiatry, 57*, 666–673.

Smart, R. G., & Ferris J. (1996). Alcohol, drugs and gambling in the Ontario adult population, 1994. *Canadian Journal of Psychiatry, 41*, 36–45.

Specker, S. M., Carlson, G. A., Christenson, G. A., & Marcotte, M. (1995). Impulse control disorders and attention deficit disorder in pathological gamblers. *Annals of Clinical Psychiatry, 7*, 175–179.

Spunt, B., Dupont, I., Lesieur, H., Liberty, H. J., & Hunt, D. (1998). Pathological gambling and substance misuse: A review of the literature. *Substance Use and Misuse, 33*, 2535–2560.

Steinberg, M. A., Kosten, T. A., & Rounsaville, B. J. (1991). Cocaine abuse and pathological gambling. *American Journal on Addictions, 1*, 121–132.

Stewart, R. M., & Brown, R. I. F. (1988). An outcome study of Gamblers Anonymous. *British Journal of Psychiatry, 152*, 284–288.

Stinchfield, R., & Winters, K. (1996). *Effectiveness of six state-supported compulsive gambling treatment programs in Minnesota*. St. Paul, MN: Department of Human Services, Mental Health Division, Compulsive Gambling Program.

Sylvain, C., Ladouceur, R., & Boisvert, J. M. (1997). Cognitive and behavioral treatment of pathological gambling: A controlled study. *Journal of Consulting and Clinical Psychology, 65*, 727–732.

Taber, J. I., McCormick, R. A., Russo, A. M., Adkins, B. J., & Ramírez, L. F. (1987). Follow-up of pathological gamblers after treatment. *American Journal of Psychiatry, 144*, 757–761.

Tonigan, J. S., Miller, W. R., & Connors, G. J. (2000). Project MATCH client impressions about Alcoholics Anonymous: Measurement issues and relationship to treatment outcome. *Alcoholism Treatment Quarterly, 18*, 25–41.

van Ours, J. C. (1995). The price elasticity of hard drugs: The case of opium in the Dutch East Indies, 1923–1938. *Journal of Political Economy, 103*, 261–279.

Volberg, R. A. (1994). The prevalence and demographics of pathological gamblers: Implications for public health. *American Journal of Public Health, 84*, 237–241.

Volpicelli, J. R., O'Brien, C., Alterman, A., & Hayashida, M. (1992). Naltrexone in the treatment of alcohol dependence. *Archives of General Psychiatry, 49*, 867–880.

Warner, E. A., Kosten, T. R., & O'Connor, P. G. (1997). Pharmacotherapy for opioid and cocaine abuse. *Medical Clinics of North America, 81*, 909–925.

Warner, L. A., Kessler, R. C., Hughes, M., Anthony, J. C., & Nelson, C. B. (1995). Prevalence and correlates of drug abuse and dependence in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 219–229.

Weiss, R. D., Griffin, M. L., Gallop, R., Onken, L. S., Gastfriend, D. R., Daley, D., et al. (2000). Self-help group attendance and participation among cocaine dependent patients. *Drug and Alcohol Dependence, 60*, 169–177.

Welte, J., Barnes, G., Wieczorek, W., Tidwell, M. C., & Parker, J. (2001). Alcohol and gambling pathology among U. S. adults: Prevalence, demographic patterns and comorbidity. *Journal of Studies on Alcohol, 62*, 706–712.

Wray, I., & Dickerson, M. G. (1981). Cessation of high frequency gambling and "withdrawal" symptoms. *British Journal of Addiction, 76*, 401–405.

Ziedonis, D. M., & Kosten, T. R. (1991). Depression as a prognostic factor for pharmacological treatment of cocaine dependency. *Psychopharmacology Bulletin, 27*, 337–343.

Received October 3, 2001
Revision received January 25, 2002
Accepted February 7, 2002 ■