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# Sex Differences in the Rates of Recovery, Treatment-Seeking, and Natural Recovery in Pathological Gambling: Results From an Australian Community-Based Twin Survey

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The aim of this study was to estimate the rates of recovery, treatment-seeking, and natural recovery from pathological gambling (PG) in men and women in a community-based national survey, and to examine the role of gambling problem recognition in recovery from PG. Participants were 4,764 individuals from a community-based Australian national twin registry (104 with a lifetime history of PG) who were administered a structured psychiatric telephone interview. Women were more likely than men to recover from (56% versus 36%; odds ratio = 2.3) and to seek treatment for PG (32% versus 13%; odds ratio = 3.2). Most individuals who recovered from PG did so without treatment (82%), but this was higher among men than among women (92% versus 57%; odds ratio = 5.3). This is the first study to document sex differences in treatment-seeking and recovery from PG. These findings highlight the value in continuing to develop self-help and brief treatments for PG that will appeal to those who are unlikely to seek formal help.

**Keywords:** pathological gambling, natural recovery, treatment-seeking, sex differences

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In a recent paper, the rates of recovery, treatment-seeking, and natural recovery from pathological gambling (PG) were estimated from two United States national surveys, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) and the Gambling Impact and Behavior Study (GIBS; Slutske, 2006a). The results from both surveys were consistent in demonstrating that the rates of recovery and treatment-seeking were about 40% and 10%, respectively, and that most of the individuals with a lifetime diagnosis of PG who got better did so without formal treatment — this phenomenon of getting better without treatment has been termed ‘natural recovery’ (others prefer the terms ‘unaided recovery’, ‘spontaneous remission’, ‘self-recovery’, or ‘self-change’). The low rate of treatment-seeking for PG has been replicated in

a more recently published United States national survey, the National Comorbidity Survey Replication (NCS-R) conducted in 2001–2003, in which nobody sought formal treatment for their gambling problems (Kessler et al., 2008).

In the NESARC, the prevalence of seeking treatment for PG was about 10% overall (Slutske, 2006a), but the prevalence among women was more than twice that among men (15.7% among women vs. 6.8% among men; Blanco et al., 2006). Although this difference was not statistically significant, it is consistent with a larger literature documenting that women are more likely to seek help for psychiatric disorders in general (Kessler, 1998; Robins et al., 1991; Wang et al., 2005), and also to use services within the general health care system for nonpsychiatric problems to a greater extent than do men (Crisp et al., 2000; Smith et al., 2006). Women may also be more likely than men to seek treatment for PG.

A number of potential explanations have been advanced to account for the general phenomenon of higher rates of treatment-seeking among women than among men. Women may differ from men in recognizing that they have a problem, and once problem recognition occurs, the belief that professional help is needed (Kessler et al., 1981). For example, Kessler et al. (1981) demonstrated that among women and men matched for current levels of depression symptoms, the women were more likely to report that they had a personal problem. In addition to differences in problem recognition, women and men differ in their attitudes towards mental health treatment, with women being more likely to positively endorse items related to willingness to seek help, comfort in talking about personal problems with a professional, and lack of embarrassment about seeking help (Mojtabai, 2007).

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The aim of the present study was to examine the rates of recovery, treatment-seeking, and natural recovery from PG in women versus men with a history of PG who were identified in a large Australian national community-based survey, and also to examine the role of gambling problem recognition in explaining potential differences between women and men. Although there are limits to using epidemiologic data for studying recovery from PG, it yields results that are generalizable (Rumpf et al., 2007), allows one to estimate the proportion of affected individuals who recover naturally or with the assistance of treatment, and is probably the method that makes the fewest assumptions about who recovers and how recovery occurs. For example, other methods, such as soliciting individuals who have recovered from PG through the media, only includes those who have labeled themselves as having a gambling problem and taken calculated steps to get better. Natural recovery may be a deliberate, active, intentional process in response to gambling problem recognition for many individuals, but for others it may happen truly naturally or spontaneously without any intention or effort. Natural recovery may occur for some because their gambling problems are developmentally or situationally limited. For example, in a 7-year follow-up of 77 problem and probable pathological gamblers recruited from a national gambling prevalence survey in New Zealand, 'older and wiser' and 'change of environment or lifestyle' were two of the most common explanations given among those who had reported a reduction in their gambling involvement (Abbott et al., 1999).

One of the challenges of community-based epidemiologic PG research is the low base rate of the disorder coupled with the very low rates of treatment-seeking. The present study attempted to address this challenge by focusing on individuals from a heavy-gambling culture, Australia. When the average per capita gambling expenditure as a percentage of net disposable income in 2003 was estimated for 21 industrialized nations (Pryor, 2008), Australia was ranked first and the United States was ranked 14th among the countries included, with 5.9% and 1.8% of their average per capita net disposable incomes spent on gambling, respectively. In the three US epidemiologic surveys noted above, the NESARC, GIBS, and NCS-R, the lifetime prevalences of DSM-IV PG were 0.43% (Slutske, 2006a), 0.80% (Slutske, 2006a), and 0.60% (Kessler et al., 2008), respectively, compared to 2.2% in this Australian national survey (Slutske et al., 2009). Australia is an ideal setting in which to conduct a community-based epidemiologic study of recovery, treatment-seeking, and natural recovery in PG.

## Method

### Participants

Participants for this study were 4,764 members of the Australian Twin Registry (ATR) Cohort II (see Slutske et al., 2009). The ATR Cohort II was originally assembled

in 1980–1982, when a sample of 4,268 twin pairs born 1964–1971 were registered as children by their parents with the Australian National Health and Medical Research Council twin registry in response to systematic appeals through the media and the Australian school systems. In 1996–2000, a telephone psychiatric interview containing a wide range of diagnostic assessments (but not gambling problems or involvement) was conducted with twin pairs from the ATR Cohort II (e.g., see Hansell et al., 2008; Lynskey et al., 2002; Waldron et al., 2008). In 2004–2007, a follow-up telephone interview containing a thorough assessment of gambling behaviors was conducted with ATR Cohort II members. All of the individuals from the ATR Cohort II who were interviewed by telephone in 1996–2000, as well as any non-interviewed cotwins of those interviewed, were targeted for the follow-up interview. After excluding twins who could not be located, were deceased or otherwise unable to complete the interview, or were not assigned for an interview by the end of the study, the individual response rate was 80.4% (see Slutske et al., 2009 for more details). The mean age at the time of the gambling interview was 37.7 years (SE = 0.04, range = 32–43); 57.2% of the sample was female, 64.2% was currently married, and 60.7% was currently employed full-time. Most of the sample (65.7%) was primarily of Northern European ancestry.

Although the sample was derived from a volunteer twin registry, the original inclusion in the registry was based on the parents volunteering the twins back in 1980–1982 when they were children, rather than the twins volunteering themselves as adults. Although this method of ascertainment does not necessarily yield a sample that can be considered truly 'representative' of the population of Australia, it covers a broader range of socioeconomic backgrounds and range of psychopathology than would be typical for most community-based volunteer samples. Indeed, an examination of the characteristics of the sample suggests that it is broadly representative of Australian individuals 32 to 43 years of age (Slutske et al., 2009). In a previous paper (Slutske et al., 2009), a number of predictors of non-participation were identified, including PG, but these did not have a large net effect on the estimated number of individuals with PG in the sample. Other studies have also suggested that individuals with gambling problems may be less likely to participate in research (Black et al., 2006; Slutske et al., 2003).

### Measures

All of the measures for this study, including lifetime and past-year diagnoses of and treatment-seeking for DSM-IV (American Psychiatric Association, 1994) PG, were obtained via the structured psychiatric interview conducted in 2004–2007. The measure of PG used for this analysis was based on the NODS (NORC DSM-IV Screen for Gambling Problems; Gerstein et al., 1999), which was originally developed for the Gambling Impact and Behavior Study (GIBS). The life-

time occurrence of and ages of onset and recency for each of the 10 DSM-IV PG symptoms as well as periods of symptom clustering were assessed.

In the DSM-IV, a diagnosis of lifetime PG requires that at least 5 of 10 symptoms are experienced, and there is no explicit requirement that the symptoms co-occur. This is in part an historical relic of earlier conceptualizations of PG that assumed that symptoms were relatively unflagging, PG was usually chronic, and endorsement of multiple symptoms implied that they had co-occurred. None of the previous epidemiologic surveys of DSM-IV PG have incorporated symptom co-occurrence ('clustering') as a part of the diagnosis of lifetime PG (e.g. Gerstein et al., 1999; Kessler et al., 2008; Petry et al., 2005; Welte et al., 2001). Rather than rely on the assumption that multiple symptoms will tend to co-occur, we directly assessed whether a participant with more than one PG symptom had ever had a 12-month period of symptom co-occurrence.

A small retest sample ( $N = 166$ ) was interviewed twice, 3.4 months apart on average ( $SD = 1.4$  months, range = 1.2 – 9.5 months), to assess the test–retest reliability of the lifetime diagnosis of PG ( $\kappa = 0.67$ ; Yule's  $Y = 0.79$ ). The internal consistency reliability (Cronbach's alpha) of the 10-item PG symptom count was 0.85.

Participants also were administered the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987). The SOGS was not used for the primary aims of this paper, but a single SOGS item related to gambling problem recognition (SOGS item #6) 'do you feel that you have ever had a problem with your gambling?' was used as a potential explanation for (non-)treatment-seeking among individuals with DSM-IV PG.

Any participant who endorsed one or more symptoms of PG was asked 'Have you ever received any professional treatment for your gambling?' and was also asked in a separate question whether they had ever attended a Gambler's Anonymous (GA) meeting.

#### Data Analysis

The main outcomes of interest were treatment-seeking, recovery, and natural recovery among individuals with a history of DSM-IV PG. For the purposes of this study, the prevalence of treatment-seeking was estimated as the percentage of individuals with a lifetime history of DSM-IV PG who had ever sought help from a professional or attended GA. The prevalence of recovery was estimated as the percentage of individuals with a lifetime history of DSM-IV PG who did not endorse any PG symptoms in the past 12 months. This more conservative definition of recovery was chosen over a more liberal definition that defines recovery as the percentage of individuals with a lifetime history of DSM-IV PG who did not meet the full diagnostic criteria for PG in the past 12 months. Slutske (2006a) explains why this latter approach is limited because it allows for individuals

who are still symptomatic to be defined as recovered and probably yields an overestimate of the recovery rate. It is also important to note that those individuals with a lifetime history of PG who did not meet the criteria for recovery could have had a variety of courses of gambling problems, including but not limited to a chronic/persisting course (Slutske 2006b). Natural recovery was estimated as the percentage of individuals with a lifetime history of DSM-IV PG who experienced recovery and had never sought treatment.

Differences in the prevalence rates of treatment-seeking, recovery, and natural recovery between men and women were examined using logistic regression (predicting the three binary outcomes of treatment-seeking, recovery, and natural recovery from biological sex). The non-independence of observations obtained from two members of a twin pair was taken into account in the analyses by using a SAS (SAS Release 9.1, 2003) survey data analysis procedure for logistic regression. In all of the analyses, the data were treated as clustered, with the family unit (that is, the twin pair) serving as the cluster. The analyses employed Taylor series (linearization) variance estimation to obtain correct sampling errors from the clustered data. Similarly, differences between men and women for continuous variables (e.g. lifetime DSM-IV PG symptom counts) were tested using a SAS (SAS Release 9.1, 2003) survey data analysis procedure for generalized least squares regression.

## Results

### PG Recovery

Of the 4,764 participants, 104 (2.2%;  $n = 34$  [32.7%] women) had a lifetime history of DSM-IV PG. The lifetime prevalence of PG was significantly higher among men (3.5%) than among women (1.3%; odds ratio = 2.8 [95% CI = 1.8, 4.3],  $p < .0001$ ). Men and women with DSM-IV PG diagnoses did not differ in the mean number of lifetime PG symptoms that they endorsed (men: 6.4; women: 6.6;  $F = 0.31$ ,  $df = 1$ , 101,  $p = .58$ ). Of the 104 individuals with a lifetime history of DSM-IV PG, 28 (26.9%) had a past year diagnosis of PG, 32 (30.8%) had some gambling problems (1–4 PG symptoms) within the past 12 months ('problem gambling'), and 44 (42.3%) had zero PG symptoms within the past 12 months ('recovery'). Women with a history of PG were more likely to experience recovery (55.9%) than were men with a history of PG (35.7%; odds ratio = 2.3 [95% CI = 1.0, 5.4],  $p = .06$ ), although the association failed to attain statistical significance. The average number of years the individuals in the recovery group had been completely symptom-free was 4.7 (range = 1–11); 93% had been symptom free for 2 or more years (41 of 44) and 48% (21 of 44) had been symptom free for 5 or more years.

### PG Treatment-Seeking

Twenty of the 104 individuals (19.2%;  $n = 11$  [55%] women) with a history of PG reported having sought

**Table 1**

Rates of Treatment-Seeking, Recovery, and Natural Recovery Among Individuals With a Lifetime History of DSM-IV Pathological Gambling Disorder From a Community-Based Australian National Survey

	Full sample (N = 104) %	Men (N = 70) %	Women (N = 34) %
Treatment-seeking	19.2	12.9	32.4
Recovery (with or without treatment)	42.3	35.7	55.9
Natural recovery (without treatment)	34.6	32.9	38.2

Note: DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Version 4

treatment for their gambling problems; 14 (13.5%) had received professional treatment and 11 (10.6%) had attended at least one GA meeting. The rate of treatment-seeking for PG was significantly higher among women (32.4%) than among men (12.9%; odds ratio = 3.2 [95% CI = 1.2, 8.9],  $p = .02$ ). Women with PG were significantly more likely to have attended at least one GA meeting than were men with PG (20.6% versus 5.7%; odds ratio = 4.3 [95% CI = 1.2, 15.9],  $p = .03$ ), but they were not significantly more likely to have received professional treatment for their gambling (20.6% versus 10.0%; odds ratio = 2.3 [95% CI = 0.7, 7.4],  $p = .15$ ). Treatment-seeking was also reported by a handful of individuals ( $n = 4$ ) who had sub-threshold levels of gambling problems (i.e., fewer than 5 lifetime PG symptoms; see Figure 1). Figure 1 shows a strong linear relation between the number of lifetime PG symptoms endorsed and the probability of having sought treatment for gambling problems.

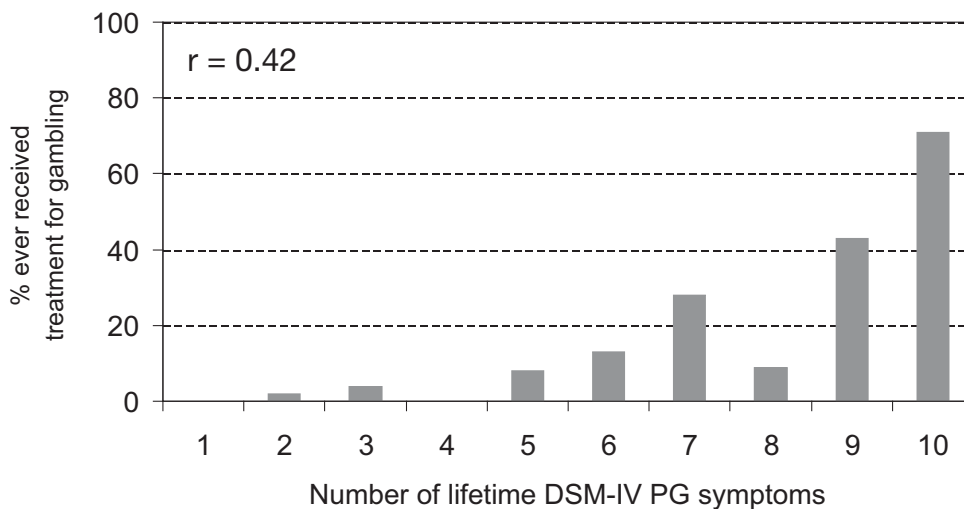
**PG and Gambling Problem Recognition**

Twenty-one of the 104 individuals (20.1%  $n = 3$  [14.3%] women) with a history of PG responded ‘no’ to the SOGS question ‘do you feel that you have ever

had a problem with your gambling?’ Figure 2 shows the relation between the number of lifetime PG symptoms endorsed and gambling problem recognition. Problem recognition was not synonymous with obtaining a DSM-IV diagnosis — in addition to individuals with a diagnosis who did not think that they ever had a gambling problem, there were also individuals who did not qualify for a diagnosis who did. Gambling problem recognition among individuals with lifetime PG was substantially higher among women (91.2%) than among men (74.3%; odds ratio = 3.6 [95% CI = 1.0, 12.9],  $p = 0.05$ ). It was also higher among individuals who had sought treatment for their PG compared to those who had not (95.0% versus 76.2%; odds ratio = 5.9 [95% CI = 0.7, 48.0],  $p = 0.09$ ), although the association failed to attain statistical significance. Gambling problem recognition was nearly a prerequisite for seeking treatment for PG, though most individuals who endorsed problem recognition did not seek treatment. The strength of the association between the sex of the participant and seeking treatment for PG was reduced from 3.2 to 2.8 (95% CI = 1.0, 8.1,  $p = .06$ ) when gambling problem recognition was included as a covariate in the model. Gambling problem recognition was also higher among those who had recovered from PG compared to those who had not (89% versus 73%; odds ratio = 2.8 [95% CI = 0.9, 8.5],  $p = 0.06$ ), although the association failed to attain statistical significance. Thus, problem recognition was also not synonymous with recovery from PG; there were a small number of individuals with a history of PG who had recovered without endorsing problem recognition (11%).

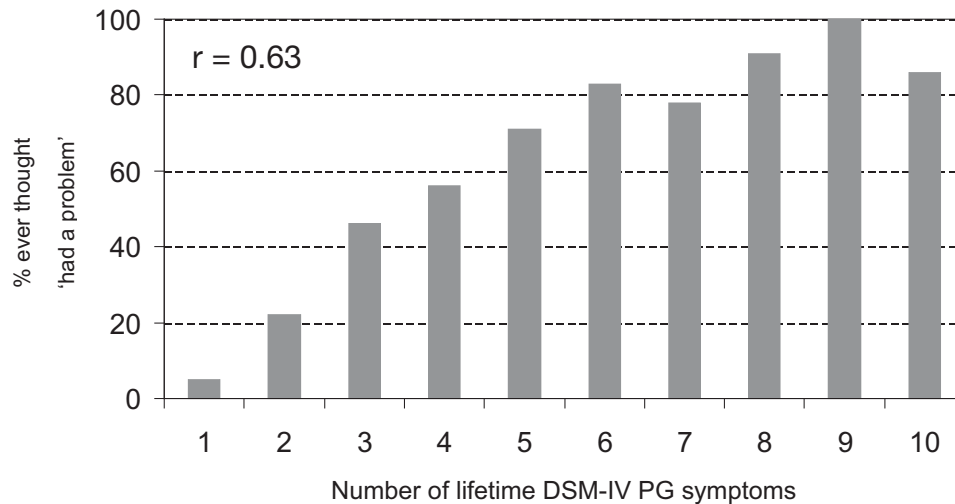
**PG Natural Recovery**

Of the 44 individuals with a history of DSM-IV PG who had zero PG symptoms in the past 12 months, 36 (81.8%  $n = 13$  [36%] women) had *not* sought treat-



**Figure 1**

Treatment for gambling problems as a function of the number of lifetime DSM-IV PG symptoms endorsed in a community-based sample of 595 Australian adults.



**Figure 2**

Gambling problem recognition as a function of the number of lifetime DSM-IV PG symptoms endorsed in a community-based sample of 595 Australian adults.

ment for their gambling problems and so would be considered natural recoveries. Among individuals who had recovered from PG, the proportion of recoveries that were attained without treatment was substantially higher among men (92.0%) than among women (56.5%; odds ratio = 5.3 [95% CI = 0.9, 31.5],  $p = 0.06$ ), although the association failed to attain statistical significance. The overall proportions of men and women with PG who had recovered naturally were similar (33% versus 38%; see Table 1).

#### PG With 12-Month Symptom Clustering

Most of the 104 individuals with a lifetime history of DSM-IV PG (79%) also reported that they had experienced a 12-month period in which at least 3 symptoms of PG had co-occurred ('symptom clustering'). The rates of treatment-seeking, recovery, and natural recovery for this more stringent definition of PG were 20.7%, 47.6%, and 39.0% in the full sample, which were similar to the rates using the conventional definition of PG presented in Table 1. Surprisingly, there was no evidence that this more stringent definition of PG led to *lower* rates of recovery.

#### Discussion

Knowledge about the extent to which natural recovery occurs for PG is important because it can provide a baseline against which to compare treatment effects. In a large national Australian community-based survey, 42% of individuals with a lifetime history of DSM-IV PG did not experience any gambling-related problems in the past year; that is, they had recovered. Only 19% of those with a history of DSM-IV PG had either sought formal treatment or attended meetings of GA, and therefore 35% of individuals with a lifetime history of DSM-IV PG had recovered naturally.

Knowledge about the extent to which natural recovery occurs for PG is also important for accurately estimating the costs to society associated with PG (National Research Council, 1999). For example, the social costs of PG will be overestimated to the extent that natural recovery does occur when the cost estimates are based on the assumption that recovery never occurs in the absence of treatment (National Research Council, 1999). The results of the present study suggest that natural recovery is not an uncommon outcome among individuals experiencing PG. In the present study, the majority of PG recoveries, 82%, were attained without treatment.

Women with PG (32%) were more likely to seek treatment than were men with PG (13%). This sex difference in treatment-seeking for PG was only partially explained by the fact that women with PG were more likely than men with PG to recognize that they had a problem (91% vs. 74%). Fifty-five per cent of the individuals seeking treatment for PG were women, which is similar to the 47% obtained in the United States NESARC (Slutske, 2006a) and the 46% among all individuals seeking publicly-funded treatment for gambling problems in Victoria, Australia in a single 12-month period (Crisp et al., 2004). Although women are less likely than men to suffer from PG, there are approximately equal numbers of women and men in PG treatment samples because of the greater propensity of women than men to seek treatment for their gambling problems. Although earlier studies conducted in the late 1980s reported that men outnumbered women 9:1 in PG treatment samples, (Volberg, 1994), this gender gap appears to have since narrowed (Petry, 2005a). The only specific type of treatment that was assessed in the present study was attending meetings of GA, which is the most widely used treatment for PG (Petry, 2005a). Women were more likely than men to

participate in GA, which is similar to previous findings from a community-based survey reporting greater use of self-help groups like Alcoholics Anonymous among women than among men with substance use disorders (Kessler et al., 1997).

The rate of treatment-seeking for PG of 19% in this Australian sample appears to be higher than the 10% that was obtained in the United States surveys, but restricting the United States NESARC to the same age range as the present study (32–43 years of age) yielded a rate of treatment-seeking of 17%. The association between treatment-seeking and country of residence (Australia vs. United States) was much weaker (odds ratio of 1.1) than the within-Australia association between treatment-seeking and sex (female vs. male) in the present study (odds ratio of 3.2). Despite the differences in the health care systems and treatment availability in Australia versus the United States (e.g., Australia has a national health service, the United States does not), the rates of treatment-seeking, recovery, and natural recovery in PG appear to be quite similar in the two countries. This result, coupled with evidence from both the United States (Blanco et al., 2006) and Australia (present study) that the rates of treatment-seeking for PG are more than twice as high among women as they are among men, is more consistent with the premise that the low rates of seeking treatment for PG are due to personal factors rather than to external barriers (Pulford et al., 2009).

Women with PG were also more likely than men to recover from their gambling problems (56% versus 36%), even though they reported similar numbers of lifetime DSM-IV PG symptoms. This may also apply to women and men who are in treatment for PG. A study of all individuals in publicly-funded treatment for gambling problems in the state of Victoria, Australia found that the women were more likely than the men at the time that they discontinued treatment to have at least partially resolved all of the problems associated with gambling for which they had sought assistance (Crisp et al., 2000), even though they reported a similar number of DSM-IV PG symptoms at intake. Taken together, these results raise the possibility that PG among men may be more chronic and intractable than PG among women.

There are different ways that the term 'recovery' has been defined in gambling research (Nower & Blaszczynski, 2008; Walker et al., 2006). In cross-sectional epidemiologic surveys, 'recovery' is usually estimated from the proportion of past year to lifetime cases of PG. This can be less than ideal because it allows for individuals who are still symptomatic to be defined as recovered. In the present study, an individual with a lifetime history of PG had to report zero PG symptoms in the last 12 months in order to be considered recovered. Another weakness of this approach is that the current diagnostic criteria do not require a period of symptom clustering, so some individuals in epidemiologic surveys who receive a lifetime diagnosis

could earn the diagnosis with only a few scattered individual symptoms over their lifetime (Nower & Blaszczynski, 2008). Those individuals who experience a period of symptom clustering may represent more severe cases of PG and therefore may be less likely to recover from and more likely to seek treatment for PG. In the present study, 79% of those with a lifetime diagnosis of PG had experienced a period of symptom clustering; they did not appear to be less likely to recover or more likely to seek treatment than the larger sample of all individuals with DSM-IV PG (with or without clustering).

It is not clear how long an individual must be symptom free to be considered recovered from PG. For treatment-outcome studies, a consensus of experts has suggested that a long-term follow-up of 2 years or more following completion of treatment is needed to establish that the treatment has been successful and that changes made in gambling involvement are stable (Walker et al., 2006). By this benchmark, most of the individuals classified as recovered in the present study would be considered stable recoveries; 93% had been symptom-free for 2 or more years, and 48% had been symptom-free for 5 or more years.

For most of those experiencing gambling-related problems, acknowledgment that there is a problem is an important step in the recovery process (Petry, 2005b). In the present study, gambling problem recognition was associated with the severity of PG, recovery from PG, and with seeking treatment for PG. However, 11% of the individuals who had recovered from PG in this study did not feel that they had ever had a gambling problem. These may represent individuals whose recovery occurred because their gambling problems were developmentally or situationally limited, and for whom recovery occurred without any intention or effort. These may be the individuals with a history of PG who are best captured by the idea of 'spontaneous remission'. These individuals probably would not have responded to media solicitations for a study of recovery from problem gambling. When they do require assistance in getting better, such individuals would be good candidates for treatment approaches that can accommodate client ambivalence, such as motivational interviewing (Diskin & Hodgins, 2009).

The results of community-based surveys of individuals with PG documenting low rates of treatment-seeking and high rates of natural recovery are consistent with the idea that a substantial number of individuals suffering from problems with gambling would prefer to get better on their own, or with minimal assistance (Bellringer et al., 2008; Hodgins & el-Guebaly, 2000). The results of the present study suggest that men with PG may be especially unlikely to seek treatment and to prefer to get better on their own. Thus, newer treatments for PG that have been developed to assist individuals with gambling problems to get better on their own (e.g., 'Becoming a Winner: Defeating Problem Gambling'; Hodgins, 2002; Hodgins et al., 2001) may

be especially appealing to men. These new self-help treatments are based on learning what has been effective in individuals who have recovered naturally from their gambling problems, as well as gleaned techniques from effective formal treatments for PG, and then incorporating these ideas into a user-friendly workbook that can be used at home (Hodgins, 2005). Other new brief minimal interventions (e.g., 10 minutes of advice, or one-session of motivational interviewing) are also a positive step towards appealing to those who previously would not have considered treatment (Diskin & Hodgins, 2009; Petry et al., 2008). Self-help or brief treatments for PG may be especially well-suited for individuals with less severe gambling problems or for men, two groups that are less likely to seek formal treatment. These treatments are also an important first step in a stepped-care model of problem gambling treatment for those who eventually may require more aggressive treatment approaches (Hodgins, 2005).

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