

Treatment of gambling disorder patients with comorbid depression

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Objective: This study was conducted to investigate and clinically assess comorbid depression and its relevance in individuals suffering from gambling disorders. The DSM-V defines the condition of gambling disorder as a persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress.

Method: A total of 61 subjects with gambling disorders were assessed using the Structured Clinical Interview for the DSM-IV (SCID-I), the South Oaks Gambling Screen (SOGS) and the Major Depression inventory (MDI).

Results: Two-way analysis of variance showed highly significant treatment outcomes associated with reductions in SOGS, $F(1,60) = 84.79, p < 0.0001$, MDI, $F(1,60) = 38.13, p < 0.0001$, craving, $F(1,60) = 29.59, p < 0.0001$, and gambling control, $47.65, p < 0.0001$.

There was also a highly significant outcome associated with comorbidity in MDI, $F(1,60) = 9.17, p < 0.0001$. Finally, there was a significant interaction effect between treatment outcome and comorbidity, $F(1,60) = 3.90, p < 0.005$, suggesting that both treatment and comorbidity contributed to reductions in depressive symptoms.

Conclusion: These results suggest and highlights the importance and benefits of integrated treatment of gambling disorders and its comorbidity, but also stresses the importance of adequate screening and detection of these two variables.

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Summations

- The present study suggests that gambling disorder sufferers with depression benefit from CBT treatment, however, screening for depression may not be a fully accurate assessment of comorbid depressive symptoms.
- Evidence suggests that gambling disorder sufferers with depression do not differ in gambling related severity level from gambling disorder sufferers without comorbidity.
- Gambling disorder sufferers with depression improve to the same symptom level as gambling disorder sufferers without depression after treatment, which supports the notion of an integrated treatment approach of gambling disorder and depression.

Limitations

- The study only included treatment completers in order to have both pre- and post-measures of depressive symptoms and gambling symptoms.
- Data used in the study indicate a full range of MDI severity of depression, i.e., mild, moderate and severe, the outpatient setting was only geared toward mild to moderate forms of depression.

- Clinicians in the study monitored the patient's medication status and were not able to include systematic records of, or control for, medications in the research.

Introduction

Comorbidity is common in gambling disorder (1,2) ranging from ~30% to 70%. Affective disorders such as depression (3,4) and alcohol and substance use disorders (5,6) are the most frequent forms of comorbidity.

Gambling disorder patients in treatment generally show significant reductions in depressive symptoms (7,8). A meta-analysis by Linnet (9) identified three randomised-controlled trials (RCT) of psychological treatment of gambling disorder, which both looked at gambling symptoms and symptoms of depression. The three studies investigated the treatment effect of cognitive behavioural therapy (CBT), compared with a waitlist control (10–12). A data analysis of 121 patients in the three RCT studies, showed that the standardised mean difference (SMD) of gambling symptoms between the treatment and control condition was 1.34 [95% CI (2.73; 0.04)], $Z = 1.90$, $p = 0.06$. These results suggest that CBT had small beneficial effects on gambling symptoms compared with a control condition. The SMD of depressive symptoms was 0.61 [95% CI (1.07; 0.15)], $Z = 2.59$, $p = 0.0009$, which suggests that CBT had moderate beneficial effects on depressive symptoms compared with a control condition. Together, the results suggest that CBT treatment of gambling disorder is beneficial on both gambling symptoms and depressive symptoms.

Gambling disorder treatment is also associated with reduction of gambling symptoms and depressive symptoms in telebased psychotherapy. Carlbring and Smit (13) investigated the treatment effect of telebased CBT of gambling disorder treatment, compared with a waitlist control. A data analysis of 32 patients showed that the SMD of gambling symptoms between the treatment and control condition was 3.87 [95% CI (5.24; 2.50)], $Z = 5.54$, $p < 0.00001$. These results suggest that CBT had moderate beneficial effects on gambling symptoms compared with a control condition. The SMD of depressive symptoms was 2.13 [95% CI (3.62; 0.64)], $Z = 2.80$, $p = 0.005$, which suggests that CBT had small beneficial effects on depressive symptoms compared with a control condition. While the evidence from telebased CBT treatment of gambling disorder is uncertain, due to the limited numbers of studies, the results are consistent with the findings of CBT treatment of gambling disorder.

However, it is currently unknown whether or not reduction of depressive symptoms is also related to gambling disorder patients with a diagnosis of depression, which may pose several challenges. First, we do not know if screening for depression is an accurate measure of comorbid depression. Clinical assessment of comorbidity is needed, in addition to screening for comorbidity in order to answer this question. Second, we do not know if reductions in depressive symptoms occurs similarly among patients with comorbid depression, and those without depression. For instance, we do not know if reductions in depressive symptoms occur mostly among patients who do not suffer from depression. This information is important in order to provide optimal treatment gambling disorder patients with comorbidity.

The purpose of the present study was to investigate the treatment effect of gambling symptoms and depressive symptoms in gambling disorder patients with a comorbid diagnosis of depression compared with gambling disorder patients without comorbidity. We hypothesised that gambling disorder sufferers with comorbid depression would show significantly larger reductions in depressive symptoms after treatment compared with gambling disorder sufferers without comorbidity. Furthermore, we hypothesised that gambling disorder sufferers with comorbid depression would no longer meet criteria for depression after treatment, that is, they would be in remission.

Methods and materials

Patients

The cohort consisted of 61 patients suffering from gambling disorder, who received treatment at the Research Clinic on Gambling Disorders and Mindwork Psychological Center. Patients were selected from the Database for Online Clinical Studies, which is a quality assessment database developed by the Research Clinic on gambling disorders under Aarhus University Hospital and the Central Denmark Region. All patients gave informed consent to the use of their data for research purposes.

Patients were assessed using the Structured Clinical Interview for the DSM-IV (SCID-I), the South Oaks Gambling Screen (SOGS) and the Major Depression inventory (MDI). Patients were included if they were between 18 and 75 years of age, had a diagnosis of gambling disorder, and completed the

SCID-I and pre- and post-measures of the SOGS and MDI. Patients were excluded if they did not have sufficient reading, writing and oral language proficiency, or suffered from severe comorbidity such as psychotic disorders, current substance abuse or dependence, or post-traumatic stress disorder. Patients with comorbid depression and other types of comorbidity (e.g. anxiety disorder) were included. However, patients were excluded if they suffered from current comorbidity other than depression. Finally, patients without current comorbidity, who had past comorbidity, were excluded.

A total of 136 patients met inclusion and exclusion criteria, and 61 (45%) of those completed pre- and post-test measures of the SOGS and the MDI. A total of 22 (56%) gambling disorder sufferers with comorbidity and 53 (55%) gambling disorder sufferers without comorbidity did not complete pre- and post-test measures, while 17 (44%) gambling disorder sufferers with comorbidity and 44 (45%) gambling disorder sufferers without comorbidity completed pre- and post-test measures. These attrition rates are comparable with other studies of gambling disorder (14–16) (Ladouceur et al., 2001). An intent-to-treatment analysis would reduce the effect sizes of the study, and the selection of participants therefore reduces the generalisability of the study to treatment completing gambling disorder sufferers.

Measures

The Structured Clinical Interview for DSM-IV (SCID-I). SCID-I (17) is a clinical interview assessing for axis I psychopathology, and also included a special module assessing pathological gambling (18). Patients were assessed on affective disorders, psychotic disorders, substance use disorders, anxiety disorders, somatoform disorders, eating disorders and gambling disorder.

SOGS. SOGS (19,20) is a widely used 20-item self-report rating scale that assesses lifetime and past year gambling-related difficulties. A score of five or more suggests a diagnosis of pathological gambling. In the present study, we used a twelve month pre test and a three month post test version to accommodate the period of treatment. The SOGS shows good reliability and validity with the diagnosis of pathological gambling (21).

MDI. MDI (22) is a 10-item self-report rating scale that assesses present symptoms of depression. A score between 20 and 24 indicates mild depression, while a score between 25 and 29 indicates moderate depression, and a score of 30 or above indicates severe depression; a score below 20 indicates no

depression. The MDI shows good reliability and validity with the Hamilton Depression Scale (23).

Craving, control, treatment sessions and absence. These scales are part of the CBT protocol use in the present study (14,24,25). Patients rated their current level of gambling craving and gambling control on a rating scale from 0 to 100, where 0 indicated the lowest level and 100 indicated the highest level. We note that the psychometric properties of these scales have not been validated. In the cohort ($n = 67$) one person had a missing score on craving and two persons had missing scores on control. The total number of treatment sessions and absence (cancellations and no-shows) were recorded.

Treatment

Treatment programme. Patients completed an evidence-based treatment programme, which integrated clinical assessment of comorbidity and CBT. The CBT method is based on Robert Ladouceur's treatment model (25–27), while the clinical assessment served as a basis for the integrated treatment approach for comorbidity. The therapists were all clinical psychologists who were trained in using the SCID-I, SOGS and MDI, and trained in using the CBT treatment manual.

Statistics

We use χ^2 test to determine gender differences between patients with comorbidity and patients without comorbidity. Second, we used binomial regression analysis to determine the classification accuracy between diagnostic assessment of gambling symptoms and depression with SOGS and MDI screening measures. Third, we used one-way analysis of variance (ANOVA) to determine group differences on age, treatment sessions, SOGS, MDI, craving and control, as well as pre- and post-measures of SOGS, MDI, craving and control. Finally, we used two-way ANOVA to determine the effect of SOGS, MDI, craving and control, where group (comorbidity vs. no comorbidity) was the dependent variable, and time (pre vs. post) and measures (SOGS, MDI, craving and control) were the independent measures.

Results

Demographic variables

A χ^2 analysis revealed no gender differences between gambling disorder sufferers with depression and those without, $\chi^2 = 0.43$, *ns*. There were eight women out of 61 gambling disorder sufferers (three with depression). Furthermore one-way ANOVA

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Table 1. Patients with comorbid depression and patients without comorbidity

	Gambling disorder patients with depression			Gambling disorder patients without depression			F	p
	n	Mean	SD	n	Mean	SD		
Pre-treatment								
SOGS	17	11.00	2.40	44	10.43	2.43	0.67	0.42
MDI	17	29.65	10.04	44	15.61	9.82	24.72*	0.0001
Craving	17	50.59	35.08	44	35.80	30.52	2.65	0.11
Control	17	41.18	33.33	43	50.23	27.14	1.19	0.28
Post-treatment								
SOGS	17	0.47	1.70	44	0.61	1.17	0.14	0.71
MDI	17	8.41	6.42	44	5.66	6.31	2.31	0.13
Craving	17	7.65	14.80	44	7.39	13.91	<0.01	0.95
Control	17	90.59	17.13	44	93.27	8.19	0.70	0.41

MDI, Major Depression Inventory; SOGS, South Oaks Gambling Screen.
* $p < 0.0001$.

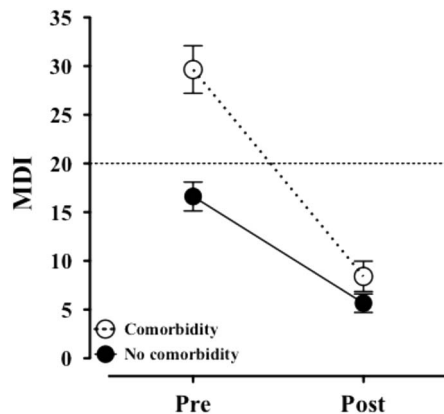


Fig. 1. Gambling disorder patients with comorbidity (empty circles) show indication of depression (above the dotted vertical line), and have significantly higher MDI scores at intake (Pre) than gambling disorder patients without comorbidity (filled circles). Neither group show indication of depression after treatment (Post). Circles and error bars represent means and standard error of mean, respectively.

showed no age differences between gambling disorder sufferers with depression and those without, $F(1,60) = 2.87$, *ns*. On average gambling disorder sufferers with depression were 35.6 years old at the time of treatment ($SD = 9.4$), while gambling disorder sufferers without depression were 31.5 years old ($SD = 8.1$).

Treatment sessions and compliance

A one-way ANOVA showed no significant differences between gambling disorder sufferers with depression and those without with regard to number of treatment sessions, $F(1,60) = 1.94$, *ns*, and number of absent sessions, $F(1,60) = 0.28$, *ns*. On average gambling disorder sufferers with depression completed 8.6

Table 2. Remission Major Depression Inventory

	Post-treatment		Total
	No depression	Depression	
A: Comorbidity			
Pre-treatment			
Depression	13 (92.9%)	1 (7.1%)	14 (100%)
No depression	3 (100.0%)	0 (0.0%)	3 (100.0%)
B: No comorbidity			
Pre-treatment			
Depression	10 (90.9%)	1 (9.1%)	11 (100%)
No depression	33 (100.0%)	0 (0.0%)	33 (100%)

sessions ($SD = 4.05$), while gambling disorder sufferers without depression completed 7.3 sessions ($SD = 3.07$). Gambling disorder sufferers with depression were absent (i.e., cancellations or no-shows) an average of 1.6 sessions ($SD = 1.91$) over the course of treatment, while gambling disorder sufferers without depression were absent an average of 1.3 sessions ($SD = 1.73$).

Treatment outcomes

One-way ANOVAs showed highly significant differences on depressive symptoms (MDI) before treatment between gambling disorder sufferers with depression and those without, $F(1,60) = 4.97$, $p < 0.000001$. There were no significant difference before treatment on SOGS, craving or gambling control. Furthermore, there were no significant difference between the two groups after treatment on MDI, SOGS, craving and gambling control (see Table 1).

Two-way ANOVAs showed highly significant treatment outcomes associated with reductions in SOGS, $F(1,60) = 84.79$, $p < 0.0001$, MDI, $F(1,60) = 38.13$, $p < 0.0001$, and craving, $F(1,60) = 29.59$, $p < 0.0001$, and highly significant increases in gambling control, 47.65 , $p < 0.0001$. These findings suggest that both gambling disorder sufferers with depression and those without depression significantly reduced their symptoms after treatment.

Furthermore, there was a highly significant outcome associated with comorbidity in MDI, $F(1,60) = 9.17$, $p < 0.0001$, where gambling disorder sufferers with depression showed significantly larger reductions in depressive symptoms than did gambling disorder sufferers without depression. Finally, there was a significant interaction effect between treatment outcome and comorbidity, $F(1,60) = 3.90$, $p < 0.005$, suggesting that both treatment and comorbidity contributed to reductions in depressive symptoms. A power analysis showed that the observed power of the interaction between depressive symptoms and

comorbidity was 0.96. The treatment outcomes of the MDI are illustrated in Fig. 1.

There were no significant outcomes of comorbidity associated with SOGS, cravings or gambling control, suggesting that gambling disorder sufferers with depression did not differ from gambling disorder sufferers without depression on these outcome measures.

Remission

Table 2 shows remissions rates of depression between pre-treatment and post-treatment measures of MDI. Table 2A shows that among the 14 gambling disorder sufferers with depression that MDI accurately classified before treatment, 13 were in remission after treatment, and only one individual still showed indication of depression. Among the three gambling disorder sufferers with depression that MDI misclassified before treatment, none showed an indication of depression after treatment.

Table 2B shows that among the 33 gambling disorder sufferers without depression that MDI accurately classified before treatment, none showed an indication of depression after treatment. Among the 11 gambling disorder sufferers without depression that MDI misclassified before treatment only one individual was still misclassified after treatment.

Discussion

In this study we found that gambling disorder sufferers with comorbid depression had significantly more symptoms of depression than gambling disorder sufferers with comorbidity, and that they had significantly larger reductions in depressive symptoms following treatment, resulting in similar rates of remission between the two groups. The results suggest that gambling disorder sufferers with depression benefit from CBT treatment. However, screening for depression may not be a fully accurate assessment of comorbid depression, and clinical assessment is therefore recommended.

The classification accuracy between SOGS and the clinical assessment was 98.4%, which is very high compared with validation studies of SOGS and DSM-IV criteria (28). There may be several reasons for this. First, the clinical assessments were carried out by skilled clinicians who thoroughly interviewed patients in a face-to-face setting, compared with a telephone survey (28). Second, the present population represents treatment seeking gambling disorder sufferers, and it is possible that people who are treatment seekers are more aware of their symptom and better able to recognise their symptoms than gambling disorder sufferers who are not treatment

seeker. Together, treatment seeking gambling disorder sufferers may represent a more clearly defined population than the entire population of treatment seeking and non-treatment seeking gambling disorder sufferer.

The classification accuracy between MDI and the clinical assessment was 77.0%, which is moderate. A rule of thumb is that classification accuracy of 0.8 (80%) is acceptable. Most of the misclassifications were associated with false positive, that is, MDI indicating a depressive disorder, without the disorder being present. But some of the misclassification (17.6%) was due to false negatives, that is, MDI failing to depression in gambling disorder sufferers. Such individuals may have an increased risk of attrition or treatment failure if their depression is not properly detected or treated. For this reason it may be important not to rely on screening measures of comorbidity, but ensure proper assessment of patients by trained clinicians.

Both treatment and comorbidity were associated with reduction of depressive symptoms in gambling disorder sufferers. There may be several reasons for this. First, gambling disorder sufferers with depression had significantly higher MDI scores than gambling disorder sufferers without depression. As gambling disorder sufferers with depression had a starting point with higher MDI scores, it could be argued that they had the possibility of larger improvements. However, we did not detect a floor effect in our data (i.e., patients indicating the lowest score after treatment). Furthermore, if it were the case that patients did not improve, we would have expected to see significant differences in depression after treatment, which was not the case. Instead, our data suggest that gambling disorder sufferers with depression improved to the same symptom level as gambling disorder sufferers without depression, which supports the notion of an integrated treatment approach of gambling disorder and depression.

The two-way ANOVAs suggested that significant outcomes of comorbid were only associate symptom level on the MDI, and not on the SOGS, craving or gambling control. This may suggest that gambling disorder sufferers with depression do not differ in gambling-related severity level from gambling disorder sufferers without comorbidity. This could support the notion of an integrated treatment approach, as the severity level of gambling symptoms does not appear to be exacerbated or excessively complicated in gambling disorder sufferers with depression. However, it may require clinicians to have the necessary skill set to both detect and treat depression and gambling disorder.

The present study is limited in several ways. First, it only included treatment completers in order to have

both pre- and post-measures of depressive symptoms and gambling symptoms. The present study design was not geared towards an intent-to-treatment analysis, nor was it geared towards a randomised-controlled study design. Therefore, it is possible that these data present the best-case scenarios of treating gambling disorder sufferers with comorbid depression. Second, although our data indicate a full range of MDI severity of depression, that is, mild, moderate and severe, the outpatient setting is only geared towards mild to moderate forms of depression. Therefore, it is unlikely that gambling disorder patients with severe depression would have been included in the study, which represents a limitation of the study. Gambling disorder patients with severe depression would, in all likelihood, have been referred to other psychiatric treatment. Third, we were not able to control for medication in this study. Although patients' medication status was monitored by clinicians, we were not able to include systematic records of medications in the present study.

To our knowledge this is the first study, which compares clinical assessment of comorbid depression in gambling disorder with screening of gambling symptoms and symptoms of depression. Studying comorbidity in gambling disorder is important, as 30–70% of gambling disorder patients suffer from comorbidity, and models are needed, which can address integrated treatment of gambling disorder and comorbidity. Our findings suggest that integrated treatment of gambling disorder and comorbidity by trained clinicians has a beneficial effect among treatment completers. However, in order to sufficiently treat comorbidity, it must be accurately detected. While screening of gambling symptoms appear to be sufficiently accurate for detecting gambling disorder, screening of depression may not be a fully accurate assessment of comorbid depression. Therefore, it is recommended to use standardised clinical assessment of comorbidity in gambling disorder treatment.

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References

1. CHAMBERLAIN SR, DERBYSHIRE K, LEPPINK E, GRANT JE. Impact of ADHD symptoms on clinical and cognitive

- aspects of problem gambling. *Compr Psychiatry* 2015;**57**:51–57.
2. DANNON PN, LOWENGRUB K, AIZER A, KOTLER M. Pathological gambling: comorbid psychiatric diagnoses in patients and their families. *Isr J Psychiatry Relat Sci* 2006;**43**:88–92.
3. BECONA E, DEL CARMEN LORENZO M, FUENTES MJ. Pathological gambling and depression. *Psychol Rep* 1996;**78**:635–640.
4. GRANT JE, KIM SW. Demographic and clinical features of 131 adult pathological gamblers. *J Clin Psychiatry* 2001;**62**:957–962.
5. SMART RG, FERRIS J. Alcohol, drugs and gambling in the Ontario adult population, 1994. *Can J Psychiatry* 1996;**41**:36–45.
6. CROCKFORD DN, EL-GUEBALY N. Psychiatric comorbidity in pathological gambling: a critical review. *Can J Psychiatry* 1998;**43**:43–50.
7. LINARDATOU C, PARIOS A, VARVOGLI L, CHROUSOS G, DARVIRI C. An 8-week stress management program in pathological gamblers: a pilot randomized controlled trial. *J Psychiatr Res* 2014;**56**:137–143.
8. MOGHADDAM JF, CAMPOS MD, MYO C, REID RC, FONG TW. A longitudinal examination of depression among gambling inpatients. *J Gambl Stud* 2014.
9. LINNET J. Effekten Af Behandlingsmetoder Indenfor Ludomani [The effects of treatment methods in gambling disorder]. Copenhagen, Denmark: Danish Ministry of Health, 2016.
10. MARCEAUX JC, MELVILLE CL. Twelve-step facilitated versus mapping-enhanced cognitive-behavioral therapy for pathological gambling: a controlled study. *J Gambl Stud* 2011;**27**:171–190.
11. WONG DF, CHUNG CL, WU J, TANG J, LAU P, WAN JP. A preliminary study of an integrated and culturally attuned cognitive behavioral group treatment for Chinese problem gamblers in Hong Kong. *J Gambl Stud* 2015;**31**:1015–1027.
12. GRANT JE, DONAHUE CB, ODLAUG BL, KIM SW, MILLER MJ, PETRY NM. Imaginal desensitisation plus motivational interviewing for pathological gambling: randomised controlled trial. *Br J Psychiatry* 2009;**195**:266–267.
13. CARLBRING P, SMIT F. Randomized trial of internet-delivered self-help with telephone support for pathological gamblers. *J Consult Clin Psychol* 2008;**76**:1090–1094.
14. LADOUCEUR R, LACHANCE S, FOURNIER PM. Is control a viable goal in the treatment of pathological gambling? *Behav Res Ther* 2009;**47**:189–197.
15. STINCHFIELD R, WINTERS KC. Outcome of Minnesota's gambling treatment programs. *J Gambl Stud* 2001;**17**:217–245.
16. SYLVAIN C, LADOUCEUR R, BOISVERT JM. Cognitive and behavioral treatment of pathological gambling: a controlled study. *J Consult Clin Psychol* 1997;**65**:727–732.
17. FIRST M, SPITZER R, GIBBON M, WILLIAMS J. Structured clinical interview for DSM-IV-Tr Axis I disorders, research version, non-patient edition. (Scid-I/Np). New York: Biometrics Research, New York State Psychiatric Institute, 2002.
18. GRANT JE, STEINBERG MA, KIM SW, ROUNSAVILLE BJ, POTENZA MN. Preliminary Validity and Reliability Testing of a Structured Clinical Interview for Pathological Gambling. *Psychiatry Research* 2004;**128**:79–88.

19. LESIEUR H, BLUME SB. Revising the South Oaks gambling screen in different settings. *J Gambl Stud* 1993;**9**:213–223.
20. LESIEUR HR, BLUME SB. The South Oaks Gambling Screen (Sogs): a new instrument for the identification of pathological gamblers. *Am J Psychiatry* 1987;**144**: 1184–1188.
21. STINCHFIELD R. Reliability, validity, and classification accuracy of the South Oaks Gambling Screen (Sogs). *Addict Behav* 2002;**27**:1–19.
22. BECH P, RASMUSSEN N-A, OLSEN L, NOERHOLM V, ABILDGAARD W. The sensitivity and specificity of the Major Depression Inventory, using the present state examination as the index of diagnostic validity. *J Affect Disord* 2001;**66**:159–164.
23. OLSEN LR, JENSEN DV, NOERHOLM V, MARTINY K, BECH P. The internal and external validity of the Major Depression Inventory in measuring severity of depressive states. *Psychol Med* 2003;**33**:351–356.
24. LADOUCEUR R, SYLVAIN C, BOUTIN C, LACHANCE S, DOUCET C, LEBLOND J. Group therapy for pathological gamblers: a cognitive approach. *Behav Res Ther* 2003;**41**:587–596.
25. LADOUCEUR R, SYLVAIN C, BOUTIN C, LACHANCE S, DOUCET C, LEBLOND J, JACQUES C. Cognitive treatment of pathological gambling. *J Nerv Ment Dis* 2001;**189**:774–780.
26. LADOUCEUR R, LACHANCE S. *Overcoming pathological gambling: therapist guide*. Oxford: Oxford University Press, 2007a.
27. LADOUCEUR R, LACHANCE S. *Overcoming your pathological gambling: workbook*. Oxford: Oxford University Press, 2007b.
28. STINCHFIELD R, MCCREADY J, TURNER NE et al. Reliability, validity, and classification accuracy of the DSM-5 diagnostic criteria for gambling disorder and comparison to DSM-IV. *J Gambl Stud* 2015;**32**:905–922.