

# Seeking Safety Therapy for Pathological Gambling and PTSD: A Pilot Outcome Study

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**Abstract**— This pilot study evaluated Seeking Safety (SS) therapy for seven outpatients with current comorbid pathological gambling (PG) and posttraumatic stress disorder (PTSD). This represents the first treatment outcome study of this population, and included both genders and 29% minorities. We found significant improvements in: *PTSD/trauma* (the PTSD Checklist criterion B symptoms; the Trauma Symptom Inventory overall mean and subscales anxiety, dissociation, sexual abuse trauma index, sex problems; and the World Assumptions Scale benevolence subscale); *gambling* (the Gamblers Beliefs Questionnaire overall mean and subscales illusion of control); *functioning* (the Basis-32 overall mean and depression/anxiety subscale); *psychopathology* (the Brief Symptom Inventory overall mean and subscales anxiety and depression; and the Addiction Severity Index, ASI, psychiatric composite score); *self-compassion* (the Self-Compassion Scale overall mean and subscales isolation, overidentified, and self-judgment); and *helping alliance* (the Helping Alliance Questionnaire overall mean). One variable indicated worsening (employment composite subscale on the ASI), possibly reflecting measurement issues. SS attendance was excellent. PTSD onset occurred prior to PG onset for most of the sample, and most believed the two disorders were related. Overall, we found that SS can be effectively conducted for comorbid PTSD and PG, with improvements in numerous domains and high acceptability. Limitations are discussed.

**Keywords**— pathological gambling, problem gambling, PTSD, Seeking Safety therapy, trauma

Pathological gambling (PG) is highly associated with other DSM-IV disorders, including substance use disorder, mood disorders, and personality disorders (Petry & Steinberg 2005). There is an emerging literature indicating a compelling association between trauma and/or posttraumatic stress disorder (PTSD) and problem

gambling and/or PG (Najavits et al. 2010). Overall, the rate of PTSD among problem gamblers is estimated at 12.5% to 29% (Ledgerwood & Petry 2006). Lifetime comorbidity between PTSD and pathological gambling is 14.8%; and PG is a significant predictor of PTSD (Kessler et al. 2008). Among treatment-seekers with PG, 34% had a high level

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The authors extend their sincere appreciation to the Ontario Problem Gambling Research Centre for funding this project, and to their colleagues at the Jean Tweed Centre: Tammy Rasmussen, Beth Murray, and Lucy Hume. Conflict of interest disclosure: Dr. Najavits is director of Treatment Innovations, which provides consultation, materials, and training related to psychotherapy, including Seeking Safety.

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of PTSD symptoms with the latter assessed by self-report checklist (Ledgerwood & Petry 2006). In another study of treatment-seeking problem gamblers, similar associations were found and a significant gender difference was discovered, with women reporting more childhood abuse than men (Petry & Steinberg 2005). Among military veterans entering treatment for PTSD (Biddle et al. 2005), 17% met DSM-IV criteria for PG. In a study by Kausch and colleagues (2006) of 111 veterans entering a gambling treatment program, 64% reported a history of emotional trauma, 40.5% reported physical trauma, and 24.3% sexual trauma; most trauma had occurred in childhood. Similarly, Scherrer and colleagues (2007) used a twin cohort design to determine that childhood and lifetime traumatic events are significantly associated with PG. Peltzer and colleagues (2006) also found an association between trauma history and gambling severity in a sample of South African horse-race gamblers. In one of the earliest studies on this topic, Taber and colleagues (1987) found a 23% rate of major traumatic events in a sample of pathological gamblers seeking treatment. In a study of 843 elderly adults, 11% were identified as “at risk” gamblers, with current PTSD symptoms one of the strongest predictors (Levens et al. 2005). In an Ontario study (Boughton & Brewster 2002), 365 women problem gamblers, most of whom had never sought treatment, reported high levels of trauma and abuse, with 38% reporting sexual abuse and 41% physical abuse as children, while 28% reported sexual abuse and 46% reported physical abuse as adults.

PTSD is a prevalent disorder (7% lifetime rate in the general population; Kessler et al. 2005), is typically chronic for many years, incurs high health care utilization and cost, is associated with a wide variety of life problems (including physical health disorders, homelessness, loss of custody of children, and numerous co-occurring Axis I and Axis II disorders) (Ouimette & Brown 2002). Yet PTSD treatment studies thus far have consistently excluded individuals with co-occurring addiction (substance or gambling) or not assessed for them (Najavits 2007). Similarly, PG treatment studies have typically not targeted comorbid mental health disorders and not reported on rates of comorbidity. We were unable to locate a single treatment study in which participants had both PG and PTSD.

## SEEKING SAFETY THERAPY

Seeking Safety (SS; Najavits 2002) is the only therapy model for comorbid PTSD and addiction established as effective thus far, using standard criteria in the field (see Najavits 2009). It is also the most widely adopted model for the comorbid PTSD/addiction in clinical settings. SS was developed specifically for comorbid addiction and PTSD given the large numbers of patients with these disorders (Kessler et al. 1995), and their serious treatment challenges and needs (Ouimette & Brown 2002). SS

is a present-focused, cognitive-behavioral therapy (CBT) approach that provides psychoeducation and coping skills to help clients attain greater safety in their lives. It was designed for flexible use: in group or individual format, for males and females, in a variety of settings (e.g., outpatient, inpatient, residential), and for all types of trauma and substances; it has been studied in both adults and adolescents. It offers 25 topics to address cognitive, behavioral, interpersonal, and case management domains. The treatment was designed for adaptability in clinical settings: topics can be conducted in any order, using as few or as many as are possible within the clients' length of stay, and by a wide variety of counselors (no particular professional degree is required). Examples of topics are: *Safety, Honesty, Asking for Help, Setting Boundaries in Relationships, Getting Others to Support Your Recovery, Healthy Relationships, Compassion, Creating Meaning, Discovery, Recovery Thinking, Taking Good Care of Yourself, Coping with Triggers, Self-Nurturing, Detaching from Emotional Pain (Grounding), Life Choices*. The model is also used with clients who have just one or the other disorder (PTSD/SUD), are subthreshold, or have a history of one or both of these. Seeking Safety strives to build hope through emphasis on ideals; it uses simple, emotionally evocative language and quotations to engage clients, it attends to clinician processes (e.g., self-care), and offers concrete strategies that are believed essential for this population (e.g., case management and a clear session structure to provide containment). There are 24 completed outcome studies on SS, including multisite trials, randomized controlled trials, and pilot studies; some used group modality, others individual modality. All of the studies thus far have found positive results (see Najavits 2009 for a review and also the outcomes section at [www.seekingsafety.org](http://www.seekingsafety.org)). Treatment attendance was strong, and satisfaction was high among both clients and clinicians.

In this project, we thus sought to conduct a pilot outcome trial of SS in a sample with current PTSD and PG. Our aims were to evaluate outcomes and basic feasibility/acceptability. We did not modify SS in any way, especially as the model already inherently allows for flexibility in use of language, examples, and order of topics conducted.

## METHOD

### Recruitment

We recruited participants during the grant period from 2009 to 2011 from two locations (Boston and Toronto) as recruitment of PG patients is known to be difficult, and because our study teams were in these cities. Written informed consent was obtained from participants. In both cities we recruited via local posting to Craigslist, word-of-mouth and fliers; and in Toronto, we also recruited from the Jean Tweed Centre (JTC), a program for women

with addiction problems. Inclusion criteria were: age 18 or older; current PG per DSM-IV criteria; gambling activity in the three months prior to intake as measured by the Canadian Problem Gambling Index (Ferris & Wynne 2001) (to adequately assess baseline gambling); and current PTSD (full, per DSM-IV criteria). Exclusion criteria were: current or past mania or psychotic disorder; inability to read or write (which would preclude assessments); and placement in an institutionalized setting for more than three weeks in the three months prior to intake (e.g., jail, inpatient, or residential treatment, as this could affect baseline gambling levels due to lack of access). Our inclusion/exclusion criteria were minimal so as to target the relevant sample without selection bias. The study was conducted under the oversight of the New England IRB (Boston site) and the Women's College Hospital IRB (Toronto site).

## SS

SS was conducted weekly on an outpatient basis in individual format. We sought to offer all 25 SS topics, thus allowing six months per patient. SS was conducted by three clinicians (two in Toronto, one in Boston), but no patients were seen by the first author (LN) as she was the developer of SS and we wanted to evaluate the model as conducted by others. The two Toronto clinicians were trained by watching the SS training videos, with the opportunity to ask questions and receive feedback on their session audiotapes from LN (based on random tapes that were selected for adherence rating).

## Assessment

After an initial brief telephone or in-person screen, potential participants were invited to the in-person baseline assessment (approximately 1.5 hours), which began with verifying the inclusion/exclusion criteria via standardized interview on the MINI Neuropsychiatric Interview (MINI; Sheehan et al. 1998). Assuming eligibility, participants next completed the baseline measures (see the next section). They were re-assessed monthly on a brief battery (months two to five), and then at month six end-of-treatment assessments were done using a larger battery of tests. Participants were paid for assessments, but not for attending therapy (vouchers worth \$40.00 for baseline and end-of-treatment assessments, \$20 for monthly assessments; all Canadian dollars). Assessments were conducted by the project managers, who were trained and supervised by the study team. We used a full intent-to-treat design, with a plan to complete assessments on all patients, even if drop-out were to occur.

## Measures

All measures were selected for their relevance to SS (e.g., coping skills); psychopathology (PG, PTSD, etc.);

and their psychometric validation. Total scores and subscales were used based on established scoring principles.

**Psychopathology.** To evaluate intake diagnoses, we used the MINI to assess current DSM-IV PTSD and the exclusion criteria listed earlier (mania, psychotic disorder), and the Diagnostic Interview of Gambling Severity (DIGS; Winters, Specker & Stinchfield 2002) for current PG. Additional measures, all used to evaluate outcomes, were the Gambling Symptom Assessment Scale (GSAS; Kim et al. 2009), the PTSD Checklist (PCL; Weathers et al. 1993) the Trauma Symptom Checklist-40 (TSC-40; Briere 1996), the Brief Symptom Inventory (for general psychopathology; Derogatis 1977), and the Addiction Severity Index-Lite (ASI; for substance use severity; McLellan et al. 1992). Finally, two other measures provided descriptive data: the Trauma History Questionnaire (THQ; Green 1996) assessed lifetime history of traumas and the Pathological Gambling/PTSD Time Line assessed age of onset of PTSD and PG (Najavits 2008).

**Sociodemographics.** Sociodemographics were obtained as part of the ASI.

**Functioning/cognition/coping.** We used the following, all as outcome measures: Gamblers' Beliefs Questionnaire (for gambling cognitions; Steenbergh et al. 2002); Gambling Self-Efficacy Questionnaire (May et al. 2003); World Assumptions Scale (for PTSD cognitions; Janoff-Bulman 1989); Self-Compassion Scale (Neff 2003); Basis-32 (functioning; Eisen et al. 1999); and Coping Scale (Najavits et al. 1995, adapted by Gatz et al. 2007). The latter is the only measure in our study that is not psychometrically validated.

**Treatment-related measures.** The Helping Alliance Questionnaire (HAQ; Luborsky et al. 1996) assessed degree of alliance with the treatment; the Treatment Services Review (TSR; McLellan 1989) assessed amount and type of external treatments.

## Assessment Schedule

All measures were collected at baseline and end-of-treatment, except the MINI (baseline only) and the HAQ (session three and end-of-treatment). The monthly battery consisted of the TSC-40, GSAS, Basis-32, and the BSI.

## Data Analysis

We used data from all subjects (intent-to-treat design). Mixed effects modeling was used as our primary analytical approach to account for the clustered structure of the data (i.e., repeated assessments within an individual). Specifically, we used the Mixed Model Analysis of Variance (MMANOVA) approach (Schwarz 1993), which models all available data for each subject regardless if a patient has complete data. Generalized estimating equation (GEE) methodology developed by Zeger and Liang (1986) was used for analyzing longitudinal binary responses, as

well as count data, while addressing the clustering of the data attributable to the repeated measures within patient.

## RESULTS

Results below are reported for our sample of seven (four from Boston, three from Toronto). Two additional individuals did not complete the full intake and/or did not meet the inclusion/exclusionary criteria and thus are not included in our results. The seven patients who entered SS also completed follow-up assessments.

### Participant Characteristics

**Demographics.** Participants, all outpatients, were four women (57%) and three men (43%), and had an average age of 45.89 (SD = 10.61,  $n = 7$ ). Ethnic/racial composition was five Caucasian (72%), one Black (14%); and one Asian (14%). Two (29%) of the participants were married/common-law, two (29%) were separated, two (29%) were divorced, and one (14%) had never married. Participants completed an average of 15 years formal education (SD = 3.00), and were paid an average of \$500 from employment in the past 30 days (SD = 651.15).

**Gambling.** The average age at which participants first started gambling was 25.56 (SD = 14.38). On the client self-report section of the DIGS, their top five gambling behaviors within the past 12 months (scaled 1 = never, 2 = less than monthly, 3 = monthly, 4 = weekly, 5 = daily) were as follows: slot/poker/gambling machines (2.71,  $n = 6$ ), numbers or bet on lotteries (2.57,  $n = 5$ ), commodities/high risk stocks (1.86,  $n = 2$ ), cards for money with friends (1.86,  $n = 3$ ), and bingo for money (1.71,  $n = 2$ ). Most ( $n = 6$ ; 86%) participants reported losing money in the last 12 months as a result of their gambling; 1 (14%) reported making money from gambling. The average permanent loss of money over past 12 months was \$5,743 (US or Canadian dollars). Four participants (57%) reported owing money in the past 12 months from efforts to finance their gambling, at an average of \$5,143; three (43%) participants reported owing no money. The sample had an average of four (SD = 4.38) periods of abstinence from gambling that lasted one month or more since their PG developed.

**Substance use.** Lifetime substance use on the ASI Lite was, in mean number of years: any alcohol use, 19.86 (SD = 11.39,  $n = 5$ ); alcohol to intoxication, 2.71 (SD = 4.65,  $n = 1$ ); other opiates/analgesics, .43 (SD = 1.13,  $n = 1$ ); sedatives/hypnotics/tranquilizers, .14 (SD = .38,  $n = 1$ ); cocaine, .14 (SD = .38,  $n = 1$ ); amphetamines, .43 (SD = 1.13,  $n = 1$ ); cannabis, 1.86 (SD = 2.41,  $n = 3$ ); more than one substance per day (including alcohol), 1.29 (SD = 1.98,  $n = 3$ ). In the 30 days prior to intake, the mean number of days of use were as follows: any alcohol use, 5.86 (SD = 10.92,  $n = 7$ ); alcohol to intoxication, .57 (SD = 1.51,  $n = 2$ ); cannabis, 2.86 (SD = 7.56,  $n = 1$ ); more

than one substance per day including alcohol, .29 (SD = 0.76,  $n = 1$ ).

**Trauma/PTSD.** On the THQ, all participants ( $n = 7$ ) reported having experienced all three of the following trauma types: physical abuse, sexual abuse, and general disaster/accident; in addition, three (43%) reported experiencing crime. Average age of first trauma on the PG-PTSD Timeline Interview was 13 (SD = 14.94) with an average onset of PTSD at age 16 (SD = 14.00). PTSD onset occurred before PG for six patients (86%), while one patient reported PTSD and PG onset occurred at the same time (14%). Most patients believed their PTSD and pathological gambling were related ( $n = 6$ , 86%), one did not (14%).

### Attendance and Outcome

**Attendance.** The seven patients attended an average of 18.86 Seeking Safety sessions (SD = 8.17). Five of the seven participants (72%) completed 22 sessions or more of the 25 available to them; two participants (28%) had much lower attendance (six to eight sessions) due to external reasons (one, previously unemployed, got a job and was no longer able to continue in treatment; the other lived an hour away and lacked transportation to come in).

**Outcomes.** See Table 1 for all significant results. Of the 46 variables analyzed, 20 (43.48%) were significant ( $p < .05$ ) in the across-time analysis (mixed effects modeling, using mixed model analysis of variance (MMANOVA) approach and generalized estimating equation methodology, depending on the data type and distribution). The number of positive results exceeds the number expected by chance (5% of 46, i.e., 2.3). Significant variables were as follows: on the Basis-32, the depression/anxiety subscale as well as the mean across all items; on the ASI Lite, the psychiatric and employment composite scores; on the BSI-18, the subscales for anxiety, depression, and the mean across all items; on the Helping Alliance Questionnaire, the mean across all items; on the Gamblers' Beliefs Questionnaire, the illusion of control subscale and the mean across all items; on the PCL, cluster B (re-experiencing); on the Self-Compassion Scale, the subscales for isolation, overidentified, self-judgment, and the mean across all items; on the TSC-40, the anxiety, dissociation, sexual abuse trauma index, and sex problems subscales, and the mean across all items. All significant results were in the direction of improvement over time, except for the ASI Lite employment composite. The latter may reflect a measurement issue (one patient left the study because he found employment and did not complete the scale).

Three variables (6.52%) were trends (i.e., had significance between  $p < .05$  and  $p < .10$ ): the ASI Lite (medical composite score), the Gamblers' Beliefs Questionnaire luck/perseverance subscale, and the World Assumptions Scale benevolence subscale.

**TABLE 1**  
**Significant Outcome Results**

Scale	Intake	1 Month	2 Month	3 Month	4 Month	5 Month	End of Treatment	Across Time (Fixed Effects) F (df), p
Basis-32 <sup>4</sup>								
Depression and anxiety	1.38 (1.06)	1.31 (.86)	1.28 (1.00)	1.23 (.99)	1.67 (1.13)	.88 (.67)	.75(.64)	30.32 (6, 2.74), .012
Mean across all items	1.35 (.80)	1.17 (.72)	1.14 (.83)	1.08 (.74)	1.29 (.83)	.77 (.41)	.70 (.62)	1086.96 (6, 5.60), .000
ASI Lite <sup>4</sup>								
Employment	.45 (.34)						.49 (.25)	6.96 (1, 6.66), .035
Medical*	.56 (.33)						.47 (.40)	4.80 (1, 6.24), .069
Psychiatric	.45 (.26)						.25 (.29)	6.47 (1, 6.44), .041
Brief Symptom Inventory -18 <sup>1</sup>								
Anxiety	1.71 (1.21)	1.11 (1.19)	1.19 (.92)	1.27 (.98)	1.30 (.82)	0.71 (.55)	0.86 (.89)	3.19 (6, 24.05), .019
Depression	1.45 (1.09)	1.31 (1.13)	1.44 (1.03)	1.30 (.84)	1.43 (1.08)	0.70 (.79)	0.89 (1.02)	2.85 (6, 24.53), .030
Mean across all items	1.40 (1.04)	0.90 (.93)	1.15 (.86)	1.17 (.93)	1.20 (.93)	0.54 (.42)	0.63 (.65)	3.16 (6, 25.62), .019
Helping Alliance Questionnaire <sup>2</sup>								
Mean across all items		5.07 (.36)					5.30 (.41)	10.46 (1, 5.17), .022
Gamblers' Beliefs Questionnaire <sup>3</sup>								
Luck/perseverance*	4.35 (1.12)						5.44 (1.21)	4.97 (1, 5.55), .071
Illusion of control	3.71 (1.05)						4.65 (1.41)	15.16 (1, 5.21), .011
Mean across all items	4.11 (.96)						5.13 (1.21)	8.26 (1, 5.44), .032
PTSD checklist <sup>1</sup>								
Criterion B	15.00 (3.77)	12.00 (5.97)	12.40 (5.32)	11.60 (5.32)	12.20 (4.44)	10.25 (2.06)	10.00 (2.83)	2.51 (6, 25.91), .047
Self-compassion Scale <sup>4</sup>								
Isolation	3.36 (.88)						2.42 (.85)	14.26 (1, 5.09), .012
Overidentified	3.29 (1.18)						2.29 (.77)	16.37 (1, 6.21), .006
Self-judgment	3.46 (1.12)						2.50 (.78)	12.36 (1, 5.32), .015
Mean across all items	2.59 (.74)						3.32 (.63)	9.98 (1, 5.53), .022
Trauma Symptom Checklist-40 <sup>1</sup>								
Anxiety	1.11 (.57)	.70 (.46)	.74 (.51)	.73 (.73)	.96 (.66)	.39 (.23)	.26 (.17)	3.03 (6, 24.26), .023
Dissociation	1.17 (.66)	.67 (.63)	.83 (.67)	.87 (.52)	1.03 (.81)	.54 (.25)	.50 (.51)	2.66 (6, 27.03), .037
Sexual abuse trauma index	1.14 (.70)	.61 (.59)	.64 (.49)	.71 (.42)	1.03 (.72)	.57 (.26)	.52 (.49)	3.21 (6, 27.02), .016
Sex problems	1.00 (.55)	.73 (.41)	.54 (.34)	.83 (.19)	.73 (.34)	.69 (.43)	.58 (.59)	2.55 (6, 27.19), .043
Mean across all items	1.21 (.57)	.88 (.48)	.93 (.49)	.92 (.45)	1.03 (.61)	.66 (.12)	.60 (.36)	3.27 (6, 27.04), .015
World Assumptions Scale <sup>5</sup>								
Benevolence*	3.95 (.75)						4.54 (.75)	4.78 (1, 5.57), .075

Notes: Blank spaces indicate the scale was not administered at that timepoint. All variables are subscales, except for means across all items as indicated. Trends are indicated with an asterisk.

<sup>1</sup>Higher score indicates more pathology.

<sup>2</sup>Higher score indicates a better therapeutic alliance.

<sup>3</sup>Higher score indicates less cognitive distortions related to gambling.

<sup>4</sup>Higher score indicates less self-compassion for subscales, more self-compassion for mean across all items.

<sup>5</sup>Higher score indicates more positive assumptions.

The 23 nonsignificant variables were from the Basis-32 (four subscales—daily living and role functioning; impulsive and addictive behavior; psychosis; and relation to self and others); the ASI Lite (alcohol, drug, family, and legal); the BSI-18 (somatization); the PTSD Checklist

(criteria C, D, and mean across all items); the Self-Compassion Scale (self-kindness, common humanity, and mindfulness); the Trauma Symptom Checklist-40 (depression and sleep); the World Assumptions Scale (meaning, self world, and mean across all items); as well as the

mean across all items on the following scales: the Coping Scale, the Gambling Self-Efficacy Questionnaire, and the Gambling Symptom Assessment Scale. Of these nonsignificant outcome results, the vast majority (19 of 23, 82.61%) were in the direction of improvement between intake and end of treatment.

### Treatment-Related Variables

**Alliance.** On the Helping Alliance Questionnaire, scaled 1–6 (with higher indicating greater alliance), the mean was 5.07 (SD = 0.36) at month one and 5.30 (SD = 0.41) at the end of treatment, indicating strong adherence at both timepoints, with a significant increase in alliance over time (per Table 1).

**Concurrent treatment.** The categories on the TSR are alcohol/drug, medications, any psychotherapy (group and/or individual), and self-help groups. Patients reported the number of days out of the past 30 they used such services. Means over the seven time-points ranged from .86 (SD = .25) to 2.43 (SD = 1.02) for alcohol/drug services, .22 (SD = .38) to .83 (SD = .62) for psychotherapy, 0.00 to 4.20 (SD = 1.58) for self-help, and .57 (SD = .53) to 1.00 (SD = 0.00) for medication. On the TSR, there were no significant differences for service utilization between intake and end of treatment, which can be seen as positive (i.e., participants did not increase in their service utilization during the study). However, the TSR is not an outcome measure per se, but rather an indication of ancillary treatments.

## DISCUSSION

We believe this project represents an important scientific step in greater understanding of treatment for comorbid PG and PTSD. This represents the first-ever treatment study for this comorbid population, who are estimated to be substantial and clinically important.

We elected to study SS as it is the only model thus far identified as effective for comorbid addiction and PTSD. Our methodology was an uncontrolled pilot trial. Our research design was rigorous as possible within the framework of a pilot, including standardized diagnostic interviews and other assessments; minimal exclusionary criteria (to select a generalizable sample); the use of three clinicians (and not including the developer of SS); measures selected for their relevance to SS and PG/PTSD, and strong psychometrics; and sophisticated longitudinal data analyses.

Our results indicated several key findings. First, SS showed positive outcomes across numerous domains, including PTSD, gambling, functioning, psychopathology, self-compassion, and alliance. Second, the model was highly acceptable to patients, as evidenced by the strong attendance rate. These results are particularly notable as SS was not modified for PG for this project beyond the flexibility inherent in the model. Third, our sample reported PTSD onset prior to PG, and a perception that the disorders were related. These findings are consistent with the literature on PTSD/substance use disorder comorbidity, an area that has had more empirical study than PTSD/PG comorbidity (Ouimette & Brown 2002).

The project's limitations are also evident: a small sample size, lack of a control condition, and no follow-up period. A next scientific step would be a larger randomized controlled trial to compare SS to treatment-as-usual or to an active PG or PTSD treatment. Additional questions for future research include the following: how might gender, minority and other sample-related characteristics impact outcomes? Might a peer-led version of SS provide greater expansion into the community (given the known difficulties of engaging problem gamblers in treatment; see Najavits 2010a, b)? Interviewing PG/PTSD patients about their treatment preferences might also yield important insights about the dissemination and implementation of models relevant to them.

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