

A Brief Clinical Screen for Problem Gambling

Report on the Performance of the NODS-CLiP and
the NODS Among Treatment-Seeking Problem
Gamblers

Rachel A. Volberg¹
Ingrid M. Munck²
Nancy M. Petry³

¹President, Gemini Research, Northampton, MA.

²President, Statistika Munck, Stockholm, Sweden.

³University of Connecticut Health Center, Farmington, CT.

Abstract

The study addresses the urgent need for a brief screening test for problem gambling that can be used by clinicians in a range of health settings. The study entailed secondary analysis of data from several problem gambling treatment studies to determine if an existing short screen, developed on the basis of population studies, performs equally well in clinical settings. We found that endorsement rates of individual problem gambling screening items vary substantially by gender, age and ethnicity as well as severity of the disorder. The three-item NODS-CLiP that we originally set out to examine performs very well across all four of the samples of treatment-seeking problem and pathological gamblers. However, extremely high endorsement rates among two of the four samples prevented us from exploring the validity and reliability of the NODS or the NODS-CLiP among these respondents. In populations with extremely high rates of pathological gambling, it seems likely that only one or two items are needed to screen for the disorder. In populations with base rates that are high but not extreme, the three-item NODS-CLiP (in both its lifetime and past-year formats) performs well. Additional analyses highlight the differential ability of the individual lifetime and past-year NODS items to discriminate between more and less severe pathological and problem gamblers.

Acknowledgement

The authors wish to acknowledge Marianna Toce-Gerstein whose work in identifying the NODS-CLiP among respondents in the U.S. Gambling Impact and Behavior Study served as the foundation for the work presented here.

Table of Contents

Introduction	1
Review of Existing Screens	1
Methods	4
Sample	4
Analytic Approach	5
Results	6
Lifetime and Past Year NODS Rates	6
Endorsement of Individual Items	7
Identifying the Best Performing Items	15
Performance of the NODS-CLiP in Relation to the NODS	17
Performance of the NODS-CLiP in Relation to the SOGS	19
Performance of the NODS-CLiP by Gender, Age and Ethnicity	21
Performance of the NODS (Lifetime and Past-Year)	21
Discussion	29
Limitations	29
Conclusions	29
Future Directions	31
References	33

List of Tables

Table 1: Features of the Four Studies	5
Table 2: Demographic Characteristics of the Four Study Samples	5
Table 3: NODS Classification for Four Treatment-Seeking Samples	6
Table 4: Endorsement of Lifetime NODS Items	7
Table 5: Rank Order of Lifetime NODS Items Among Brief Intervention Samples	8
Table 6: Rank Order of Lifetime NODS Items Among CBT Samples.....	9
Table 7: Endorsement of Past Year NODS Items	10
Table 8: Endorsement of Lifetime NODS Items in General Population & Treatment Seeking Samples.....	10
Table 9: Endorsement of Lifetime NODS Items by Gender.....	11
Table 10: Endorsement of Lifetime NODS Items by Age	12
Table 11: Endorsement of Lifetime NODS Items by Ethnicity	14
Table 12: Performance of Lifetime NODS-CLiP	17
Table 13: Performance of Past Year NODS-CLiP	19
Table 14: Performance of Lifetime NODS-CLiP in Relation to SOGS.....	19
Table 15: Performance of Past Year NODS-CLiP in Relation to SOGS.....	20
Table 16: Principal Component Analysis (Full NODS)	23
Table 17: Principal Component Analysis (Gambling Behavior Only)	24
Table 18: Endorsement of Lifetime NODS Items by Lifetime NODS Severity	25
Table 19: Discriminatory Power of Lifetime NODS Items by Lifetime NODS Severity	26
Table 20: Endorsement of Past-Year NODS Items by Lifetime NODS Severity	27
Table 21: Discriminatory Power of Past-Year NODS Items by Lifetime NODS Severity.....	28

Introduction

There is a broad underlying assumption among clinicians and researchers that gambling-related difficulties are a robust phenomenon that exist in the community and can be measured. Despite agreement at this fundamental level, there is disagreement about how to conceptualize and measure gambling-related difficulties. Nevertheless, the pragmatic demands imposed by the rapid expansion of legalized gambling worldwide have meant that researchers and clinicians continue to seek out or develop relatively brief, easily administered measures to assess the extent and degree of problem gambling in a range of settings. For a variety of reasons, including lack of funding for basic psychometric research as well as the importance of establishing and maintaining comparability over time and across jurisdictions, researchers and clinicians have continued to use only a few tools to serve sometimes disparate purposes (Thomas, Jackson, & Blaszczynski, 2003).

Valid and reliable screening measures are vitally important tools in the public health armamentarium and can serve multiple purposes. The gambling field is not unique in its need for brief screening tools that can be utilized in both clinical and population research settings. In the alcohol field, there are now a number of brief screening tools that employ subsets of items from longer, standardized assessments to efficiently filter out most individuals who would not be positively identified using the longer screen while yielding minimal loss of cases as false negatives (Bush, Kihlavan, McConell, Fihn, & Bradley, 1998; Cherpitel, 2002; Cherpitel, Ye, Moskalewicz, & Swiatkiewicz, 2005; Dawson, Grant, Stinson, & Zhou, 2005; Pokorny, Miller, & Kaplan, 1972). As with alcohol use disorders, there is good evidence that even very short screens can be as effective as longer screening measures in the initial identification of depression in clinical and population settings. For example, a recent meta-analysis demonstrated that a 2-item screen is effective in identifying clinical depression among adults in primary care settings (U. S. Preventive Services Task Force, 2002). In reviewing methods for screening for family and intimate partner violence, Nelson et al. (2004) identified a number of brief screens that have been developed for use in emergency hospital settings.

While several short assessment tools for problem gambling have been developed, none of these screens are well-known or widely used, even within the problem gambling services environment. Consequently, gambling problems are infrequently detected, referred or treated outside of specialized gambling treatment units. This report describes a study designed to examine the performance of one of the brief screening tests for problem gambling. We believe that this psychometrically validated screen will be of use to clinicians in a range of health settings for the purpose of identification although administration should be followed by further assessment to establish a diagnosis of problem or pathological gambling—that is, ascertain whether such individuals were properly classified by the initial screen. The purpose of this investigation is to determine if this brief screening test for problem gambling—the NODS-CLiP—performs as well in clinical settings as in the population surveys where the short screen was developed.

Review of Existing Screens

As a growing number of jurisdictions mandates screening for problem and pathological gambling in substance abuse and mental health treatment settings, the need becomes even more urgent for a

practical, psychometrically valid assessment tool in these settings—one that is easy to use and score without extensive training, that requires minimal administration time and that can be easily followed by more extensive assessments or by referral to specialist treatment programs. In this section, we review the development and performance of several short problem gambling screens, presented in chronological order.

The EIGHT Screen

The earliest short screen for problem gambling was developed by Sullivan (1999) for use in primary care and clinical settings. The EIGHT Screen was intended to serve as a filter for further screening or a clinical interview. Items for the screen were selected from existing screens, including the South Oaks Gambling Screen (SOGS; Lesieur & Blume (1987)), the DSM-IV criteria and the Gamblers Anonymous 20 Questions (GA-20). Formal validation involved administering a list of 35 items to problem gamblers in treatment and to non-problem gamblers in a community sample. Analysis showed that eight of these items were able to differentiate problem gamblers from non-problem gamblers on the basis of their SOGS score. Based on the SOGS, a cutoff score of four on the EIGHT Screen was found to maximize sensitivity and specificity of the test. The EIGHT Screen demonstrated acceptable internal consistency and test-retest reliability. The EIGHT Screen has a simple scoring format and has been used in primary health care, prisons and other settings in New Zealand (Delfabbro & LeCouteur, 2003). One significant concern is that the EIGHT Screen is almost as long as the nine-item Problem Gambling Severity Index (PGSI; Ferris & Wynne (2001)) and some DSM-IV based measures, suggesting that it might be better to use these measures from the outset.

Lie-Bet Screen

The Lie-Bet Screen consists of two items extracted from the DSM-IV with a dichotomous (yes-no) response format (Johnson et al., 1997). The Lie-Bet Screen was derived from a 12-item scale based on the DSM-IV criteria that was administered to 191 members of Gamblers Anonymous and 171 employees of a Veterans Administration Medical Center. The authors used discriminant analysis to identify the items that best differentiated between the two groups. Further validation with 146 problem gamblers and 277 controls was carried out (Johnson, Hamer, & Nora, 1998). Oddly, the Lie-Bet Screen has not performed satisfactorily in screening for problem gambling in specialized treatment programs in three U.S. states (Rugle, 2004).

Despite impressive psychometric results in its initial development, the Lie-Bet Screen has not been widely used. An exception is the first national prevalence surveys of adolescents and adults conducted in Norway (Götestam, Johansson, Wenzel, & Simonsen, 2004). Noting the need for a rapid screening tool for pathological gambling, the Norwegian researchers examined the performance of the Lie-Bet Screen in large adult and adolescent general population samples in Norway. While the items performed poorly as a screen for pathological gambling *per se*, a positive response to one or both items did perform well with respect to the detection of individuals with DSM-IV scores of 3 or more. The Lie-Bet Screen correctly detected over 90% of DSM-IV defined problem and pathological gamblers (11 of 12 adults; 180 of 194 adolescents). There were also 146 people incorrectly classified as having problems (false positives). With respect to screening, if administration of the full screen was confined to people in the Norwegian prevalence surveys who scored positive on the Lie-Bet Screen, only 196 people would have

needed to be assessed fully at the cost of missing 15 people with problems. As Neal, Delfabbro and O’Neil (2005) note in relation to the Lie-Bet Screen, the search for a very efficient surrogate for longer scales is a worthwhile endeavour. Clearly, further investigation of the Lie-Bet Screen in other settings and in relation to other measures is warranted.

Reduced SOGS Measures

In a recent review, Abbott and Volberg (2006) concluded that the high level of correlation amongst all of the existing problem gambling measures suggests that consideration should be given to further refinement of the SOGS, including retention of the better performing items and removal of those that have become obsolete or fail to reflect problems in some groups.

One research team in the U.S. has already undertaken work in this direction. Strong et al. (2004) used modern test theory to identify a reduced set of items from the SOGS that perform well in both community and clinical samples. These researchers initially identified a subset of 15 items from the original SOGS that demonstrated significant stability across community and clinical samples and a good relationship to the DSM-IV criteria in the clinical sample. In a subsequent study, Strong et al. (2003) again used Rasch modelling to identify a subset of six items from the original SOGS that predicted problem gambling severity equally well in a large sample of U.S. college students and in a separate sample of treatment-seeking pathological gamblers. While potentially quite useful, this shortened version of the SOGS consists of one highly subjective item (“Did you ever gamble more than you intended to?”) and five items that address financial issues. This set of items entirely ignores other personal and social factors that may influence an individual’s ability to control their gambling.

The NODS-CLiP

A critical challenge in population-based studies of problem gambling is the relative infrequency of the disorder in the general population. The NODS-CLiP was developed as a result of the need among population researchers for a screening procedure that would minimize respondent burden and reduce the expense of community studies of problem gambling. Toce-Gerstein and Volberg (2003) used data from eight different national and statewide surveys that included the NODS—a DSM-IV-based assessment developed for the national problem gambling prevalence survey in 1998 (Gerstein, Volberg, Harwood, Christiansen, & al, 1999)—to identify a subset of three lifetime questions to which 99% of the NODS-classified pathological gamblers (NODS=5 or more) and 94% of NODS-classified problem gamblers (NODS=3 or 4) answered at least one in the affirmative. This new screen was dubbed the NODS-CLiP to remind users of the three criteria assessed using this screen (Loss of **Control**, **Lying** and **Preoccupation**). Subsequent analysis suggests that the lifetime NODS consists of three distinct factors and the three items that make up the NODS-CLiP each assess one of these factors (Toce-Gerstein & Gerstein, 2005).

The NODS-CLiP questions by themselves, while proving to be just as sensitive to problem and pathological gambling in general population surveys as the full NODS screen, are not sufficiently specific to be useful as a stand-alone screen in population surveys. Toce-Gerstein and Volberg (2003) suggested that further refinement or analysis of NODS items was needed to identify a reduced set of screening items with adequate specificity and sensitivity for use as a stand-alone screen.

The developers of the NODS-CLiP were unprepared for the tremendous interest in the short screen among clinicians working in gambling treatment programs as well as in alcohol and drug programs. In retrospect, it seems obvious that a three-item screen, even if it must be followed by an additional three-minute battery of questions to confirm or disconfirm a potential diagnosis of pathological gambling, would be just as attractive to clinicians as to population researchers.

Methods

As noted above, the NODS-CLiP was developed on the basis of its performance in large population samples. The study carried out here represents another important step in the development of the NODS-CLiP. Our focus in the present study is on the performance of the NODS-CLiP as well as other items from the full suite represented by the NODS among treatment-seeking problem and pathological gamblers. As noted above, the purpose of this investigation is to determine if the NODS-CLiP performs as well in clinical settings as in the population surveys where the short screen was developed.

Sample

The sample for this study is made up of participants in four separate studies of intervention strategies for problem and pathological gamblers carried out at the University of Connecticut Health Center and funded by the U.S. National Institutes of Health (Petry, Principal Investigator). Participants in these studies were recruited primarily in response to advertisements in newspapers or on radio and television. For two brief intervention studies (Petry, Weinstock, Ledgerwood, & Morasco, 2008; Petry, Weinstock, Morasco, & Ledgerwood, Under review), respondents were screened and invited to participate in the study if they had gambled at least two days in the past two months, had wagered at least \$50 per month in the same time period and obtained a lifetime SOGS score of three or more. Exclusion criteria included acute suicidality or psychosis, low reading ability (less than 5th grade) or a desire for more intensive gambling treatment. In two studies of lengthier, cognitive behavioral interventions (Petry et al., 2006), respondents were screened and invited to participate in the study if they had gambled in the past one month and endorsed five or more of the DSM-IV criteria for Pathological Gambling in the past year. Exclusion criteria for these studies included acute suicidality or psychosis and low reading ability.

All of the participants in these studies completed extensive assessments at baseline that included the lifetime and past-year NODS as well as the lifetime and 2-month SOGS. Baseline assessments also obtained extensive information on participants' gambling frequency and quantity, demographic characteristics and a range of screens for other disorders often comorbid with problem and pathological gambling. Table 1 on the following page presents key information about the four studies, including the populations from which the samples were drawn, the intervention, the problem gambling measures administered to the respondents, and the sample size.

Table 1: Features of the Four Studies

	COLLEGE	ADULT	CBT-CM	CBT-CM+
Population	College-age problem gamblers	Adult problem gamblers	Adult pathological gamblers	Adult pathological gamblers
Intervention	Brief intervention	Brief intervention	CBT & CM	CBT, CM & psychoeducation
PG Measures	NODS Lifetime & Past Year SOGS Lifetime & Past 2 Months	NODS Lifetime & Past Year SOGS Lifetime & Past 2 Months	NODS Lifetime/Past Year SOGS Lifetime & Past 2 Months	NODS Lifetime & Past Year SOGS Lifetime & Past 2 Months
Sample Size	120	375	100	206
CBT = Cognitive & Behavioral Therapy CM = Contingency Management CM+ = Contingency Management & Psychoeducation				

The overall sample includes 801 individuals. The following table presents information about the demographic characteristics of the respondents in the four samples. As might be expected, the sample of college students is significantly younger than the samples from the three adult studies. The college student respondents are also significantly more likely to be male than respondents from the three adult studies. Respondents from the adult Brief Intervention study are significantly more diverse ethnically than respondents from the other three studies.

Table 2: Demographic Characteristics of the Four Study Samples

	COLLEGE (120)	ADULT (375)	CBT-CM (100)	CBT-CM+ (206)
Male*	85.0	59.2	65.0	53.9
Average Age*	20.4	42.3	46.4	47.9
Ethnicity*				
White	87.5	49.1	87.0	81.1
African American	2.5	33.3	7.0	13.1
Hispanic	---	15.2	2.0	3.4
Other	10.0	2.4	4.0	2.4
Note: * = $p < .001$.				

Analytic Approach

The analytic approach taken here replicates the approach taken to identify the NODS-CLiP items in the original population surveys from which it was developed (Toce-Gerstein & Volberg, 2003). After completing the analyses separately with the four different samples, the steps were repeated with the two CBT samples and the two Brief Intervention samples pooled to achieve greater statistical power. The additional analyses undertaken to identify the best-performing individual NODS items (both lifetime and past year) extend an approach developed by Toce-Gerstein and colleagues in relation to the 1998 U.S. national survey (Toce-Gerstein, Gerstein, & Volberg, 2003).

Results

Lifetime and Past Year NODS Rates

The first step in the analysis was to determine the rates of at-risk, problem and pathological gambling based on the NODS (both lifetime and past-year) for the four different samples.

As expected, the majority of each sample scored as problem or pathological on both the lifetime and past-year NODS. To remind readers, the respondents in the two Brief Intervention studies were screened in on the basis of a lifetime SOGS score of three or more while respondents in the two CBT studies were screened in on the basis of a past-year DSM-IV score of five or more. Given the different inclusion criteria for the studies, it is understandable that rates of problem and pathological gambling are extremely high among the two CBT groups, all but two of whom score as pathological gamblers on both the lifetime and past-year NODS.

The SOGS is generally a less conservative measure of gambling-related problems than any of the DSM-IV measures (Abbott & Volberg, 2006; Derevensky & Gupta, 2000). Since respondents in the two Brief Intervention samples were screened in on the basis of their SOGS scores, it is not surprising that substantial numbers of respondents in these two samples score in the non-problem (e.g., scores of zero) and at-risk (scores of one or two) categories on the basis of the DSM-IV-based NODS. One difference between the two Brief Intervention samples is that college students are more evenly distributed across the four NODS categories than the adult sample, with nearly one-third (29%) in the lifetime at-risk category compared with 14% of the adult sample.

Table 3: NODS Classification for Four Treatment-Seeking Samples

	COLLEGE (120)	ADULT (375)	CBT-CM (100)	CBT-CM+ (206)
Lifetime				
Non-problem	2.5	3.7	---	---
At Risk	29.2	13.9	---	---
Problem	30.8	21.6	---	1.0
Pathological	37.5	60.8	100.0	99.0
Past Year				
Non-problem	5.0	9.3	---	---
At Risk	34.2	23.2	---	---
Problem	34.2	24.8	---	1.0
Pathological	26.7	42.7	100.0	99.0

It is also possible to view the non-problem and at-risk gamblers in the two Brief Intervention samples as “false positives” in relation to the NODS “gold standard.” These respondents are all from the Brief Intervention samples where the inclusion criterion was a score of three or more on the lifetime SOGS. Using the NODS as the gold standard in the present case, we would be particularly interested in items that provide better specificity by not capturing these individuals with few or no gambling-related difficulties.

Endorsement of Individual Items

The Lifetime NODS

The next task was to identify the individual NODS items most likely to contribute to capturing the largest proportion of each group in the NODS typology. The following table presents information about the proportion of each sample in the study that endorsed each of the 17 lifetime NODS items. Given the different inclusion criteria used in the different studies, endorsement levels for individual items are only comparable within each sample and not across the different columns of the table.

Table 4: Endorsement of Lifetime NODS Items

Lifetime Items	COLLEGE (120)	ADULT (375)	CBT-CM (100)	CBT-CM+ (206)
Preoccupation1	65.8	64.5	91.0	95.1
Preoccupation2	35.0	58.1	82.0	82.0
Tolerance	49.2	52.5	80.0	82.5
Dependence Gate (Loss of Control)	61.7	74.1	97.0	97.1
Withdrawal	24.2	44.5	80.0	84.0
Control Gate (Failed to Stop)	29.2	50.4	93.0	92.2
Control (3+ times)	17.5	41.9	84.0	87.9
Escape1	27.5	55.5	79.0	78.6
Escape2	28.3	52.5	79.0	80.6
Chasing	82.5	78.9	93.0	92.2
Lying Gate	65.0	68.8	88.0	92.2
Lying (3+ times)	36.7	59.7	87.0	90.8
Illegal Acts	5.8	34.4	43.0	55.8
Risk Relationships1 (Friends/Family)	---	29.6	100.0	100.0
Risk Relationships2 (School)	46.7	8.8	12.0	18.3
Risk Relationships3 (Work)	3.3	21.6	34.0	32.0
Bailout	17.5	43.0	63.0	77.2

This table shows that there are substantial differences in the rates at which respondents in the four samples endorse individual NODS items. In most instances, respondents in the two CBT samples endorse individual items at a much higher rate than the two Brief Intervention samples. In most instances as well, endorsement rates among respondents in the adult Brief Intervention sample are higher than among the college student respondents. The three questions about whether gambling has caused problems in family relationships, with school and with work (Risk Relationships1, 2 and 3) are exceptions as is the question about whether gambling debts have led respondents to do something illegal (Illegal Acts). Respondents in the college student sample are significantly more likely than any of the adult respondents to endorse the question about gambling causing problems with school. None of the students endorsed the question about gambling causing problems with family or friends. In contrast, nearly one-third of the adult Brief Intervention sample and all of the CBT respondents endorsed this item. Adult respondents were more likely than the college student respondents to indicate that gambling had caused problems with work. Adult respondents were also more likely than the college students to indicate that they had done something illegal to pay for their gambling.

A rather different picture emerges when we rank order endorsement rates among respondents in the Brief Intervention and CBT samples. Among respondents in the two Brief Intervention studies, Chasing is the most heavily endorsed item, followed by questions about Preoccupation, ever lying about one's gambling (Lying Gate) and ever trying to stop, cut down or control one's gambling (Dependence Gate). In earlier analyses of NODS data from a general population survey, Chasing marked a nonclinical pattern of gambling and best served to discriminate between individuals who did not score at all on the lifetime NODS and those who scored 1 or more (Toce-Gerstein et al., 2003). It is worth noting that the three next most heavily endorsed items among respondents in the Brief Intervention samples are the three items that make up the NODS-CLiP (see highlighted items).

Table 5: Rank Order of Lifetime NODS Items Among Brief Intervention Samples

Lifetime Items	COLLEGE (120)	ADULT (375)
Chasing	1	1
Preoccupation1	2	4
Lying Gate	3	3
Dependence Gate (Loss of Control)	4	2
Tolerance	5	8
Risk Relationships2 (School)	6	17
Lying (3+ times)	7	5
Preoccupation2	8	6
Control Gate (Failed to Stop)	9	10
Escape2	10	8
Escape1	11	7
Withdrawal	12	11
Control (3+ times)	13	13
Bailout	13	12
Illegal Acts	15	14
Risk Relationships3 (Work)	16	16
Risk Relationships1 (Friends/Family)	17	15

Among respondents in the two CBT samples, the most frequently endorsed item relates to whether gambling has ever caused problems in relationships with family members or friends (Risk Relationships1) followed by the question about ever trying to stop, cut down or control one's gambling (Dependence Gate). The table on the following page shows that, beyond these two items, the rank order of endorsement rates differs for the two CBT samples. In the CBT-CM sample, these two items are followed by Chasing, then questions about having tried but not succeeded in trying to control one's gambling (Control Gate), Preoccupation, and ever lying about one's gambling (Lying Gate). In the CBT-CM+ sample, the top two items are followed by Preoccupation and then Chasing, Control Gate and Lying Gate – all of which are endorsed at equally high rates. The three items that make up the NODS-CLiP are all included in the six items most heavily endorsed in both of the CBT samples (see highlighted items).

Table 6: Rank Order of Lifetime NODS Items Among CBT Samples

Lifetime Items	CBT-CM (100)	CBT-CM+ (206)
Risk Relationships1 (Friends/Family)	1	1
Dependence Gate (Loss of Control)	2	2
Chasing	3	4
Control Gate (Failed to Stop)	3	4
Preoccupation1	5	3
Lying Gate	6	4
Lying (3+ times)	7	7
Control (3+ times)	8	8
Preoccupation2	9	11
Tolerance	10	10
Withdrawal	10	9
Escape2	12	12
Escape1	12	13
Bailout	14	14
Illegal Acts	15	15
Risk Relationships3 (Work)	16	16
Risk Relationships2 (School)	17	17

An important feature of the present study is that endorsement rates for the individual NODS items are much more variable among the Brief Intervention respondents than among the CBT respondents. Among the college students, endorsement rates range from a high of 83% (Chasing) to a low of zero (Risk Relationships1). Among the adult Brief Intervention respondents, endorsement rates range from a high of 79% (Chasing) to a low of 9% (Risk Relationships2). Among the CBT respondents, extremely high endorsement rates across the board means that there is too little variation to generate differential capture rates. All of the CBT respondents endorse the item regarding the impact of their gambling on family and friends and endorsement rates are over 60% for all other items except gambling affecting school (Risk Relationships2) and work (Risk Relationships3) and leading to illegal acts (Illegal Acts). While presenting a challenge in the present context, these results point to the excellent capacity of nearly all of the individual NODS items to identify individuals with severe gambling-related problems.

The Past-Year NODS

While endorsement rates are typically lower for the past-year items than for the lifetime items, past-year endorsement rates among these treatment-seeking problem and pathological gamblers are substantial and in stark contrast to most general population surveys. The table on the following page shows that the pattern of significantly higher endorsement rates among the CBT samples compared with the Brief Intervention samples—noted above in relation to the lifetime items—generally holds true for the past-year items. However, none of the college students and only a small proportion of the adult Brief Intervention sample felt that their gambling had caused serious or repeated problems in their personal relationships in the past year (Risk Relationships1) compared with 100% of the two CBT

samples. The pattern of much greater impacts of gambling involvement on school among the college students remains similar to the pattern noted for the lifetime NODS.

Table 7: Endorsement of Past Year NODS Items

Past Year Items	COLLEGE (120)	ADULT (375)	CBT-CM (100)	CBT-CM+ (206)
Preoccupation1	59.2	53.9	88.0	95.1
Preoccupation2	29.2	46.1	73.0	87.6
Tolerance	35.0	41.3	74.0	77.2
Dependence Gate (Loss of Control)	55.8	61.9	94.0	92.2
Withdrawal	19.2	36.3	75.0	79.6
Control (Failed to Stop)	29.2	42.1	89.0	87.9
Control (3+ times)	12.5	32.5	80.0	79.5
Escape1	22.5	47.2	74.0	76.2
Escape2	21.7	43.7	77.0	76.7
Chasing	80.8	71.5	93.0	89.6
Lying Gate	55.8	58.1	86.0	89.3
Lying (3+ times)	32.5	47.5	83.0	82.5
Illegal Acts	3.3	23.7	35.0	45.6
Risk Relationships1 (Friends/Family)	---	9.6	100.0	100.0
Risk Relationships2 (School)	42.5	1.9	6.0	3.9
Risk Relationships3 (Work)	2.5	11.2	22.0	25.7
Bailout	15.0	36.8	55.0	66.5

The following table compares endorsement rates for the individual items that make up the lifetime NODS in a recent general population survey with overall endorsement rates among the four treatment-seeking samples. The general population data is from the 2006 California Problem Gambling Prevalence Survey (Public Use File available from the California Office of Problem Gambling; see also Volberg, Nysse-Carris & Gerstein (2006)). We have chosen to include only those respondents from the California survey to whom the NODS was administered (all of whom had gambled at some time in their lives). We have included in a separate column information about endorsement rates among those respondents in the California survey who scored as problem or pathological gamblers based on the lifetime NODS. The table shows that endorsement rates among the treatment-seeking respondents in the present study are dramatically higher than endorsement rates among gamblers in the general population. This is true even for the most heavily endorsed items, such as whether individuals had ever tried to stop, cut down or control their gambling (Dependence Gate) and whether respondents had often returned another day to get even (Chasing).

Table 8: Endorsement of Lifetime NODS Items in General Population & Treatment Seeking Samples

Lifetime Items	California General Population Gamblers	California Problem & Pathological Gamblers	Treatment- Seeking Sample
	(3685)	(218)	(801)
Chasing	8.5	80.3	80.3

Lifetime Items	California General Population Gamblers	California Problem & Pathological Gamblers	Treatment- Seeking Sample
	(3685)	(218)	(801)
Dependence Gate (Loss of Control)	9.1	80.7	72.8
Preoccupation1	2.9	58.3	69.5
Lying Gate	2.4	55.0	69.3
Lying (3+ times)	0.7	45.9	58.7
Control Gate (Failed to Stop)	1.5	47.7	57.8
Preoccupation2	0.4	15.4	55.3
Escape1	2.2	47.7	54.3
Tolerance	1.4	54.6	53.7
Escape2	3.0	48.2	53.1
Withdrawal	1.2	50.5	49.7
Control (Failed to Stop 3+ times)	0.5	33.9	47.6
Bailout	0.4	30.7	43.4
Risk Relationships1 (Friends/Family)	0.4	27.1	42.7
Illegal Acts	0.2	11.0	27.7
Risk Relationships3 (Work)	0.1	4.1	15.0
Risk Relationships2 (School)	N/A	N/A	9.0

The table also shows that endorsement rates among problem and pathological gamblers in the general population are on the whole quite similar to endorsement rates in the treatment-seeking sample. Exceptions include thinking about ways to get money to gamble (Preoccupation2), doing something illegal to pay for gambling (Illegal Acts), gambling causing serious or repeated problems in personal relationships (Risk Relationships1) and gambling causing problems with work (Risk Relationships3). Endorsement rates among problem gamblers in the general population are much lower for these items than among the treatment-seeking problem and pathological gamblers in the present study although still significantly higher than rates among non-problem and at-risk gamblers in the general population.

Endorsement of Individual Items by Gender, Age and Ethnicity

Given the lack of variability in patterns of endorsement among respondents from the CBT samples, we focus here only on respondents from the college student and adult Brief Intervention samples. The following table presents differences in rates of endorsement of the lifetime NODS items by gender. Readers are reminded that 85% of respondents in the college student sample are male compared with 60% of the adult Brief Intervention sample.

Table 9: Endorsement of Lifetime NODS Items by Gender

Lifetime Items	Male (324)	Female (171)
Preoccupation1	65.7	63.2
Preoccupation2	52.2	53.2
Tolerance	51.5	52.0
Dependence Gate (Loss of Control)	67.9	77.2
Withdrawal	37.0	45.0

Lifetime Items	Male (324)	Female (171)
Control Gate (Failed to Stop)	42.5	53.3
Control (3+ times)	37.6	40.3
Escape1	44.1	57.3
Escape2	41.4	56.7
Chasing	81.5	76.6
Lying Gate	69.4	64.9
Lying (3+ times)	54.3	54.4
Illegal Acts	26.9	28.7
Risk Relationships1 (Friends/Family)	16.0	34.5
Risk Relationships2 (School)	21.9	10.5
Risk Relationships3 (Work)	20.1	11.7
Bailout	40.1	43.3

The table shows that there are substantial differences in endorsement rates of individual lifetime NODS items by gender. Several items are significantly more likely to be endorsed by women, including questions about having ever tried to cut down, control or stop gambling (Dependence Gate), having ever tried but not succeeded in cutting down, controlling or stopping (Control Gate), having gambled to escape personal problems and uncomfortable feelings (Escape1 and Escape2), and gambling having ever caused serious or repeated problems with family members or friends (Risk Relationships1). Chi-square significance tests are all below .02 for these items. Endorsement rates among men are higher than for women only for the two items assessing problems with school (Risk Relationships2) and with work (Risk Relationships3). Taken together, these differences suggest that women problem and pathological gamblers are more likely than men to have used gambling as a means to escape unhappy or uncomfortable personal situations and are also more likely to experience difficulties controlling their gambling. Male problem and pathological gamblers are more likely than women to acknowledge difficulties related to their professional lives (school and jobs).

As with gender, there are quite a number of differences in endorsement rates for individual lifetime NODS items by age. The following table presents differences in rates of endorsement of the lifetime NODS items by age. Readers are reminded that 80% of respondents aged 18-24 are from the college student sample. Only three of the 120 respondents in the college student sample are aged 25 or older (3%) compared with 92% of the adult Brief Intervention sample.

Table 10: Endorsement of Lifetime NODS Items by Age

Lifetime Items	18 – 24 (146)	25 – 44 (190)	45 and over (157)
Preoccupation1	67.1	69.5	56.7
Preoccupation2	39.7	62.6	52.2
Tolerance	52.1	56.3	45.2
Dependence Gate (Loss of Control)	63.0	74.2	74.5
Withdrawal	26.0	49.2	40.4
Control Gate (Failed to Stop)	30.1	54.9	51.0
Control (3+ times)	20.9	48.3	44.2

Lifetime Items	18 – 24 (146)	25 – 44 (190)	45 and over (157)
Escape1	31.5	62.1	47.8
Escape2	28.8	60.5	45.9
Chasing	82.2	84.2	72.0
Lying Gate	67.1	74.7	60.5
Lying (3+ times)	41.4	66.7	52.2
Illegal Acts	8.2	41.1	29.3
Risk Relationships1 (Friends/Family)	8.2	26.8	29.9
Risk Relationships2 (School)	39.7	11.1	6.4
Risk Relationships3 (Work)	5.5	27.4	15.9
Bailout	21.2	55.3	42.7

The table shows that there are substantial differences in endorsement rates of individual lifetime NODS items by age. Several items are significantly less likely to be endorsed by individuals aged 18-24 compared with older adults. These include having ever tried to cut down, control or stop gambling (Dependence Gate), having ever tried but not succeeded in controlling gambling (Control Gate) and having tried to stop gambling three or more times (Control). Individuals aged 18-24 are also significantly less likely than older adults to spend periods of time thinking about ways to get money to gamble (Preoccupation2), to have been restless or irritable when trying to control gambling (Withdrawal) and to have lied three or more times about their gambling (Lying). Finally, individuals aged 18-24 are significantly less likely than older adults to have experienced serious or repeated problems in relationships with family members or friends (Risk Relationships1), to have lost a job or missed an important career opportunity because of gambling (Risk Relationships3), to have needed a bailout from a desperate financial situation caused by gambling (Bailout) or to have done something illegal to pay for gambling (Illegal Acts).

Certain lifetime NODS items are substantially less likely to be endorsed by adults aged 45 and over than by younger adults. For example, adults aged 45 and over are significantly less likely than younger adults to have spent periods of time thinking about gambling experiences (Preoccupation1), to have often returned another day to get even (Chasing), and to have ever lied about their gambling (Lying Gate). Endorsement rates for the two items assessing Escape (Escape1 and Escape2) are highest among adults aged 24-44. Chi-square significance tests are all well below .02 for all of these comparisons.

Finally, the table on the following page presents differences in rates of endorsement of the lifetime NODS items by ethnicity. Readers are reminded that 88% of respondents from the college student sample are Caucasian and 9% are Asian or Pacific Island. By contrast, half of the respondents in the adult Brief Intervention sample are Caucasian, 33% are African American, 15% are Hispanic and only 3% are from some other ethnic group.

Table 11: Endorsement of Lifetime NODS Items by Ethnicity

Lifetime Items	Caucasian (289)	African American (128)	Hispanic (57)	Other (21)
Preoccupation1	61.2	69.5	77.2	52.4
Preoccupation2	40.8	73.4	71.9	33.3
Tolerance	45.7	58.6	70.2	42.9
Dependence Gate (Loss of Control)	66.4	80.5	73.7	71.4
Withdrawal	30.1	58.7	47.4	38.1
Control Gate (Failed to Stop)	37.3	60.5	60.7	42.9
Control (3+ times)	30.0	50.8	57.7	30.0
Escape1	40.5	60.9	63.2	47.6
Escape2	39.4	57.8	61.4	38.1
Chasing	72.0	92.2	89.5	85.7
Lying Gate	62.3	72.7	84.2	71.4
Lying (3+ times)	42.7	69.3	82.5	47.6
Illegal Acts	15.9	46.9	45.6	19.0
Risk Relationships1 (Friends/Family)	15.9	31.3	36.8	19.0
Risk Relationships2 (School)	20.1	11.7	19.3	23.8
Risk Relationships3 (Work)	9.3	24.2	40.4	19.0
Bailout	28.7	63.3	61.4	23.8

This table shows that—as with gender and age—there are substantial differences in endorsement rates of individual lifetime NODS items by ethnicity. Several items are significantly more likely to be endorsed by African American and Hispanic respondents compared with Caucasians and respondents classified as “Other.” Hispanic respondents are significantly more likely than respondents from other ethnic groups to have ever lied about their gambling (Lying Gate), to have placed larger bets to get the same feeling of excitement (Tolerance), to have needed money from others to relieve a desperate financial situation (Bailout), and to have spent periods of time thinking about gambling experiences (Preoccupation1). Hispanic respondents are also significantly more likely than those from other ethnic groups to indicate that their gambling had affected their job or career opportunities (Risk Relationship3). African American respondents are significantly more likely than respondents from other ethnic groups to have ever tried to cut down, control or stop gambling (Dependence Gate) and to have felt restless or irritable when trying to stop gambling (Withdrawal).

For several items, endorsement rates are significantly higher for African American and Hispanic respondents compared with Caucasians and Others. These include spending periods of time thinking about getting money to gamble (Preoccupation2), trying but not succeeding in controlling gambling (Control Gate), trying but not succeeding multiple times (Control), gambling as a way to escape personal problems (Escape1) and as a way to relieve uncomfortable feelings (Escape2), lying about gambling to family or friends multiple times (Lying) and serious or repeated problems in relationships with family and friends (Risk Relationships1).

Two other differences in endorsement rates along ethnic lines are noteworthy. First, endorsement of Chasing is lower among Caucasian respondents compared with respondents from other ethnic groups.

Second, endorsement of Illegal Acts is significantly lower among Other respondents than among Caucasian, Hispanic or African American respondents. Chi-square significance tests are all well below .01 for all of these comparisons except Preoccupation1.

Identifying the Best Performing Items

It would be easy to assume that the items that best capture problem and pathological gamblers in the general population also work best at capturing treatment-seeking problem and pathological gamblers. This would certainly seem to be the case with respondents from the two Brief Intervention samples. However, since this is the first time that the performance of the NODS-CLiP has been thoroughly examined among treatment-seeking problem gamblers, it is important to scrutinize the performance of different combinations of items to determine whether this is indeed the case.

Table 4 on Page 7 presents information about endorsement rates of all of the lifetime NODS items among respondents in the four treatment-seeking samples. Frequencies were run to calculate the proportion of respondents reporting one or more of all two- and three-item combinations of the lifetime NODS questions. These frequencies were then cross-tabulated by the NODS taxonomy of pathological, problem and at-risk gambling to determine the distribution of endorsing two or more items in each given combination. All combinations of items that captured at least 98% of pathological gamblers were then examined to determine whether more than 90% of problem gamblers are also captured.

Since the Brief Intervention and CBT samples are based on different selection criteria, analyses to identify the best performing items were completed first with the CBT respondents and then with the two Brief Intervention samples.

One-Item Combination

We noted above (and showed in Table 4) that all of the problem and pathological gamblers in the two CBT samples endorsed the lifetime NODS item about gambling causing problems in relationships with family members or friends (Risk Relationships1). Since this item captures all of the problem and pathological gamblers in these two samples, it is logical to conclude that—in settings where the base rate of problem and pathological gambling is extremely high—this single question will capture 100% of the problem and pathological gamblers. Further research to examine rates of endorsement of this item in other populations where base rates of problem and pathological gambling are extremely high is needed. While potentially useful for populations with high rates of pathological gambling, use of this item alone would likely capture a much smaller proportion of problem and pathological gamblers in the general population (see Table 8).

Two-Item Combinations

We next looked separately at the performance of numerous two-item combinations in the Brief Intervention samples and the CBT samples (N=306; all but two of whom were classified as pathological gamblers on the basis of the NODS). Many of the two-item combinations captured 98% or more of the pathological gamblers in the CBT samples although only the combinations that included the Dependence Gate question also captured both of the problem gamblers in the CBT samples.

Among the respondents in the two Brief Intervention samples (N=495), three items combined with Chasing to capture 98% or more of the pathological gamblers and 90% or more of the problem gamblers. These included Dependence Gate, the gate question for both Loss of Control and Withdrawal, Preoccupation1 and Escape1. Only the combination of the Dependence Gate question and Preoccupation1 captured 98% of the pathological gamblers in the Brief Intervention samples and none of the two-item combinations captured 90% or more of the problem gamblers in these samples.

To be completely thorough, we examined the performance of the two items in the present study that most closely match the questions from the Lie-Bet Screen. The question “Have you ever had to lie to people about how much you gambled?” is most closely matched by the lifetime NODS question about ever having lied to family members, friends or others about how much one gambled (Lying Gate). The question “Have you ever felt the need to bet more and more money?” is most closely matched by the lifetime NODS question about gambling with increasing amounts of money or making larger bets to get the same feeling of excitement (Tolerance). In the Norwegian general population study mentioned above, these two items captured 90% of DSM-IV defined problem and pathological gamblers—that is, those scoring three or more on a DSM-IV-based screen (Götestam et al., 2004). In the present study, these two items captured all but two of the pathological gamblers in the two CBT samples. In the two Brief Intervention samples, these two items captured 94% of the pathological gamblers but only 75% of the problem gamblers. Our results here are more similar to the performance of the Lie-Bet Screen in three U.S. state treatment programs (Rugle, 2004) than to the Norwegian general population study. Together, these results do not support the use of these two items as a screen for pathological gambling among treatment-seeking pathological gamblers.

Three-Item Combinations

Looking first at the CBT samples, we found that all of the combinations of Chasing, Dependence Gate and one other item captured all of the problem and pathological gamblers in the CBT samples. As noted above, nearly any combination of a subset of items from the NODS will do a good job of identifying problem and pathological gamblers for further screening in samples with extremely high base rates of problem gambling.

Looking at the less severely affected respondents in the two Brief Intervention samples, we found that all of the combinations of Chasing, Dependence Gate (the gate question for Loss of Control and Withdrawal) and one other item captured 98% or more of the pathological gamblers and 90% or more of the problem gamblers. While all of the combinations of Dependence Gate, Preoccupation1 and one other item captured 98% of the pathological gamblers in the Brief Intervention samples, only nine combinations of these two items with one other captured 90% or more of the problem gamblers in these samples. These included Lying Gate, Lying, Preoccupation2, Escape1, Tolerance, Escape 2, Bailout, Risk Relationships1 and Risk Relationships2.

The combination of Chasing and Dependence Gate with any other item also captured between 24% and 41% of the non-problem gamblers and between 75% and 87% of the at-risk gamblers in the two Brief Intervention samples. Beyond Chasing and Dependence Gate, all of the three-item combinations

started to lose specificity by capturing increasingly large proportions of the non-problem and at-risk gamblers in the Brief Intervention samples.

In the present context, with clinical usage predominant, the challenge is to identify the best set of items that capture problem and pathological gamblers even at the expense of including relatively large numbers of non-problem and at-risk gamblers. This suggests that a key performance characteristic is the sensitivity of the subset of items; that is, the probability that an individual with gambling problems will endorse one or more of the items. Among all of the two- and three-item combinations that we examined, the combination of Chasing, Dependence Gate and Lying Gate had the highest sensitivity (99.0%) while the original NODS-CLiP (Dependence Gate, Preoccupation1 and Lying Gate) was only slightly lower (98.7%).

Performance of the NODS-CLiP in Relation to the NODS

The Lifetime NODS-CLiP

As might be expected in a population with a high base rate of gambling problems, the NODS-CLiP performs extremely well across all four of the treatment-seeking samples included in the present study. The three-item NODS-CLiP captures 100% of the lifetime pathological gamblers and lifetime problem gamblers in the two CBT samples. The three-item NODS-CLiP captures 100% of the lifetime pathological gamblers and 96% of the problem gamblers in the two Brief Intervention samples. This three-item combination also captures 74% of the at-risk gamblers and 41% of the non-problem gamblers in the Brief Intervention samples.

It is interesting to examine the NODS-CLiP as a scored variable (ranging from zero to three). The following table presents this information for the overall combined sample. Among the pathological gamblers in the Brief Intervention samples, 9% endorse only one of the CLiP items, 29% endorse two and 63% endorse all three of the items. Among the problem gamblers in the Brief Intervention samples, 26% endorse one item, 56% endorse two items and 14% endorse all of the items. Among the at-risk gamblers in the Brief Intervention samples, 40% endorse one of the items, 29% endorse two of the items and only 5% endorse all three items. Among the small number of non-problem gamblers in these samples, six endorse one of the items and one endorses two of the items. Among the pathological gamblers in the CBT samples, less than 2% of the respondents endorse only one of the CLiP items, 14% endorse two items and 84% endorse all three of the items. One of the two problem gamblers in the CBT samples endorses one item and the other endorses two items. This analysis suggests that the NODS-CLiP may be a good proxy for problem gambling severity, at least among treatment-seeking individuals.

Table 12: Performance of Lifetime NODS-CLiP

CLiP Score	Lifetime NODS Classification				
	No Problems (17)	At Risk (87)	Problem (120)	Pathological (577)	Total (801)
None	58.8	26.4	4.2	---	4.7
One or more	41.2	73.6	95.8	100.0	95.3

CLiP Score	Lifetime NODS Classification				
	No Problems (17)	At Risk (87)	Problem (120)	Pathological (577)	Total (801)
One	35.3	40.2	26.7	5.0	12.7
Two	5.9	28.7	55.8	21.0	26.7
Three	---	4.6	13.3	74.0	55.8

The Past-Year NODS-CLiP

The next task in the analysis was to examine whether the past-year NODS items that mirror the lifetime NODS-CLiP items capture past-year problem and pathological gamblers as effectively as the lifetime items. Some problem gambling researchers have argued for the use of screening items framed in the past year because of issues of recall bias in relation to lifetime items (Abbott & Volberg, 2006). In addition, a lifetime measure tends to have less clinical utility, as clinicians are primarily interested in working with clients on addressing current issues. The purpose of this step was to assess whether use of the past-year version of the NODS-CLiP items is psychometrically sound.

Although the fit between the past year NODS-CLiP and the past year NODS typology is not quite as good as the with lifetime version, the past-year NODS-CLiP still captures 100% of the pathological gamblers in the overall sample as well as 93% of the problem gamblers. As with the lifetime version, the three-item NODS-CLiP also captures 74% of the at-risk gamblers; the past-year NODS-CLiP captures a smaller proportion of the non-problem gamblers than the lifetime version.

Considering the samples separately, the past-year NODS-CLiP captures 100% of the pathological gamblers and both of the problem gamblers as did the lifetime version. In the Brief Intervention samples, the past-year NODS-CLiP again captures 100% of the pathological gamblers and 93% of the problem gamblers. As with the lifetime version, the past-year NODS-CLiP captures significant proportions of the at-risk and non-problem gamblers as well.

Considering the past-year NODS-CLiP as a scored variable, there is again concordance between problem gambling severity in the past year and the number of CLiP items endorsed. Among the pathological gamblers in the Brief Intervention samples, 8% endorse one item, 32% endorse two items and 59% endorse all three items. Among the problem gamblers in the Brief Intervention samples, 29% endorse one item, 53% endorse two items and 11% endorse all of the items. Among the at-risk gamblers, 43% endorse one item, 30% endorse two items and less than 2% endorse all three items. None of the non-problem gamblers in the Brief Intervention samples endorse more than one past-year NODS-CLiP item. Among the pathological gamblers in the CBT samples, 2% endorse one item, 21% endorse two items and 77% endorse all three of the past-year items. As with the lifetime NODS-CLiP, one of the problem gamblers in the CBT samples endorses one item and the other endorses two items.

Table 13: Performance of Past Year NODS-CLiP

CLiP Score	Past Year NODS Classification				
	No Problems (41)	At Risk (128)	Problem (136)	Pathological (496)	Total (801)
None	70.7	25.8	6.6	---	8.9
One or more	29.3	74.2	93.4	100.0	91.1
One	29.3	43.0	29.4	4.6	16.2
Two	---	29.7	52.9	25.2	29.3
Three	---	1.6	11.0	70.2	45.6

Performance of the NODS-CLiP in Relation to the SOGS

The next step in the analysis was to examine the capture rate of the lifetime and past-year NODS-CLiP using the SOGS taxonomy as the gold standard. Readers will recall that participants in the Brief Intervention studies were recruited into the study if they obtained a lifetime SOGS score of three or more. While the criteria for the CBT studies included endorsing five or more of the DSM-IV criteria in the past year, the lifetime SOGS was also administered to these respondents. Based on the lifetime SOGS, 3% of the respondents scored as non-problem gamblers, 9% scored as problem gamblers (SOGS = 3 or 4) and 88% scored as “probable pathological gamblers” (SOGS $\geq$ 5).

The following table presents information about the proportions of respondents captured by the lifetime NODS-CLiP based on the lifetime SOGS typology. The table shows that the NODS-CLiP performs quite well in relation to the SOGS, capturing 95% of the respondents in the overall sample who score as probable pathological gamblers. The NODS-CLiP captures 83% of the less-severe problem gamblers and 35% of the small group of non-problem gamblers.

Table 14: Performance of Lifetime NODS-CLiP in Relation to SOGS

CLiP Score	Lifetime SOGS Classification			
	No Problems (23)	Problem (70)	Probable Pathological (707)	Total (801)
None	65.2	17.1	1.6	4.8
One or more	34.8	82.9	98.4	95.3
One	13.0	37.1	10.3	12.8
Two	17.4	30.0	26.6	26.6
Three	1.3	15.7	61.5	55.9

When we consider the samples separately, the NODS-CLiP again performs particularly well in the two CBT samples compared with the two Brief Intervention samples. This appears to be due to the greater severity of gambling problems among the respondents in the CBT samples, all of whom score as

probable pathological gamblers on the basis of the SOGS. Among the respondents in the Brief Intervention samples, the NODS-CLiP captures 97% of the probable pathological gamblers, 83% of the problem gamblers and 35% of the non-problem gamblers (as defined by the SOGS).

Among the respondents from the CBT samples, 2% endorse one of the CLiP items, 14% endorse two items and 84% endorse all three items. Among respondents from the Brief Intervention samples, 17% of the probable pathological gamblers endorse one of the CLiP items, 36% endorse two items and 45% endorse all three items. Among the problem gamblers, 37% endorse one item, 30% endorse two items and 16% endorse all three items. Among the non-problem gamblers, 13% endorse one item, 17% endorse two items and only 4% endorse all three of the NODS-CLiP items.

The next table presents information about the proportions of respondents captured by the past-year NODS-CLiP based on the lifetime SOGS typology. The table shows that the past-year NODS-CLiP also performs quite well in relation to the SOGS, capturing 91% of the respondents in the overall sample who scores as probable pathological gamblers. The past-year NODS-CLiP captures 66% of the SOGS-defined problem gamblers and 26% of the small group of non-problem gamblers. As with the lifetime NODS-CLiP, the three-item screen again captures 100% of the respondents in the CBT-CM samples, all of whom score as probable pathological gamblers on the basis of the SOGS. The majority of these respondents (77%) endorse all three of the past-year NODS-CLiP items while another 21% endorse two items and 3% endorse only one item.

Table 15: Performance of Past Year NODS-CLiP in Relation to SOGS

CLiP Score	Lifetime SOGS Classification			
	No Problems (23)	Problem (70)	Probable Pathological (707)	Total (800)
None	73.9	34.3	4.2	8.9
One or more	26.1	65.7	95.8	91.1
One	8.7	32.9	14.9	16.3
Two	13.0	21.4	30.6	29.3
Three	4.3	11.4	50.4	45.6

Among the respondents in the Brief Intervention samples, the past-year NODS-CLiP captures 93% of the probable pathological gamblers. One-quarter of these respondents (25%) endorse one of the past-year CLiP items, 34% endorse two items and 27% endorse all three items. The SOGS-defined probable pathological gamblers in the Brief Intervention samples are most likely to endorse two or three of the past-year CLiP items while the problem gamblers are most likely to endorse one or two of the past-year CLiP items.

The purpose of this step was to examine the performance of the NODS-CLiP in relation to the most widely-used screen in the problem gambling field. Based on these data, the lifetime NODS-CLiP performs well, capturing well over 90% of the SOGS-classified probable pathological gamblers as well as

the majority of the SOGS-classified problem gamblers. As with the lifetime NODS typology, the NODS-CLiP also seems to serve as a reliable proxy for problem gambling severity as defined by the SOGS. The past-year NODS-CLiP also performs well in relation to SOGS-defined treatment-seeking problem and pathological gamblers, although not as well as the lifetime version.

Performance of the NODS-CLiP by Gender, Age and Ethnicity

Since the three-item NODS-CLiP captures 100% of the respondents in the two CBT samples, it follows that the screen performs equally well among men and women, among respondents of different ages and among respondents from different ethnic groups.

Among respondents from the two Brief Intervention samples, the lifetime NODS-CLiP captures 91% of the male respondents and 95% of the female respondents. Like the lifetime version, the past-year NODS-CLiP also captures a smaller proportion of the male respondents in these two samples (84% vs. 89% of the female respondents).

When we examine the performance of the NODS-CLiP among the Brief Intervention respondents by ethnicity, we find that the lifetime screen performs particularly well among Hispanics and African Americans while Caucasians, Asian and Pacific Islanders and the small number of respondents classified as “Other” are less likely to endorse one of the three items. While 98% of Hispanics and 96% of African Americans score 1 or more on the lifetime NODS-CLiP, capture rates for Caucasians, Asian and Pacific Islanders and Others are 90%, 92% and 89% respectively. The picture is similar for the past-year NODS-CLiP with capture rates highest for Hispanic and African American respondents. In contrast to the lifetime screen, the past-year NODS-CLiP performs significantly less well among Caucasian respondents than among those from other ethnic groups with only 80% of these respondents captured.

To examine the capture rate of the NODS-CLiP among respondents of different ages, we classified the Brief Intervention samples into three age groups (18 to 24, 25 to 44 and 45 and over). All but three of the respondents in the college student sample are under the age of 25 and are included in the youngest age group. Half of the respondents in the adult Brief Intervention sample are between the ages of 25 and 44 and 42% are over the age of 45. Only 8% of the adult Brief Intervention sample is under the age of 25. Analysis shows that the lifetime NODS-CLiP captures 90% of the 18-24 year olds, 95% of the 25-44 year olds and 90% of the respondents aged 45 and over. Capture rates are lowest among respondents aged 55 and over with only 88% of these respondents endorsing one or more of the three-item lifetime NODS-CLiP. As with different ethnic groups, the past-year NODS-CLiP performs significantly less well among older respondents compared with younger respondents. The capture rate for the past-year NODS-CLiP is highest among 25-44 year olds (88%) and lowest among respondents in the Brief Intervention samples aged 55 and over (76%).

Performance of the NODS (Lifetime and Past-Year)

The original validation study of the NODS was based on a small sample of 40 individuals enrolled in outpatient programs for problem gambling in the U.S. and a random sample of 44 adults residing in the Chicago metropolitan area (Gerstein et al., 1999). The present study provides an opportunity to further examine the performance of the full suite of NODS items in a much larger, treatment-seeking sample.

This information is important in improving our understanding of the full NODS as well as the subset of items that capture the majority of individuals in both the general population and in treatment-seeking samples who score as problem or pathological gamblers.

Reliability of the NODS

The most widely accepted test of reliability is a measure of the internal consistency of an instrument. Given the differences across the four samples of treatment-seeking problem gamblers, we examined the reliability of the NODS separately for respondents from the CBT and Brief Intervention samples. Among the respondents from the CBT samples, the internal consistency of the lifetime NODS was not satisfactory with Cronbach's alpha of .65. It appears that the lack of variation in scores among the more severely troubled CBT respondents affected this measure of the reliability of the lifetime NODS. Among the respondents from the Brief Intervention samples, the internal consistency of the lifetime NODS was much better with Cronbach's alpha of .83. The internal consistency of the past-year NODS among the Brief Intervention samples was also good at .84.

We then examined the reliability of the NODS separately for different demographic groups, using only the Brief Intervention samples because of the lack of variability in the CBT samples. The internal consistency of the lifetime NODS among both men and women in the overall sample is very good with Cronbach's alpha of .84 among the men (N=297) and .79 among the women (N=153). The internal consistency of the lifetime NODS is also good across different age groups, ranging from .82 among individuals aged 18 to 24 (N=138) to .84 among those aged 25 to 44 (N=168) to .81 among those aged 45 and over (N=142). The internal consistency of the lifetime NODS varied little across different ethnic groups (.81 among Caucasians, .82 among African Americans and .80 among Hispanics).

Our general conclusion is that the reliability of both the lifetime and past-year NODS among treatment-seeking problem and pathological gamblers, regardless of gender, age or ethnicity, is very good.

Factor Structure of the NODS

In addition to testing the internal consistency of the lifetime NODS, we carried out a Principal Components Analysis (PCA) to examine how the individual items cluster together. As with earlier analyses and for the same reasons, we limited consideration to the respondents from the Brief Intervention samples. Table 16 on the following page shows the loadings for individual items in the lifetime and past-year NODS.

The PCA for the lifetime NODS yielded a primary component with an eigenvalue of 5.3; a secondary component had an eigenvalue of 2.4 and there were three additional components with eigenvalues of 1. The primary component in the lifetime NODS PCA accounts for 31% of the total variance while the secondary component accounts for an additional 14% of the total variance. The primary component had factor loadings of at least 0.50 for 11 of the 17 items. Items that did not load strongly on the primary lifetime component include Risk Relationships2, Risk Relationships1, Chasing, Tolerance, Risk Relationships3 and Preoccupation1.

As with the lifetime NODS, the PCA for the past-year NODS yielded a primary component with an eigenvalue of 5.0; a secondary component had an eigenvalue of 2.1 and there were three additional

components with eigenvalues of 1. The primary component in the past-year NODS PCA accounts for 29% of the total variance and the secondary component accounts for an additional 12% of the total variance. The primary component for the past-year NODS had loadings of at least 0.50 for 14 of the 17 items. Items that did not load strongly on the primary past-year component include Risk Relationships2, Risk Relationships1 and Chasing. In our view, the results of this analysis suggest that, among treatment-seeking problem and pathological gamblers, the lifetime and past-year NODS may not be measuring a single underlying construct.

Table 16: Principal Component Analysis (Full NODS)

Items	Lifetime Component Loading	Past Year Component Loading
Withdrawal	.802	.533
Control Gate (Failed to Stop)	.754	.596
Control (3+ times)	.749	.579
Dependence Gate (Loss of Control)	.683	.510
Lying (3+ times)	.609	.649
Preoccupation2	.601	.660
Bailout	.594	.659
Escape2	.539	.585
Lying Gate	.538	.595
Escape1	.525	.578
Illegal Acts	.515	.575
Preoccupation1	.491	.532
Risk Relationships3 (Work)	.458	.511
Tolerance	.441	.549
Chasing	.426	.474
Risk Relationships1 (Friends/Family)	.188	.196
Risk Relationships2 (School)	.121	.070

Table 16 shows that the strongest items in the lifetime NODS include Withdrawal, the questions about having ever tried but not succeeded in cutting down or stopping gambling (Control Gate) and having tried but failed three or more times (Control), the Dependence Gate question and the question about lying three or more times about one's gambling (Lying). The strongest items in the past-year NODS include Preoccupation2, which focuses on time spent thinking about ways to get money to gamble, needing to ask for money to get out of a desperate money situation caused by gambling (Bailout), and lying three or more times in the past year about one's gambling (Lying).

The weakest item in both the lifetime and past-year NODS scales is that which assesses experiencing difficulties with school as a consequence of gambling (Risk Relationships2). This is probably due to the small number of respondents, even among the college student sample, who felt that their gambling had caused difficulties for them in school. Other weak items in both the lifetime and past-year NODS include Chasing and experiencing serious or repeated difficulties with family members or friends as a consequence of gambling (Risk Relationships1). Three additional items, including Tolerance,

experiencing problems with work (Risk Relationships³) and spending time thinking about gambling (Preoccupation¹) also performed relatively poorly in relation to the lifetime scale.

An alternative approach is to consider the NODS items that relate to gambling **behavior** separately from the items that relate to the **consequences** of gambling involvement. This approach is supported by psychometric findings from the first British prevalence survey which suggest that the DSM-IV scale used in that study assessed two or more underlying factors with some items reflecting a “gambling dependence” dimension while others reflect “gambling-related consequences” (Orford, Sproston, & Erens, 2003; Stinchfield, 2003). Similar results have been obtained by Stinchfield (2003) in a study of treatment-seeking problem gamblers in Minnesota and by Toce-Gerstein and Gerstein (2005) in their analysis of data from the 1998 U.S. national survey.

The following table shows that the reduced NODS, focused solely on gambling behaviors, is a more homogeneous scale than the full NODS. Both the lifetime and past-year items make up a single factor that accounts for 39% of the total variance in the lifetime scale and 31% of the total variance in the past-year scale. The strongest items in the reduced lifetime scale continue to be Withdrawal, Control, Control Gate, Dependence Gate and Lying. The strongest items in the reduced past-year scale include Control Gate, Lying, Control, Preoccupation² and Escape². Eight of the 12 items in the reduced lifetime NODS load strongly on the principal component with Escape¹, Preoccupation¹, Tolerance and Chasing loading only moderately. All of the items in the reduced past-year NODS load strongly on the principal component with the exception of Tolerance and Chasing.

Table 17: Principal Component Analysis (Gambling Behavior Only)

Items	Lifetime Component Loading	Past Year Component Loading
Withdrawal	.851	.529
Control (3+ times)	.822	.638
Control Gate (Failed to Stop)	.820	.662
Dependence Gate (Loss of Control)	.771	.579
Lying (3+ times)	.568	.639
Preoccupation ²	.552	.629
Escape ²	.528	.599
Lying Gate	.516	.597
Escape ¹	.496	.576
Preoccupation ¹	.480	.555
Tolerance	.423	.557
Chasing	.411	.483

The Hierarchy Approach

In an article published in 2003, Toce-Gerstein, Gerstein and Volberg investigated the distribution of the ten DSM-IV criteria for pathological gambling among U.S. gamblers. Using data from the U.S. Gambling Impact and Behavior Study, the investigators found that most gamblers in their sample who met only one or two criteria reported Chasing. At the sub-clinical level (meeting three or four criteria), gamblers

reported elevated rates of gambling fantasy, including Lying, gambling to Escape and Preoccupation. Pathological gamblers endorsing between five and seven criteria reported marked elevations of Loss of Control, Withdrawal and Tolerance as well as Risking Relationships and needing Bailouts. The highest level pathological gamblers (endorsing between eight and ten criteria) were significantly more likely than less severe pathological gamblers to report Illegal Acts. The investigators concluded that, while dependence appears to be a hallmark of pathological gambling, it marks only one threshold in a qualitative hierarchy of disorders that begin with the common subclinical behavior of Chasing.

Extending the approach developed by Toce-Gerstein et al. (2003), we grouped respondents in the present study according to the severity of the disorder (based on their lifetime NODS score) and compared the proportions of each group endorsing individual items. The following table presents the proportion of the Brief Intervention respondents at different levels of severity endorsing the individual lifetime NODS items. The “None-Low” group includes respondents scoring zero, one or two on the lifetime NODS. The “Problem” group includes respondents scoring three or four. The “Pathological” group includes those scoring between five and seven and the “Severe Pathological” includes those scoring between eight and ten on the lifetime NODS.

Table 18: Endorsement of Lifetime NODS Items by Lifetime NODS Severity

Lifetime Items	None-Low (104)	Problem (118)	Pathological (152)	Severe Pathological (121)
Dependence Gate (Loss of Control)	49.0	61.0	75.7	94.2
Chasing	41.3	81.4	90.1	98.3
Lying Gate	34.6	59.3	73.0	98.3
Preoccupation1	17.3	58.5	80.9	91.7
Control Gate (Failed to Stop)	12.6	29.8	52.0	83.3
Escape1	12.5	30.5	59.9	83.5
Lying (3+ times)	11.5	36.8	62.9	97.5
Tolerance	11.5	38.1	61.2	87.6
Escape2	9.6	30.5	57.9	80.2
Preoccupation2	6.7	31.4	69.1	91.7
Control (3+ times)	6.0	18.3	42.1	82.3
Bailout	5.8	16.1	43.4	93.4
Risk Relationships1 (Friends/Family)	5.8	20.3	26.3	33.9
Risk Relationships2 (School)	4.8	16.9	22.4	24.8
Withdrawal	3.8	12.7	47.4	88.2
Illegal Acts	1.0	3.4	28.9	71.9
Risk Relationships3 (Work)	1.0	2.5	13.2	50.4

In the original article, levels of statistical significance were identified simply by asterisks. In our extension of this approach, we have used analyses of variance in the mean scores of each group on individual items to identify two test statistics that provide numeric measures of:

- the magnitude of the difference in the mean scores across all of the groups (F_{all}) and
- the magnitude of differences in mean scores between each group (t_{diff}).

The “F_all” statistic is obtained from a standard ANOVA test and provides a measure of each item’s ability to discriminate effectively across all of the groups. The “t_diff” statistic is derived by dividing the mean difference between the scores of two groups by the standard error for that difference. This represents a descriptive use of the t-values rather than their more standard use as tests of statistical significance. The broader purpose is to identify the best items for discriminating not only pathological and non-pathological gamblers but also groups whose scores are intermediate between these ends of the continuum. It is important to note that both the “F” and “t” values are dependent on group size which means that we can assess different items in relation to each other but we cannot compare the values across rows because the groups are different sizes. For ease of interpretation, we have colour-coded the five items in each column that perform best in discriminating across all of the groups or between two groups of increasing severity.

Table 19: Discriminatory Power of Lifetime NODS Items by Lifetime NODS Severity

Lifetime Items	F_all (across all groups)	t_diff None/Low- Problem	t_diff Problem- Pathological	t_diff Pathological- Severe Pathological
Bailout	131.90	2.09	6.06	11.15
Preoccupation2	110.94	4.73	7.94	4.80
Illegal Acts	102.88	0.51	5.93	10.04
Withdrawal	89.40	2.34	6.08	7.54
Lying (3+ times)	84.47	5.10	4.41	6.64
Preoccupation1	78.76	7.77	4.65	2.25
Tolerance	67.02	4.68	4.45	5.13
Escape1	62.21	3.13	5.60	4.54
Risk Relationships3 (Work)	59.95	0.36	2.64	9.44
Escape2	59.51	3.62	5.20	4.26
Chasing	59.18	8.61	2.07	1.95
Control Gate (Failed to Stop)	53.43	3.12	4.05	5.44
Control (3+ times)	48.73	2.18	3.96	5.73
Lying Gate	46.82	4.44	2.70	5.03
Dependence Gate (Loss of Control)	24.08	2.10	2.81	3.59
Risk Relationships1 (Friends/Family)	9.57	2.66	1.20	1.53
Risk Relationships2 (School)	6.22	2.39	1.17	0.53

This table shows that Bailout, Preoccupation2, Illegal Acts, Withdrawal and Lying are the best items overall at discriminating across groups of increasingly severe problem and pathological gamblers. The table also shows that individual items discriminate differentially between specific groups. For example, the items Risk Relationships3 and Illegal Acts are particularly ineffective at discriminating between respondents who score less than three and those who score three or four. Risk Relationships1 and Risk Relationships2 are poor discriminators across all of the groups.

When it comes to items that do discriminate effectively between groups of differing severity, the table shows that the item that discriminates most effectively between respondents who score less than three on the lifetime NODS and those who score three or four is Chasing, followed by Preoccupation1, Lying,

Preoccupation2 and Tolerance. The items that discriminate best between respondents who score three or four and those who score between five and seven on the lifetime NODS include Preoccupation2, Withdrawal, Bailout, Illegal Acts and Escape1. Finally, the items that discriminate best between respondents who score between five and seven and those who score higher on the lifetime NODS include Bailout, Illegal Acts, Risk Relationships3, Withdrawal and Lying.

If the purpose is to screen only for pathological gamblers, this analysis suggests that asking questions about preoccupation with getting money to gamble (Preoccupation2), experiencing restlessness or irritability when trying to stop gambling (Withdrawal) and having had to ask for a bailout from a desperate financial situation due to gambling (Bailout) would be the best items. However, if the purpose is to screen for individuals across a broader spectrum of severity—as would be appropriate in settings where the focus is on early intervention, for example—this analysis suggests that asking questions about returning another day to get even (Chasing), preoccupation with past gambling experiences or planning future gambling ventures (Preoccupation1) and having lied about one’s gambling three or more times (Lying) would be the best items.

In the interest of thoroughness, we repeated our analysis using the past-year NODS items but maintaining the lifetime NODS as the basis for classifying our respondents. The following table presents the proportion of the Brief Intervention respondents at different levels of lifetime severity who endorse the individual past-year NODS items.

Table 20: Endorsement of Past-Year NODS Items by Lifetime NODS Severity

Past-Year Items	None-Low (93)	Problem (111)	Pathological (149)	Severe Pathological (118)
Dependence Gate (Loss of Control)	39.8	50.9	67.3	84.0
Chasing	36.6	74.4	82.9	95.8
Lying Gate	28.0	49.1	65.3	86.8
Preoccupation1	16.1	53.2	66.4	84.7
Control Gate (Failed to Stop)	12.2	25.9	43.0	73.1
Lying (3+ times)	10.0	30.7	49.7	82.6
Escape1	8.7	27.2	50.3	72.7
Tolerance	6.1	28.7	44.6	77.3
Withdrawal	6.0	13.6	53.6	76.5
Preoccupation2	5.9	20.7	54.8	82.4
Escape2	5.8	26.7	46.3	71.2
Control (3+ times)	5.3	15.5	33.8	60.0
Risk Relationships2 (School)	4.9	14.7	17.1	8.4
Bailout	3.8	11.1	28.7	79.3
Risk Relationships1 (Friends/Family)	1.9	4.3	12.0	9.2
Illegal Acts	1.0	1.7	16.9	53.7
Risk Relationships3 (Work)	1.0	0.9	5.3	29.4

Not surprisingly, this table is very similar to Table 18 above. As with the lifetime NODS items, the Dependence Gate question is the item most frequently endorsed by respondents who score zero, one or

two on the lifetime NODS, followed by Chasing, the Lying Gate question and Preoccupation1. It is worth noting that three of these four items make up the original NODS-CLiP.

The table on the following page presents the results of our analysis of the discriminatory power of individual past-year NODS items in relation to the lifetime NODS typology. Again, for ease of interpretation, we have colour-coded the five items in each column that perform best in discriminating across all of the groups or between two groups of increasing severity.

Table 21: Discriminatory Power of Past-Year NODS Items by Lifetime NODS Severity

Lifetime Items	F_all (across all groups)	t_diff None/Low- Problem	t_diff Problem- Pathological	t_diff Pathological- Severe Pathological
Bailout	136.61	1.95	5.45	12.14
Preoccupation2	116.65	4.07	8.27	5.50
Illegal Acts	98.86	0.38	5.37	10.28
Tolerance	71.04	4.64	4.08	6.34
Withdrawal	68.74	1.58	7.04	4.67
Preoccupation1	67.52	7.43	3.52	3.17
Escape2	60.64	3.85	4.74	4.81
Escape1	58.49	3.34	5.07	4.54
Chasing	58.13	8.28	1.97	2.62
Risk Relationships3 (Work)	57.07	0.21	2.30	9.54
Lying (3+ times)	53.40	3.62	3.73	5.37
Lying Gate	45.14	4.25	3.04	4.52
Control Gate (Failed to Stop)	36.94	2.26	3.49	4.77
Control (3+ times)	24.28	1.74	3.05	3.57
Dependence Gate (Loss of Control)	24.28	1.87	3.06	3.56
Risk Relationships1 (Friends/Family)	8.47	2.21	1.85	0.65
Risk Relationships2 (School)	4.41	2.48	0.93	-0.72

This table shows that, based on past-year responses, Bailout, Preoccupation2 and Illegal Acts continue to be the best items overall at discriminating across all of the groups in our typology. The table also shows that the past-year Risk Relationships3 and Illegal Acts items remain ineffective at discriminating between respondents who score less than three and those who score three or four on the lifetime NODS. Finally, as with the lifetime items, Risk Relationships1 and Risk Relationships2 remain poor discriminators across all of the groups.

Turning to items that discriminate effectively between groups of differing severity, Chasing continues to be the strongest item discriminating between respondents who score zero, one or two on the lifetime NODS, again followed by Preoccupation1. While Lying remains an effective discriminator between these two groups in the past-year version of the scale, the Lying Gate question is stronger in the past-year scale compared with the lifetime scale. The top five past-year items that discriminate best between respondents who score three or four and those who score between five and seven on the lifetime NODS are identical to the top five items in the lifetime scale. The top three past-year items that discriminate best between respondents who score between five and seven and those who score higher on the

lifetime NODS are also identical to the lifetime scale but the next two top items are Tolerance and Preoccupation² rather than Withdrawal and Lying.

Discussion

Limitations

There are several limitations to keep in mind in considering the results of this study. The most important limitation is that all of the respondents are individuals with some level of concern about their gambling involvement and a willingness to seek help for their gambling-related difficulties. Respondents in the two CBT samples had much more severe difficulties than the respondents in the two Brief Intervention samples. Since problem and pathological gamblers seeking treatment represent only a small proportion of individuals in the general population with moderate to severe gambling-related problems (Dickerson, 1997; Volberg, 1997; Volberg et al., 2006), it is possible that the NODS-CLiP may not perform as well in samples of individuals with less severe gambling-related difficulties than those in the present study. However, since the NODS-CLiP was originally developed on the basis of its performance in large, general population samples, this seems unlikely.

Another limitation to the present study is that respondents in the CBT and Brief Intervention samples had to be examined separately because of the different inclusion criteria for these studies. As a consequence, some of our conclusions rest on less data than we would like. However, many clinical studies in the gambling studies field, and in the addictions field more generally, rely on far smaller samples than the groups investigated here.

A final limitation is that all of the respondents in the study were recruited from a single state in the Northeastern US. Although the samples are diverse, with substantial numbers of young adults, females and ethnic minorities, it is possible that the NODS-CLiP may perform differently in other jurisdictions where the demographic characteristics of the population—or of problem gamblers—are very different.

Conclusions

This report has examined the performance of a short screen developed to identify problem and pathological gamblers in general population surveys in four samples of treatment-seeking problem and pathological gamblers. Our analysis of these data leads to several conclusions. First, endorsement rates of some items from the lifetime NODS are rather different across the different study groups. For example, none of the college students in the Brief Intervention study endorsed the item asking whether gambling had caused serious problems with family members or friends. In contrast, all of the respondents in the two CBT studies endorsed this item. One possibility is that the college students—selected into the study on the basis of their lifetime SOGS score—were not yet ready to acknowledge the severe consequences related to their gambling that older and more troubled gamblers accepted. Another possibility is that these students had not yet generated significant problems with family members and friends because of their lack of life experience.

Among respondents in the two Brief Intervention samples, we identified numerous differences in endorsement rates of individual lifetime NODS items on the basis of gender, age and ethnicity. While women are more likely to endorse items related to loss of control over their gambling and escape as a motivation for gambling, men are more likely to endorse items assessing difficulties with school or work related to gambling. Young adults are less likely to acknowledge items related to loss of control as well as items assessing difficulties with personal relationships, school and work than older adults. Older adults are less likely than younger adults to acknowledge chasing their losses but more likely to acknowledge escape as a motivation for gambling. Finally, African American and Hispanic respondents are significantly more likely than respondents from other ethnic groups to endorse many of the lifetime NODS items. While the reasons for this are unclear, further exploration of the experiences of African American and Hispanic problem gamblers is clearly warranted.

Second, the fact that all of the respondents in the two CBT samples endorsed the item asking whether gambling had caused serious problems with family members or friends suggests the need for further exploration. It is possible that this question could serve as a single item screen for problem and pathological gambling among populations with extremely high base rates of this disorder (e.g., prison populations). This finding is bolstered by the results of a multivariate analysis of data from the recent California problem gambling prevalence survey which found that an item asking whether one's gambling had ever led to arguments with important people in one's life was the most significant predictor of severity of gambling problems as assessed by the lifetime NODS, with an odds ratio over 53. The authors of the California report suggest that one or more questions about such arguments might represent a fruitful new approach to screening for problem gamblers in a variety of settings (Volberg et al., 2006).

A third important finding in the present study is that while numerous two-item combinations work well among respondents in the CBT samples, such combinations do not work as well among respondents in the Brief Intervention samples. With regard to three-item combinations, we noted that all of the combinations of Chasing, Dependence Gate and one other item capture all of the respondents in the CBT samples. While several three-item combinations work well with the Brief Intervention samples, classification accuracy is highest for the combination of Chasing, Dependence Gate and Lying followed by the combination Dependence Gate, Preoccupation1 and Lying Gate (the combination that constitutes the original NODS-CLiP).

Fourth, we found that the lifetime NODS-CLiP performs well across all four samples of treatment-seeking problem and pathological gamblers. A more detailed examination of the NODS-CLiP as a scored measure suggests that this screen may serve as a good proxy for problem gambling severity. The past-year NODS-CLiP also did a good job across all four samples of treatment-seeking problem and pathological gamblers. Finally, both the lifetime and past-year versions of the NODS-CLiP were found to perform well in relation to the lifetime SOGS typology.

Fifth, we found that—across these samples of treatment-seeking problem and pathological gamblers—the NODS-CLiP performs slightly better among women than men, among Hispanics and African Americans compared with Caucasians and individuals from other ethnic groups, and among younger

individuals compared with older adults. However, capture rates for the lifetime NODS-CLiP are 90% or greater for all groups except respondents from “Other” ethnic groups and those aged 55 and over.

The present study provided an opportunity, for the first time, to examine the performance of the full suite of NODS items in a large, treatment-seeking sample. Lack of variation in both the lifetime and past-year NODS among respondents in the CBT samples led us to focus this effort only on respondents in the two Brief Intervention samples. Among these respondents (N=495), the internal consistency of both the lifetime and past-year NODS was excellent across the two samples as well as by gender, age and ethnicity. Examination of the factor structure of the NODS suggests that the scale is made up of at least two distinct factors—gambling-related behaviors and gambling-related consequences. This replicates findings from several other studies and, in our view, warrants further investigation. A second principal components analysis using the subset of 12 items assessing gambling-related behaviors yielded a more homogeneous scale as well as improvement in the proportion of total variance explained (39% vs. 31% for the lifetime scale and 31% vs. 29% for the past-year scale).

The final step in our analysis was to compare the power of the individual items that make up the lifetime and past-year NODS to discriminate between individuals at increasing levels of severity. This analysis showed that the best overall lifetime items include Bailout, Preoccupation2, Illegal Acts, Withdrawal and Lying. The best items for discriminating at the lower end of the severity scale include Chasing and Preoccupation1 while the best items for discriminating at the higher end of the severity scale include Bailout and Illegal Acts. Preoccupation2 and Withdrawal are the best items for discriminating between problem and pathological gamblers in this sample of treatment-seeking individuals. As noted above, if the purpose is to screen only for pathological gamblers, then the Preoccupation2, Withdrawal and Bailout questions provide the greatest discriminatory power. However, if the focus is on early intervention, the questions about Chasing, Preoccupation1 and Lying would provide better discrimination. Consideration of the past-year NODS items yielded results quite similar to the lifetime NODS items with the top three items identical in most cases.

Future Directions

In considering future directions for research on short screens for identifying problem and pathological gamblers in a range of settings, our results point to the following priorities:

- Further exploration of the experiences of African American and Hispanic gamblers that leads to higher endorsement rates of individual items;
- Further exploration of the blanket endorsement that gambling causes relationship problems among extreme pathological gamblers which suggests that a single question about arguments with important people in one’s life may be a good screen in populations with extremely high rates of pathological gambling; and
- Further investigation of the factor structure of gambling-related problems as well as further development of a problem gambling scale that focuses more closely on gambling-related

behaviors and, perhaps, development of a separate problem gambling scale that focuses on gambling-related consequences.

To conclude, we have noted elsewhere that work is needed to examine the underlying conceptualization of problem gambling (Volberg & Young, 2008). This report has examined the performance of a brief screening test for problem gambling as well as the full DSM-IV screen from which this brief test was drawn in a large sample of treatment-seeking problem and pathological gamblers. We believe that this analysis will be of use to researchers and clinicians working with problem and pathological gamblers. We also believe that this analysis will contribute to improvements in the measurement of problem gambling and its harms.

References

- Abbott, M. W., & Volberg, R. A. (2006). The measurement of adult problem and pathological gambling. *International Gambling Studies*, 6(2), 175-200.
- Bush, K., Kihlavan, D. R., McConell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. *Archives of Internal Medicine* 158(1789-1795).
- Cherpitel, C. J. (2002). Screening for alcohol problems in the U.S. general population: Comparison of the CAGE, RAPS4 and RAPS4-QF by gender, ethnicity, and services utilization. *Alcoholism: Clinical & Experimental Research* 26(11), 1686-1691.
- Cherpitel, C. J., Ye, Y., Moskalewicz, J., & Swiatkiewicz, G. (2005). Screening for alcohol problems in two emergency service samples in Poland: Comparison of the RAPS4, CAGE and AUDIT. *Drug & Alcohol Dependence* 80, 201-207.
- Dawson, D. A., Grant, B. F., Stinson, F. S., & Zhou, Y. (2005). Effectiveness of the derived alcohol use disorders identification test (AUDIT-C) in screening for alcohol use disorders and risk drinking in the US general population. *Alcoholism: Clinical and Experimental Research*, 29(5), 844-854.
- Delfabbro, P. J., & LeCouteur, A. (2003). *A Decade of Gambling Research in Australia (1992-2002): Implications for Policy, Regulation and Harm Minimisation*. Adelaide: University of Adelaide, Department of Psychology.
- Derevensky, J. L., & Gupta, R. (2000). Prevalence estimates of adolescent gambling: A comparison of the SOGS-RA, DSM-IV-J, and the GA 20 Questions. *Journal of Gambling Studies* 16(2/3), 227-251.
- Dickerson, M. G. (1997). *The Australian experience of the development of strategies to address gambling related problems in the community: Implications for other jurisdictions*. Paper presented at the 10th International Conference on Gambling and Risk Taking.
- Ferris, J., & Wynne, H. (2001). *The Canadian Problem Gambling Index: Final Report*. Ottawa: Canadian Centre on Substance Abuse.
- Gerstein, D. R., Volberg, R. A., Harwood, H., Christiansen, E. M., & al, e. (1999). *Gambling Impact and Behavior Study: Report to the National Gambling Impact Study Commission*. Chicago, IL: National Opinion Research Center at the University of Chicago.
- Götestam, K. G., Johansson, A., Wenzel, H. G., & Simonsen, I.-E. (2004). Validation of the Lie/Bet Screen for pathological gambling on two normal population data sets. *Psychological Reports* 95, 1009-1013.
- Johnson, E. E., Hamer, R., Nora, R. M., Tan, B., Eisenstein, N., & Engelhart, C. (1997). The lie/bet questionnaire for screening pathological gamblers. *Psychological Reports* 80, 83-88.
- Johnson, E. E., Hamer, R. M., & Nora, R. M. (1998). The lie/bet questionnaire for screening pathological gamblers: A follow-up study. *Psychological Reports* 83, 1219-1224.
- Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry* 144, 1184-1188.
- Neal, P., Delfabbro, P., & O'Neil, M. (2005). *Problem Gambling and Harm: Towards a National Definition*. Melbourne: Victoria Department of Justice, Office of Gaming and Racing.
- Nelson, H. D., Nygren, P., McInerney, Y., & Klein, J. (2004). Screening women and elderly adults for family and intimate partner violence: A review of the evidence for the U.S. Preventive Services Task Force. *Annals of Internal Medicine* 140(5), 387-396.
- Orford, J., Sproston, K., & Erens, B. (2003). SOGS and DSM-IV in the British Gambling Prevalence Survey: Reliability and factor structure. *International Gambling Studies*, 3(1), 53-65.
- Petry, N. M., Ammerman, Y., Bohl, J., Doersch, A., Gay, H., Kadden, R., et al. (2006). Cognitive-behavioral therapy for pathological gamblers. *Journal of Consulting and Clinical Psychology*, 74, 555-567.

- Petry, N. M., Weinstock, J., Ledgerwood, D., & Morasco, B. (2008). A randomized trial of brief interventions for problem and pathological gamblers. *Journal of Consulting and Clinical Psychology, 76*, 318-328.
- Petry, N. M., Weinstock, J., Morasco, B., & Ledgerwood, D. M. (Under review). Randomized trials of brief motivational interventions for problem gambling college students.
- Pokorny, A., Miller, B., & Kaplan, H. (1972). The brief MAST: A shortened version of the Michigan Alcoholism Screening Test. *American Journal of Psychiatry, 129*, 342.
- Rugle, L. (2004). *The Treatment of Problem and Pathological Gambling*. Sacramento, CA: Office of Problem and Pathological Gambling.
- Stinchfield, R. (2003). Reliability, validity and classification accuracy of a measure of DSM-IV diagnostic criteria for pathological gambling. *American Journal of Psychiatry, 160*, 180-182.
- Strong, D. R., Breen, R. B., Lesieur, H. R., & Lejuez, C. W. (2003). Using the Rasch model to evaluate the South Oaks Gambling Screen for use with nonpathological gamblers. *Addictive Behaviors 28*, 1465-1472.
- Strong, D. R., Lesieur, H. R., Breen, R. B., Stinchfield, R., & Lejuez, C. W. (2004). Using a Rasch model to examine the utility of the South Oaks Gambling Screen across clinical and community samples. *Addictive Behaviors 29*, 465-481.
- Sullivan, S. (1999). GPs take a punt with a brief gambling screen: Development of the early intervention gambling health test (Eight Screen). In A. e. a. Blaszczynski (Ed.), *Culture and the Gambling Phenomenon* (pp. 384-393). Sydney: National Association of Gambling Studies.
- Thomas, S., Jackson, A., & Blaszczynski, A. (2003). *Measuring Problem Gambling: Evaluation of the Victorian Gambling Screen*. Melbourne: Gambling Research Panel.
- Toce-Gerstein, M., & Gerstein, D. R. (2005). *Using Statistics to Explore the Diagnostic Criteria for Pathological Gambling*. Paper presented at the 19th National Conference on Problem Gambling.
- Toce-Gerstein, M., Gerstein, D. R., & Volberg, R. A. (2003). A hierarchy of gambling disorders in the general population. *Addiction 98*, 1661-1672.
- Toce-Gerstein, M., & Volberg, R. A. (2003). *The NODS-CLiP: A New Brief Screen for Pathological Gambling*. Paper presented at the 17th National Conference on Problem Gambling.
- U. S. Preventive Services Task Force. (2002). Screening for depression: Recommendations and rationale. *Annals of Internal Medicine, 136*, 760-764.
- Volberg, R. A. (1997). *Gambling and problem gambling in Oregon*. Salem, OR: Oregon Gambling Addiction Treatment Foundation.
- Volberg, R. A., Nysse-Carris, K. L., & Gerstein, D. R. (2006). *2006 California Problem Gambling Prevalence Survey: Final Report*. Sacramento, CA: Office of Problem and Pathological Gambling.
- Volberg, R. A., & Young, M. M. (2008). *Using SOGS vs. CPGI in Problem Gambling Screening and Assessment*. Toronto: Ontario Problem Gambling Research Centre.