

Pathological Gambling Among Adolescents: Massachusetts Gambling Screen (MAGS)

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This article describes the development of the Massachusetts Gambling Screen (MAGS). The purpose of the MAGS is to provide a brief clinical screening instrument that can (1) yield an index of non-pathological and pathological gambling during a 5 to 10 minute survey or interview and (2) document the first psychometric translation of the proposed DSM-IV pathological gambling criteria into a set of survey or clinical interview questions. The development data for this instrument were obtained from a survey of 856 adolescents who were students in suburban Boston high schools. The results provided evidence that weighted item scores (i.e., discriminant function coefficients) could correctly classify 96% of adolescent gamblers as pathological, in transition or non-pathological when DSM-IV criteria were employed as the conceptual referent. The results also describe the prevalence of a variety of social and emotional problems associated with adolescent gambling. Finally, the discussion examined the normalization and contemporary social context of gaming and the impact of these influences on the measurement and identification of pathological gambling.

Thanks are extended to Dr. Thomas Sharkey, Mary Kaddaras, Alan Bryce, David Shaffer, and Reingard Heller for their assistance during the development and implementation of this project.

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INTRODUCTION

During the past five years, the proliferation of American gambling has been extraordinary (Eadington, 1992). For example, between 1975 and 1985, the national per capita sales of lottery products alone increased from \$20.00 to \$97.00 (Clotfelter and Cook, 1989). More young people are gambling now than ever before: perhaps they are encouraged by the increased access to gambling provided by the development of casinos and state sponsored lotteries, the explicit endorsements by the government and the church (i.e., through advertising and product promotions), or the absence of warnings from public health officials who may feel political conflict of interest (i.e., some state public health departments derive revenue from state lottery income). Contemporary high school seniors now represent a unique group of twentieth century Americans: these young people are the only constituency who has experienced gambling that is both state sponsored and culturally approved for their entire lifetime. However, as Winters, Stinchfield, and Fulkerson (1993) recently noted, “. . . adolescent gambling has received limited research attention” (p. 63). By the senior high school year, contemporary estimates of the lifetime rate of adolescent gambling remain between 76% (Ladouceur and Mireault, 1988) and 91% (Lesieur and Klein, 1987). The prevalence of lifetime gambling among youth is very similar to the estimated 92% lifetime prevalence of adolescent alcohol use (Johnston, O'Malley, and Bachman, 1993).

Instruments designed to identify problem and pathological gamblers remain few. The South Oaks Gambling Screen (SOGS) (Lesieur and Blume, 1987) is the best known and most widely cited *clinical* screening instrument for problem and pathological gambling (Gambler's Anonymous 20 questions may be the most widely used general screening instrument). However, the SOGS originally was designed specifically to identify problem gamblers in a clinical population (i.e., patients who were already in treatment) within a clinical interview setting. Recently, Winters et al. (1993) modified the SOGS and provided initial psychometric descriptions of the SOGS-RA for use with adolescents. Like the SOGS, the SOGS-RA will provide a useful and important estimate of the prevalence of adolescent problem gambling. Neither the SOGS nor the SOGS-RA, however, was published with information about its capacity to classify correctly pathological gam-

blers who are identified by clinical criteria (e.g., DSM-III-R); however, the SOGS was found to be highly correlated with DSM-III-R (i.e., $r = .94$, Lesieur and Blume, 1987, p. 1186). In addition, both of these screens are somewhat lengthy to complete.

The present study was designed to accomplish two specific goals: (1) develop a brief clinical screening instrument that can yield an index of pathological gambling during a 5 to 10 minute survey or interview (similar in length and content to the Short Michigan Alcoholism Screening Test [SMAST] (Selzer, Vonokur, and van Rooijen, 1975)), and (2) document the first psychometric translation of DSM-IV pathological gambling criteria (American Psychiatric Association, 1993) into a set of survey or clinical interview questions. DSM-III-R has been the most widely used diagnostic criteria for the clinical identification of pathological gambling. In addition to its face validity, DSM-IV offers a meaningful revision of these previous criteria. DSM-IV describes pathological gambling in relatively precise operational terms that provide the basis for measures that are reliable, replicable and sensitive to local and regional variation. DSM-IV criteria also distinguish gambling behavior from other impulse disorders by the extent to which this activity stimulates social, vocational, psychological and biological dysfunction. These descriptions of the adverse consequences associated with gambling translate directly to the impairment domain and suggest the utility of applying specific types of clinical treatments. Finally, a DSM-IV diagnosis of pathological gambling permits an absolute estimate of "caseness" (i.e., how many people with the observed symptoms and signs might actually enter and benefit from treatment (e.g., Vaillant and Schnurr, 1988).

METHOD

Subjects

The survey development sample for this study was comprised of the entire student body from one suburban Boston high school ($N = 698$); the remaining subjects were recruited from two other high schools from similar demographic suburban Boston areas ($N = 158$). The first school was surveyed as part of a community partner program that links Harvard's Zinberg Center for Addiction Studies with a

Massachusetts community for the purpose of developing model addiction prevention, education, research and treatment programs. When two additional schools requested information about gambling so they could update their health curriculum, they also were recruited into this study.¹ Instead of surveying the entire student body, however, these two schools identified academic classrooms for the survey. These classes represented health courses that were required of all students. Sampling health classes required of all students is a sampling method that was also employed by Winters et al. (1993).

The present respondents were not a randomly selected sample. Student respondents were only representative of their suburban high schools and not the general adolescent population. The high school student respondents did not have the opportunity to self-select for this survey. Although this respondent selection strategy avoids many sampling problems commonly associated with survey research, it also restricts the generalizability of these findings to adolescent populations different from the observed sample of high school students. Nevertheless, this sampling strategy was considered acceptable for the purpose of preliminary survey development since additional confirmatory research is necessary to determine external validity and the capacity of the MAGS to discriminate other groups of respondents (e.g., substance abusers, alcohol abusers, persons with nongambling impulse disorders); this additional work is now ongoing.

The total number of high school student respondents in the present study was 856. The students were 49 percent male and 51 percent female. The mean age of the respondents was 15.6 years and they ranged from 13 to 20 years of age. No student declined to participate in this voluntary survey. However, 8 respondent surveys eventually were discarded from the data set for invalid response patterns (e.g., claiming to have never gambled but then identifying gambling related prob-

¹The Zinberg Center/Harvard Community Partner Program is one component of a long term public initiative. The first high school selected served as a sample of convenience and should not be misunderstood as a school with problematic levels of gambling. Similarly, the two other schools in this study participated because of emerging interest in educational programs about gambling and not because school officials sought prevention or treatment programs for their high school. In Massachusetts, the Massachusetts Council on Compulsive Gambling provides extensive education programs to high school students. These activities are the direct consequence of increasing interest among Massachusetts communities in government sponsored gambling activities from social, economic and psychological perspectives.

lems). This subject pool was obtained from three suburban communities that were primarily White (i.e., between 95–97 percent). African Americans comprised only 1–2 percent of the communities. The majority of students from these public schools were enrolled in college preparatory courses (e.g., 47 percent graduated to four year colleges and another 24 percent graduated to 2 year college programs). The students came from communities that were economically middle and upper middle class (e.g., median family income of more than \$51,271).

Measures: The Massachusetts Gambling Screen (MAGS) and Its Two Subscales

Since (1) the games of chance that serve as the object(s) of pathological gambling wax and wane with social approval and public popularity and (2) the essence of pathological gambling is *not* identified clinically by the differential targets of these impulses (i.e., games of chance) but rather by the presence of a disordered and disregulated impulse to gamble (American Psychiatric Association, 1993), the MAGS was not designed—as was the original SOGS—to provide information about the games people play and the extent to which money is wagered. Instead, the development of the MAGS began by examining existing instruments or items that assessed social and psychological events, experiences, and subjective states commonly associated with gambling. The MAGS was constructed to rapidly identify the biological (e.g., tolerance and withdrawal), psychological (e.g., impulse disorder and guilt) and social problems that accrue to excessive gamblers who may or may not be in treatment. The primary interest in these gambling related problems was to obtain a prevalence estimate of these events (within the past year). This index provides a reasonable assessment of the rate of similar gambling problems during the present year so that clinical resources can be allocated to meet the identified treatment “need” that may be associated with gambling.

The set of 26 MAGS items includes two distinct subscales. These subscales were comprised of (1) an original item pool and translated (to gambling) set of SMAST items yielding 14 questions, and (2) the 12 question DSM-IV (American Psychiatric Association, 1993) subscale. The DSM-IV subscale is similar in presentation to the household telephone survey developed by McAuliffe et al. (1993) for the national substance abuse needs assessment project at Harvard University. The

DSM-IV subscale of psychiatric items serves two primary functions: (1) provides a "gold standard" (i.e., criterion-related validity, DeVellis, 1991) against which the meaningfulness of the other more social (i.e., MAGS subscale) items could be evaluated and (2) provides the important opportunity to examine concurrent prevalence estimates of clinical and subclinical psychiatric and neuroadaptive symptom patterns among respondents who gamble.

Criterion-related validity furnishes evidence of a new instrument's capacity to measure the phenomena under investigation by comparing the new scale's data with results generated from an instrument with known criteria that are endorsed widely as valid. Data from both instruments must be obtained from the identical sample of respondents so that the two indices provide separate but comparable measures of the same underlying characteristic (e.g., pathological gambling). The *criteria* (e.g., DSM-IV) or standard against which the new screening instrument is evaluated should not be confused with the *method* of data collection (e.g., self-report, face-to-face or telephone interview). In the present study, identical self-report methods were employed to compare the two significant subscales under investigation: DSM-IV and MAGS. Furthermore, it is important to note that self-report, face-to-face interview and telephone survey methods have been found to yield equivalent data with regard to the collection of sensitive personal information such as the experience and intensity of depression or personal health practices (e.g., Hochstim, 1967; Wells, Burham, Leake, and Robins, 1988) so long as high response rates are obtained.

Readers should see Appendix A for the 10 DSM-IV criteria and the corresponding 12 item subscale derived from these criteria and Appendix B for additional 14 item MAGS subscale included in this survey.

Procedure

Teachers were not present during the administration of this survey. Student participation was voluntary and no identifying information was collected from those who agreed to participate. Data collectors read an informed consent form and asked students if they were willing to participate in the survey; students were free to decline participation. No student declined to participate in the data collection process.

RESULTS

Preliminary analyses revealed that there were no significant demographic differences among the three high schools participating in this project. Therefore, the three data sets were merged and analyzed as an aggregate. The analyses reported below yield results that are grouped within the following sections that focus on three major issues: (1) subscale reliability, (2) validity and discriminant analysis and (3) the prevalence of gambling associated problems.

Reliability

Subscale Reliability. The reliability of the two subscales (i.e., DSM-IV and MAGS) is an estimate of internal consistency, for example, the stability of the scale score with repeated applications. The DSM-IV 12 item subscale yielded a Cronbach alpha (Cronbach, 1951) of .87. The MAGS 7 item subscale yields an alpha of .83. These measures indicate scales “. . . perfectly adequate for use in a study comparing groups with respect to the construct being measured. Individual assessment, especially when important decisions rest on that assessment, demand a much higher standard” (DeVellis, 1991, p. 86).

Validity and Discriminant Analysis

The criterion-related validity of the MAGS was evaluated against the recently promulgated DSM-IV criteria (American Psychiatric Association, 1993). The full complement of MAGS items was entered into a discriminant analysis attempting to correctly classify membership of respondents as either pathological or non-pathological gamblers as indicated by scoring ≤ 5 or < 5 , respectively, on the DSM-IV subscale. A Wilk's lambda analysis revealed that 7 MAGS items significantly classified respondents into either pathological or non-pathological gamblers (Chi-square = 422.24, $df = 7$, $p < .0001$). These seven items are summarized in Table 1.

For each subject, the total discriminant function score represents a single summary index depicting a linear combination of the seven significant MAGS items, taking into consideration the relative weights, or influence, of each item. This index (i.e., discriminant

Table 1
Significant MAGS Items and Discriminant Function Scores

| <i>MAGS Item</i> | <i>Wilk's Lamda</i> (all items significant) <i>p</i> < .0001 | <i>Unstandardized</i> <i>Cononical Discriminant</i> <i>Function Coefficient</i> |
|--|--|---|
| Gotten in trouble at work or school | 0.62 | 1.51 |
| Neglected obligations for > 2 consecutive days | 0.54 | 1.53 |
| Relative complains about their gambling | 0.46 | 0.91 |
| Experiences pressure to gamble when not gambling | 0.45 | 0.63 |
| Arrested | 0.47 | 1.63 |
| Experiences family problems | 0.50 | 0.93 |
| Unable to stop gambling when wants to stop | 0.44 | 0.56 |
| Constant | | -0.62 |

function) is a more effective predictor of gambling pathology than the total MAGS item scores for the seven discriminating items precisely because this solution does not assume that the contribution by each item to the total index is equal (see Winters et al., 1993 for an example of an equal weighting approach). Thus, each item is represented by an empirically derived relative weight that maximizes the capacity of the index to distinguish pathological from non-pathological gamblers.

The discriminant function scores obtained by this analysis were entered into a scoring algorithm that yields a distribution of scores which serves to guide the classification of gamblers who are pathological, non-pathological, or in transition either to or from these two dichotomous conditions. These scoring guides are found in Table 2.

The predictive validity of the 7 item MAGS subscale is evidenced by its ability to classify 96% of the 589 high school students who

Table 2
MAGS Item Classification Table

| | Classification Pattern of Respondents by 7 MAGS Items | | | Totals (Total N = 546) |
|---|---|--|---|---------------------------|
| | Respondents Correctly Identified | Respondents Incorrectly Identified | 7 Item MAGS Discriminant Function Score | |
| Non-Pathological | 96.8% | 3.2% | < .00 | N = 438 |
| DSM IV Pathological | 93.8% | 6.2% | > 2.00 | N = 32 |
| Transitional or Potential Pathological Gamblers | 71 | 5 | > = .00 & < = 2.00 | N = 76 |
| | DSM-IV Groupings | | | |
| | non-pathological (DSM-IV totals = between 0-4) | pathological (DSM-IV totals = 5 or more) | | |

reported having had gambled in the past as either pathological or non-pathological gamblers. Of the students who were classified, the 7 item MAGS discriminant model classified 6.2% of high school students, who obtained a DSM-IV diagnosis as a pathological gambler, as non-pathological gamblers. Of those students who did not reach DSM-IV criteria for diagnosis, 3.2% were classified as pathological gamblers.

According to the DSM-IV criteria, 6.4% of the high school students surveyed were classified as pathological gamblers. Using discriminant scores, the 7 MAGS items identified 8.5% of the high school students as pathological gamblers.

The MAGS 7 Subscale Scoring Scheme. The total discriminant function score for any respondent can be calculated by multiplying the discriminant function coefficient in table 1 by the score for that item (either 0 or 1, i.e., no or yes); sum the resultant values across the 7 items and then add the constant to generate the total discriminant score for each subject. The total discriminant score determines (1) non-pathological gambling, (2) the presence of a transitional gambling status (i.e., at risk for relapse or moving toward pathological gambling status) or (3) pathological gambling. The discriminant score for the MAGS 7 correlated significantly with the total DSM-IV score ($r = .76$, $p < .001$, $N = 574$).

Non-discriminating MAGS Items. It is important to note that 7 other MAGS items did not discriminate DSM-IV adolescent pathological from non-pathological gamblers in spite of previously collected development data that revealed significant univariate differences for all MAGS items when comparing pathological gamblers with non-pathological gamblers. Nevertheless, the seven nondiscriminating MAGS items revealed important prevalence patterns for significant psychological and social problems that are associated with both pathological and non-pathological gamblers and therefore are retained in this version of the MAGS. Table 3 reveals the prevalence of positive responses to each of the 14 MAGS items and Table 4 presents the prevalence of positive responses to the 12 DSM-IV items.

Discriminant Function Analysis and Scale Development. As the findings above reveal, multiple discriminant function analysis and classification is a very useful statistical procedure for scale development and

Table 3
MAGS Items: Problem Prevalence

| <i>Nondiscriminating Items</i> | <i>Mean</i> | <i>Standard Deviation</i> |
|---|-------------|---------------------------|
| Pressure to start or increase the amount of gambling | 0.15 | 0.36 |
| Thought about reducing gambling | 0.15 | 0.36 |
| Thinks the amount of their gambling is abnormal | 0.15 | 0.36 |
| Friends or relatives think the amount of their gambling is abnormal | 0.45 | 0.50 |
| Gone for help about gambling | 0.04 | 0.53 |
| Gambles less, the same, or more than most others | 0.43 | 0.53 |
| <i>Discriminating Items</i> | <i>Mean</i> | <i>Standard Deviation</i> |
| Gotten in trouble at work or school | 0.08 | 00.27 |
| Neglected obligations for 2 or more consecutive days | 0.08 | 0.27 |
| Relative complains about their gambling | 0.10 | 0.30 |
| Experiences pressure when not gambling | 0.12 | 0.33 |
| Arrested | 0.06 | 0.23 |
| Experiences family or friend problems | 0.11 | 0.31 |
| Unable to stop gambling when wants to stop | 0.14 | 0.35 |

analysis. When, as in this case, discriminant function analysis is used with dichotomous variables and a target construct (i.e., pathological gambling) that conceptually should be expected to influence data variability, there is an increased likelihood of violating underlying assumptions of this technique (i.e., multivariate normality and equality of group covariances). However, "in the case of dichotomous variables, most evidence suggests that the linear discriminant function often performs reasonably well (Gilbert, 1968; Moore, 1973)" (Norusis, 1993, p. 37). Nevertheless, further analyses involving samples diverse from the one used here and the application of procedures more specific to scale construction are required and will result in methods of scoring the MAGS that likely will depart from the discriminant function

Table 4
DSM-IV Items: Problem Prevalence

| <i>DSM-IV Item</i> | <i>Mean</i> | <i>Standard Deviation</i> |
|--|-------------|-------------------------------|
| Preoccupied | 0.11 | 0.32 |
| Failed to stop when wanted | 0.11 | 0.31 |
| Bet increasing amounts to achieve same level of excitement | 0.12 | 00.33 |
| Same amount of gambling had reduced effect | 0.19 | 0.39 |
| Lied to conceal gambling | 0.14 | 0.35 |
| Gambled to regain losses | 0.30 | 0.46 |
| Experienced restlessness & withdrawal symptoms | 0.09 | 0.29 |
| Lost an important relationship | 0.07 | 0.25 |
| Gambled to avoid withdrawal symptoms | 0.08 | 0.27 |
| Gambled to escape uncomfortable feelings | 0.09 | 0.31 |
| Committed illegal acts because of gambling | 0.09 | 0.29 |
| Got bailout to rescue them from gambling debt | 0.10 | 0.30 |

equations described above. Therefore, the present scoring scheme should not be considered static. Instead, these guidelines are offered as the initial step in a developmental process.

Age, Onset, Gender, and Psychosocial Problem Patterns Among Adolescent Gamblers

Among the students who reported having gambled during their lifetime (i.e., 75% of the respondents), this survey revealed that 32.5% place their first bet before the age 11, another 56.0% first gambled between the ages of 11 and 15, and 11.5% began to gamble after the age of 15. Furthermore, students classified as pathological gamblers by DSM-IV criteria placed their first bet at a significantly younger age than their non-pathological gambling peers. Pathological gamblers placed their first bet at an average age of 9.70; their non-pathological gambling peers, however, placed their first bet at an average age of 11.62 ($t = 2.48$, $p < .01$).

The prevalence of gambling related social and emotional problems was significantly greater for adolescent males than for females. These gender differences are summarized in Table 5.

Table 5
Gender Differences and the Impact of Gambling

| <i>Problem Area</i> | <i>Male Prevalence</i> | <i>Female Prevalence</i> | <i>Univariate F (df = 1, 603)</i> | <i>Significance Level of Difference Between Prevalence Rates</i> |
|--|------------------------|--------------------------|-----------------------------------|--|
| Feels pressure to start or increase gambling | 21.1% | 7.6% | F = 21.10 | p < .0001 |
| The amount of gambling is abnormal | 18.00% | 11.0% | F = 5.52 | p < .02 |
| Friends or relatives view amount of gambling as abnormal | 49.4% | 38.1% | F = 6.62 | p < .01 |
| Feels guilty about gambling | 13.9% | 4.8% | F = 12.64 | p < .0004 |
| Relatives complain about their gambling | 15.2% | 2.2% | F = 27.45 | p < .0001 |
| Feels pressure to gamble when not gambling | 16.0% | 5.3% | F = 16.60 | p < .0001 |
| Thought about reducing their gambling | 19.0% | 9.0% | F = 10.69 | p < .001 |
| Experiencing family or friend problems because of gambling | 14.1% | 4.8% | F = 13.08 | p < .0003 |
| Gotten in trouble at school or work because of gambling | 11.0% | 3.00% | F = 12.40 | p < .0005 |
| Neglected obligations for 2 consecutive days or more because of gambling | 10.7% | 2.2% | F = 15.34 | p < .0001 |

DISCUSSION

The results obtained from this analysis of the initial version (i.e., 4.0) of the MAGS reveals four major findings. First, pathological and non-pathological adolescent gamblers can be correctly classified by a 7 item MAGS subscale (i.e., MAGS 7). This set of items has high reliability and discriminant, criterion-related, and predictive validity. Second, the 10 DSM-IV criteria established by the American Psychiatric Association (1993) were translated effectively into a 12 item subscale that also had high reliability. Third, gamblers who are in transition—as either at risk for becoming pathological gamblers or gamblers in remission (e.g., abstinent)—can also be distinguished. Fourth, and finally, this project revealed the prevalence of a wide range of important adverse social and psychological consequences that accrue to youthful gamblers.

The MAGS 7 as a Rapid Screening Instrument for Adolescents

The MAGS 7 was created to provide the field with a rapidly administered screening instrument for the identification of pathological gambling. In addition, because the DSM-IV subscale yields a standard diagnosis, this instrument also can be used to determine treatment need for allocating clinical resources. In this study, for example, the DSM-IV subscale yielded a prevalence rate for pathological gambling (i.e., DSM-IV total score equal to or greater than five) as 6.4%; the MAGS 7 items generated a higher prevalence rate of 8.5%. Both of these estimates are somewhat higher than would be expected from the adult population. However, this finding is not unusual. Lesieur (1989) noted that studies of high school and college students reveal higher prevalence rates for probable pathological gambling than among adults. For example, compared with the 1 to 3 percent rates for probable pathological gamblers among adults, rates of probable pathological gambling among high school students have been estimated between 3 and 5 percent (Lesieur and Klein, 1988). College students rates have been estimated to be between 6 and 8 percent (Lesieur, 1988). Any application of the prevalence rates provided by this study should consider that Massachusetts currently leads the nation in per capita lottery gambling with a rate of \$6.00 per person per week (Crockford, 1993). This factor might contribute to the prevalence of adolescent gambling observed in Massachusetts which, in turn, can

inflate the overall rate of pathological gambling and invalidate attempts to generalize Massachusetts rates to the rest of the nation. The higher than adult prevalence rate of high school student pathological gambling observed in this study may be due, in part, to the current trend toward normalization of gambling in America. Some evidence for this conclusion derives from the content of the MAGS items measuring social and psychological problems that failed to distinguish pathological from nonpathological gamblers.

Finally, future research must examine whether rates of adolescent gambling pathology is growing as a function of increased accessibility to gambling and reduced sanctions against gambling or, alternatively, if the present sample of respondents simply represents a biased group of adolescents who display higher than adult rates of pathological gambling. It is also important to determine whether sentient or conservative estimates of gambling pathology are desirable. More sensitive measures of gambling related dysfunction, for example, will provide clinicians with increased opportunities for secondary prevention and treatment.

Gamblers in Transition and At Risk: The Normalization of Gaming

Several of the MAGS items that failed to discriminate adolescent pathological from nonpathological gamblers were previously the cornerstone of clinical assessment in the gambling treatment field. For example, experiencing pressure to start or increase the amount of gambling, thinking about reducing gambling, thinking that the amount of one's gambling is abnormal, or having friends or relatives who think the amount of one's gambling is abnormal all failed to distinguish pathological from non-pathological adolescent gamblers. We can speculate that this finding represents empirically the observation that, for adolescents, gambling in general and some of the adverse psychosocial consequences of gambling in particular have become normalized within contemporary society. In addition, the present data reveal that more students are beginning to gamble between the ages of 11 and 15 than previously reported (e.g., Jacobs, 1989).

Measurement, Prevalence Estimation and Social Setting

Every attempt to estimate the prevalence of a disorder among the general population rests upon the interaction between (1) the measurement instruments and methods employed to construct a prevalence

index and (2) the social context that influences the meaning and experience associated with average day to day patterns of human behavior (Zinberg and Shaffer, 1985). Therefore, this discussion and the development of the MAGS must consider the shifting social milieu that is affecting adolescents who gamble, their associated experiences and the impact of this process on prevalence estimates.

The importance of social setting cannot be underestimated during any attempt to measure the prevalence of a disorder. For example, Mechanic (1968) illustrated that the dynamic confluence of social factors can, on occasion, yield unusual formulations of pathology. Mechanic (1968) described dyschromic spirochetosis, a disease characterized by spots of various colors on the skin. This disease was so common among a tribe of South American Indians that those who were absent the condition were considered abnormal and excluded from marriage because of this abnormality. Judgments and estimates of health and disease are indeed determined by the culture and context within which these occur (Mechanic, 1968).

With respect to pathological gambling, for the first time this century, Massachusetts high school students have lived their entire life within the social context of legalized gambling. Furthermore, this legalization process is accompanied by (1) state endorsed, (2) state provided, and (3) state marketed gambling (Clotfelter and Cook, 1989). The legalization of gambling has removed the formal social controls that had served to regulate gambling among many people. In addition, during the past twenty years, the widespread legalization of gambling has shifted the social climate and therefore the American zeitgeist from prohibition to social approval. Now, for example, many games of skill that were once necessary for young people to gamble (e.g., pitching cards or coins, playing card games, etc.), are no longer required. These skill requirements had served previously as informal social controls regulating how much, where or when young people could gamble. Though some forms of gambling still include a skill component, these social regulators mostly are absent. The adverse effects of gambling within a context absent informal and formal social controls are magnified further because the results of most contemporary gambling experiences are almost instantaneous—often leaving the player in a position to repeat the activity. In addition, the government, which once had been a powerful opponent of gambling, now provides and promotes opportunities to gamble. State governments create their

own lotteries and other games of chance and there is no licit competition. States have multimillion dollar marketing programs to promote and encourage gambling. In Massachusetts, for example, the state lottery mails coupons for "sample" lottery products directly to homes without regard to the presence of children. Within this social context, adolescents can minimize their adverse gambling experiences and attribute these problems to transient sources independent of gambling. The acceptance of gambling related problems as average and expectable (e.g., Shaffer and Zinberg, 1985; Zinberg and Shaffer, 1985) can both minimize the incidence of gambling disorders and reduce prevalence estimates of gambling related disorders.

The Prevalence of Adverse Consequences of Youthful Gambling

The normalization of gambling has not come without cost. The present study reveals that a meaningful percentage of young people experience troubling side effects from gambling. For example, at least 19% of those students who had gambled reported experiencing some symptoms of tolerance or withdrawal (i.e., neuroadaptation) associated with gambling, 11% have family problems, 8% have gotten in trouble at school or work, 15% have thought about reducing their gambling, and 14% have been unable to stop gambling when they want. The prevalence of these difficulties is significantly more pervasive among males than females.

Caveats and the Need for Future Research

This study presented the initial development of the MAGS, including a DSM-IV subscale, as a rapidly administered screening instrument for identifying adolescent pathological gamblers. This instrument also has application to adult populations. However, additional empirical information and discriminant function scores will need to be developed on a randomly selected and multivariate normally distributed sample of respondents since the development sample in this study was not necessarily representative of the general population. Additional adolescent research also is necessary before the MAGS items can be scored dependably for other populations and assure generalizability. For example, it is possible that some of the MAGS items which failed to discriminate adolescent pathological from non-pathological gam-

blers in this study will correctly classify adult gamblers who have not been equally socialized to legalized gaming. Similarly, in this study, one could suggest that the MAGS 7 may have overestimated pathological gambling when compared with DSM-IV projections because the adolescents in this sample of respondents were not randomly selected, biased toward the middle and upper middle class and, therefore, did not represent the general population. Alternatively, the MAGS 7 items actually may be more sensitive to gambling related psychopathology than DSM-IV since the MAGS 7 items focus on adverse social and psychological consequences of excessive gambling while DSM-IV centers on more advanced levels of psychopathology and neuroadaptation (i.e., tolerance and withdrawal). It is important to remember that the MAGS 7 and DSM-IV are not identical measures of pathological gambling. Although the present results reveal a significant correlation between the DSM-IV and MAGS 7 subscales, this relationship is not an identity. It is useful to have different indices for the same underlying construct. For example, a more sentient measurement of the consequences of excessive gambling will provide a more socially sensitive estimate of gambling related problems and therefore a higher projected prevalence rate. For adolescents, an instrument with a lower threshold for pathological gambling identification is preferable to a less delicate index. Screening instrumentation with a lower identification threshold will provide a better chance to mobilize resources for early intervention and secondary prevention than a screen without such sensitivity. Under these conditions prevention and treatment specialists can maximize the opportunity to interrupt the integration of a new emerging pattern of pathological behavior among a youthful population.

CONCLUSIONS

Once the MAGS identifies individuals who are at risk or in need of treatment for pathological gambling, instruments like the SOGS, designed specifically for in-treatment screening, are available to clarify the specific nature and extent of gambling behaviors and the degree to which these are problematic. Thus, the MAGS should be employed most effectively as only one step in the screening, identification and treatment process. Eventually, prospective studies will be necessary to

determine the precision of the classification scheme described in this article. These longitudinal projects will help (1) determine the movement of at risk gamblers and (2) identify the early warning signs and symptoms associated with pathological gambling within the shifting context of socially approved gaming.

Examining the effectiveness of the MAGS prospectively and on other populations (e.g., adults) will continue the process of developing a normative database. In addition, since the present sample was not randomly selected, random, socially stratified surveys also must be completed to provide comprehensive, representative and confirmatory data. This is necessary since the background or social context of gambling behavior is changing rapidly. In the context of normalized gambling, a wider variety of people will gamble, increasing the potential for problem and pathological gambling. Alternatively, in an environment where gambling is prohibited, gamblers will be over represented by antisocial personality characteristics thus confusing the effects of excessive gambling with the possible causes (e.g., Zinberg and Shaffer, 1985). Any attempt to measure gambling related psychopathology inherently provides an index of the shifting social setting (e.g., Shaffer and Zinberg, 1985; Zinberg, 1984; Zinberg and Shaffer, 1985).

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APPENDIX A

Proposed DSM-IV (American Psychiatric Association, 1993) Diagnostic Criteria for Pathological Gambling (Indicated by at Least 5 of the Following)

1. preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)

2. needs to gamble with significantly increasing amounts of money in order to achieve the desired excitement (i.e., tolerance)
3. restlessness or irritability when attempting to cut down or stop gambling (i.e., withdrawal)
4. gambles as a way of escaping from problems or relieving dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)
5. after losing money gambling, individual often returns another day in order to get even (“chasing” one’s money)
6. lies to family members or others to conceal the extent of involvement with gambling
7. illegal acts, such as forgery, fraud, theft, or embezzlement committed to finance gambling
8. has jeopardized or lost a significant relationship, job, educational or career opportunity because of gambling
9. reliance on others or institutions to provide money to relieve a desperate financial situation produced by gambling (i.e., a “bailout”)
10. repeated unsuccessful efforts to control, cut back, or stop gambling

Specific Data Needs for DSM-IV Diagnosis

To determine the presence of pathological gambling and potential treatment need, the MAGS determines if individuals meet the proposed DSM-IV criteria for pathological gambling. The MAGS makes this diagnosis for the past 12 months to reflect current treatment need status rather than lifetime treatment need which inaccurately can reflect those individuals who are in transition (e.g., full or partial remission, or those who have some symptoms but do not meet diagnostic criteria).

DSM-IV Criteria and Corresponding DSM-IV Subscale Items

Criterion 1: preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble.

1. Item: Have you been preoccupied with thinking of ways to get money for gambling or reliving past gambling experiences (e.g., handicapping) during the past 12 months?

Criterion 2: needs to gamble with significantly increasing amounts of money in order to achieve the desired excitement (i.e., tolerance symptoms).

1. Item: During the past 12 months, have you gambled increasingly larger amounts of money to experience the desired level of gambling excitement?
2. Item: Did you find during the past 12 months that the same amount of gambling had less effect on you than before?

Criterion 3: restlessness or irritability when attempting to cut down or stop gambling (i.e., withdrawal symptoms).

1. Item: Has stopping gambling or cutting down how much you gambled made you feel restless or irritable during the past 12 months?
2. Item: Have you gambled during the past 12 months to make the uncomfortable feelings that come from stopping gambling (e.g., restlessness or irritability) go away or keep from having them?

Criterion 4: gambles as a way of escaping from problems or relieving dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression).

1. Item: Have you gambled as a way of escaping from problems or relieving feelings of helplessness, guilt, anxiety or depression during the past 12 months?

Criterion 5: after losing money gambling, individual often returns another day in order to get even ("chasing" one's money).

1. Item: After losing money gambling, have you returned to gambling on another day to win back your lost money?

Criterion 6: lies to family members or others to conceal the extent of involvement with gambling.

1. Item: Have you lied to family members or others to conceal the extent to which you have been gambling during the past 12 months?

Criterion 7: illegal acts, such as forgery, fraud, theft, or embezzlement committed to finance gambling.

1. Item: Have you committed any illegal acts (e.g., forgery, fraud, theft, embezzlement, etc.) during the past 12 months to finance your gambling?

Criterion 8: has jeopardized or lost a significant relationship, job, educational or career opportunity because of gambling.

1. Item: During the past 12 months, have you jeopardized or lost a significant relationship, job, educational or career opportunity because of your gambling?

Criterion 9: reliance on others or institutions to provide money to relieve a desperate financial situation produced by gambling (i.e., a “bailout”).

1. Item: have you relied on others (e.g., family, friends or work) to provide you with money to resolve a desperate financial situation caused by your gambling?

Criterion 10: repeated unsuccessful efforts to control, cut back, or stop gambling

1. Item: During the past 12 months, have you made efforts unsuccessfully to limit, reduce or stop gambling?

Scoring DSM-IV Items

Each of the 12 MAGS DSM-IV items receives one point for a positive response except for the four items associated with criteria two

and three above. Each of these four questions receive .5 for a positive response. This scoring protocol yields a potential total score of 10 points and keeps the scoring of the MAGS DSM-IV items consistent with the guidelines established by the American Psychiatric Association (1993), that is, making a diagnosis of pathological gambling when a respondent receives a total score of 5 or more.

APPENDIX B

Massachusetts Gambling Screen (MAGS) Subscale Items²

1. Have you ever experienced social, psychological or financial pressure to start gambling or increase how much you gamble?
2. How much do you usually gamble compared with most other people?
3. Do you feel that the amount or frequency of your gambling is "normal"?
4. Do friends or relatives think of you as a "normal" gambler?
5. Do you ever feel pressure to gamble when you do not gamble?
6. Do you ever feel guilty about your gambling?
7. Does any member of your family ever worry or complain about your gambling?
8. Have you ever thought that you should reduce or stop gambling?
9. Are you always able to stop gambling when you want?
10. Has your gambling ever created problems between you and any member of your family or friends?
11. Have you ever gotten into trouble at work or school because of your gambling?
12. Have you ever neglected your obligations (e.g., family, work or school) for two or more days in a row because you were gambling?
13. Have you ever gone to anyone for help about your gambling?
14. Have you ever been arrested for gambling?

²All items require dichotomous answers (i.e., yes or no) except question two which has a 3 point response scale: less, about the same or more.