

A Baseline Study of Past-Year Problem Gambling Prevalence Among Ohioans

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Abstract

Historically, the scope of legalized gambling was limited in Ohio, but everything changed when a new constitutional amendment allowed four casinos to open. To better understand the impact of gambling expansion, a household survey was commissioned to determine the baseline estimate of problem gambling behaviours in the state before casinos opened. Participants were selected through multi-stage probability sampling, with over 3,500 respondents completing valid surveys. Nearly 60% of Ohioans gambled in the past year, but the statewide prevalence of problem gambling was relatively low; only 1.4% of persons scored high enough on the Problem Gambling Severity Index to be classified as a potential problem gambler (score ≥ 3). Regional estimates of problem gambling were highest for Franklin and Hamilton counties (both 5.0%) and lowest for Lucas and Cuyahoga counties (3.2% and 2.1%, respectively). Exploratory logistic regression modelling found that race, employment, education, family history of problem gambling, and feelings of depression increased the odds of being a problem gambler. Results will inform the discussion about current gambling problems and enable policy makers to design prevention strategies.

Keywords: gambling, prevalence, risk factors, gambling correlates, addiction, Problem Gambling Severity Index

Résumé

Sur le plan historique, la légalisation du jeu était limitée en Ohio, mais tout a changé lorsqu'une nouvelle modification constitutionnelle a permis à quatre casinos d'ouvrir leurs portes. Afin de mieux comprendre l'incidence de l'augmentation du jeu, une enquête auprès des ménages a été commandée pour établir une estimation de référence des comportements de jeu problématique dans l'État avant l'ouverture des casinos. Les participants ont été sélectionnés au moyen d'un échantillonnage aléatoire à plusieurs degrés, et plus de 3 500 répondants ont rempli les sondages valides. Près de 60 % des Ohioans ont joué l'an dernier, mais la prévalence du jeu problématique à l'échelle de

l'État était relativement faible; seulement 1,4 % des personnes a obtenu un résultat suffisamment élevé sur l'indice de gravité du jeu pathologique pour être classé comme joueur potentiellement problématique (résultat ≥ 3). Les estimations régionales du jeu problématique étaient plus élevées pour les comtés de Franklin et de Hamilton (5,0 % dans les deux cas) et plus faibles pour les comtés de Lucas et de Cuyahoga (3,2 % et 2,1 %, respectivement). Un modèle de régression logistique et exploratoire a permis de constater que la race, l'emploi, l'éducation, les antécédents familiaux de jeu problématique ainsi que les sentiments de dépression augmentaient les risques d'être un joueur problématique. Les résultats de l'étude alimenteront la réflexion sur les problèmes de jeu pathologique actuels et aideront les décideurs à mettre au point des stratégies de prévention.

Introduction

Opportunities for legalized gambling have been historically limited in Ohio. State regulations promulgated about gambling limited its availability to games such as the Ohio lottery, betting at harness racing and thoroughbred racetracks, and charitable gaming. Like many other states, Ohio has been faced with referendums about the legalization of additional forms of gambling, and most legalization efforts have met with success over time. Ohioans have faced several referendums about casino gambling. Although constitutional amendments to allow casino gambling were turned down in 2006 and 2008, proponents of the measure finally succeeded in getting the amendment passed in 2009. This amendment allowed four casinos to open in urban areas, with the first casino opening in June 2012. Legislators took a pro-gambling stance after the law's passage and also changed the Ohio Revised Code to allow video lottery terminals (VLTs) at racetracks (i.e., racinos). Over 10,000 VLTs have been placed across the state since June 2012, presenting Ohioans with even more opportunities to gamble.

The expansion of gambling in Ohio has offered the state new revenue sources, but it has also raised concerns about the public health consequences of increased access. Although a majority of people gamble without experiencing difficulties, a small percentage of gamblers exhibit problem gambling, or "negative consequences for the gambler, others in his social network, or for the community" as a result of excessive gambling (Ferris & Wynne, 2001, p. 2). Meta-analyses and other reviews of the literature have found a link between gambling expansion and problem gambling, generally finding that greater access is associated with a higher prevalence of problem gambling (Room, Turner, & Ialomiteanu, 1999; Shaffer, Hall, & Vander Bilt, 1999). LaPlante and Shaffer (2007) theorize that the expansion of gambling opportunities can be likened to a disease model in which there is an initial exposure to a disease and eventual adaptation to it. In this scenario, the prevalence of problem gambling (i.e., the disease) will increase over time as the number of gambling

opportunities increases (i.e., the exposure), but the increase will be mediated by a population's increasing resistance to problem gambling behaviour (i.e., adaptation). Replication studies explore whether gambling prevalence has increased in the same jurisdiction, and they serve as an excellent way to test the disease-exposure model. Williams, Volberg, and Stevens (2012) surveyed replication studies over the past 30 years and found that increased gambling opportunities led to an increased standardized rate of problem gambling prevalence. The degree of change varied by country and degree of gambling expansion, but generally followed the hypothesized disease model with increases, plateaus, and decreases in the standardized problem gambling prevalence rates. Theories about population adaptation to gambling exposure have been suggested to involve mechanisms such as increased age, social learning, decreased interest in a novel activity, increased prevention messaging, and treatment availability (LaPlante & Shaffer, 2007; Storer, Abbot, & Stubbs, 2009; Williams et al., 2012).

Correlates of Problem Gambling

Expansion of gambling opportunities means that state and local officials must understand whether certain groups are at greater risk than others for developing problem gambling behaviour. Men typically have higher rates of problem gambling than women do (Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg, 2001; Volberg, Nysse-Carris, & Gerstein, 2006), and Blacks have higher rates than other racial groups do (Mancuso, Gilson, & Felver, 2005; Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg et al., 2006). Studies have frequently found that persons less than 35 years old have greater odds of having problem gambling behaviour (Emshoff et al., 2007; Volberg, 1997, 2001), and some studies have found that persons between the ages of 30 and 50 (Mancuso et al., 2005) or 50 and over are at greater risk for problem gambling (Ferguson, Frost-Pineda, & Gold, 2002). Separated, divorced, and single persons also are much more likely to be problem gamblers (Mateja, Wilson, & Ableman, 1998; Moore, 2006; Volberg, 2001; Wallisch, 1993). Moreover, problem gambling is more likely among persons who have lower educational attainment, especially those with a high school education or less (Emshoff et al., 2007; Volberg, 1997). Unemployed persons (Volberg, 2001, 2003; Volberg et al., 2006) or part-time employed persons (Mateja et al., 1998; Spitzer & Carpenter-Palumbo, 2007) are also much more likely to be problem gamblers than are fully employed persons.

The prevalence of problem gambling is higher among substance abusers than among the general population (Lorains, Cowlshaw, & Thomas, 2011; Nalpas et al., 2011; Petry, Stinson, & Grant, 2005; Potenza, Steinberg, & Wu, 2005). Studies of persons diagnosed with substance abuse in residential treatment facilities have found problem gambling to range from 10.5% to 14.9% (Toneatto & Brennan, 2002; Toneatto, Ferguson, & Brennan, 2003). In Ohio, the Ohio Substance Abuse Monitoring (OSAM) Network found that 12.1% of persons in treatment for alcohol and other drug problems scored high enough on a standardized assessment instrument, the South Oaks Gambling Screen (SOGS), to qualify as probable pathological gamblers. In addition, the OSAM found that gambling and substance use had a reciprocal relationship; respondents used more alcohol and other drugs

when gambling and gambled more when using alcohol and other drugs (Sherba & Martt, 2013). Research has indicated that alcohol is the most commonly abused substance among problem gamblers (Substance Abuse and Mental Health Services Administration, 2005). However, among those diagnosed with substance use disorders, some studies indicate problem gamblers prefer cannabis (24.1%) and cocaine (11.5%) over alcohol (9.0%; Toneatto & Brennan, 2002).

Psychiatric conditions are also common correlates of problem gambling. Problem gamblers have greater odds of having mood disorders, anxiety disorders, and personality disorders (Cunningham-Williams, Cottler, Compton, & Spitznagel, 1998; Petry et al., 2005; Williams, Lee, & Back, 2013; Wood & Williams, 2009). Although lifetime comorbidity is highest for substance use disorders such as alcohol and nicotine dependence, it is also very high for major depressive disorder and obsessive-compulsive disorder (Petry et al., 2005). Sex-specific differences also occur with psychiatric disorders. Women have shown higher odds of a lifetime problem gambling comorbidity for major depressive episodes and generalized anxiety disorder, along with substance use disorders such as any alcohol dependence and any drug abuse (Petry et al., 2005). Moreover, odds of psychiatric disorders are consistently higher over time for persons who screen positive for problem gambling (Chou & Afifi, 2011).

Problem gambling is also associated with family histories of gambling (Clarke, 2004; Oei & Raylu, 2004). Children of current or former problem gamblers are more likely to be at risk for developing problem gambling behaviours (Wardle et al., 2007). Toneatto and Brennan (2002) have shown that people whose parents, siblings, and friends had a problem gambling diagnosis within the past year scored significantly higher on the SOGS than did those with no family history of gambling. Other studies have examined the broader topic of addiction and found that families with a history of gambling problems are more likely to experience other forms of addiction (Slutske et al., 2000, 2001).

Consequences of Problem Gambling

Problem gambling can have devastating effects upon spouses, children, and extended family members. Research indicates that the majority of persons seeking out treatment for problem gambling are family members, rather than the gamblers themselves. By disclosing a gambling problem, the problem gambler often creates significant emotional stress for the family as the extent of the addiction becomes known. The family may begin to realize the magnitude of the outstanding debts to legitimate and illegitimate sources. As a result, the spouse may experience anger, depression, anxiety, confusion of his or her role within the family, and feelings of self-blame (Dowling, Smith, & Thomas, 2009; McComb, Lee, & Sprenkle, 2009; Wenzel, Oren, & Bakken, 2008). The level of emotional turmoil experienced by the spouse often leads to decreased quality of life and may even lead to suicidal ideation (McComb et al., 2009; Wenzel et al., 2008). All of these stressors can have a detrimental impact upon the marital relationship, which may explain the higher divorce rates among problem gamblers (Black, Shaw, McCormick, & Allen, 2012;

Moore, 2006). Even adult children and extended family members may experience the consequences of the problem gambler's addiction, resulting from requests for money and coverage of debts (Potenza, Fiellin, Heninger, Rounsaville, & Mazure, 2003; Wenzel et al., 2008).

If one views gambling on a continuum in which there are increasing degrees of harmfulness, then a clinical diagnosis of gambling disorder is the most severe consequence of problem gambling. According to the American Psychiatric Association (2013), a diagnosis of gambling disorder may occur if a person has clinically significant distress on a regular basis. Maladaptive behaviour patterns associated with gambling (e.g., lying to cover gambling losses) may impair problem gamblers' work and personal lives (Jazaeri & Habil, 2012; Koo, Rosentraub, & Horn, 2007). They may become restless and irritable during attempts to stop gambling, which often fail. They frequently return to gambling in order to regain lost funds, borrow money from family or friends, and lie about the frequency of gambling. Problem gamblers even lose employment or related opportunities because of their gambling issues at the height of the addiction. Bankruptcy is frequently associated with problem gamblers who have exhausted all of their resources (Boardman & Perry, 2007; Garrett, 2004).

Present Study

Little was known about the problem gambling prevalence in Ohio before the opening of the casinos. Nationally, estimates of the standardized past-year rate of problem gambling average 2.2%, ranging from 0.6% to 8.1% (Williams et al., 2012). The only estimate that could serve as a baseline for Ohio was a study conducted over 30 years ago, which found that 3.4% of Ohioans were likely at risk to become problem gamblers (i.e., had increased odds of problem gambling behaviour) and that 2.5% of Ohioans were problem gamblers (Culleton, 1985). However, this study was significantly limited because modern instruments that evaluate the prevalence of problem gambling had not yet been developed.

A statewide household survey was commissioned by Ohio for Responsible Gambling (ORG) and funded by the Ohio Lottery Commission to better develop an understanding of the prevalence of problem gambling. The goal of this baseline survey was to obtain a prevalence estimate of past-year at-risk and problem gambling behaviours in the state before new gambling venues opened. Additionally, ORG wanted to understand the socio-demographic correlates that may increase the likelihood of problem gambling behaviour. Results will inform the discussion about current gambling problems and enable policy makers to design prevention strategies.

Methods

Participant Recruitment

The Ohio Department of Mental Health and Addiction Services contracted with the Survey Research lab at Kent State University to conduct a landline telephone survey

in 2012 with Ohioans aged 18 and older. Guidelines from the American Association for Public Opinion Research were used to conduct the survey and calculate response rates (American Association for Public Opinion Research, 2015). The survey was administered through a computer-assisted telephone interviewing technique using random-digit dialling. The multi-stage sampling strategy involved collection of data from five regions: a statewide region (approximately 1,200 persons) and four additional areas that were oversampled to develop local prevalence estimates for areas where casinos would operate (i.e., Cuyahoga, Franklin, Hamilton, and Lucas counties; approximately 600 per region). The final sample included 3,623 persons, which was adequate to result in a low margin of error (+ 3%). Landline response rates, the response rate for completed and partial interviews (RR2), were similar for each of the samples (statewide 32%, Cuyahoga 30%, Franklin 32%, Hamilton 30%, and Lucas 30%). Regional oversamples were identified by the phone number's first four numbers because a preponderance of those numbers were located within each region based on both city and zip code boundaries. Geographic screens were then used in the survey to ensure that people were accurately assigned to each region. Kent State University conducted telephone surveys from February through July 2012. Surveys in Cuyahoga and Lucas counties, as well as for the statewide sample, were completed before the opening of the casinos in Cleveland (May 14, 2012) and Toledo (May 29, 2012). Surveys from the Franklin County and Hamilton County subsamples occurred before the opening of casinos in Columbus (October 8, 2012) and Cincinnati (March 4, 2013); however, it is possible that some survey participants travelled to either Cleveland or Toledo in the short window before the end of the survey. This study was approved by the Kent State University Institutional Review Board, protocol #12-021.

Questionnaire

The conceptual framework used to determine the presence of problem gambling follows the Canadian Problem Gambling Index (CPGI; Wynne, 2003). The CPGI is composed of 31 items and 11 demographic questions, which measure gambling involvement (e.g., type and frequency), adverse consequences (e.g., personal and social), and correlates of problem gambling such as family problems and behavioural health (e.g., alcohol/drug use and feeling depressed). The CPGI has questions related to all forms of gambling, including lottery (e.g., Mega Millions, instant win, or scratch tickets), casino (e.g., slot machines and roulette), and other (e.g., raffle or fundraising tickets, and Internet). Survey questions did not differentiate between whether these games were played in state or out of state over the past year; however, responses related to gambling at casinos likely took place out of state because the survey largely took place before the opening of the casinos. The Problem Gambling Severity Index (PGSI) comprises nine of the CPGI's core questions, and these items are used to determine the presence of at-risk and problem gambling behaviour on a continuum of problem gambling severity. Most persons evaluated with the PGSI are not considered to have a gambling problem because they do not score on the instrument (i.e., they have a score of 0). A minority of persons are classified as being at risk, meaning that they have displayed behaviours consistent with problem gambling that may increase their odds of becoming a problem gambler in the future.

For example, a low (1-2) or moderate (3-7) score indicates that persons may experience adverse consequences from gambling, whereas a high score (≥ 8) indicates profound adverse consequences to the individual, network, or community.

Ferris and Wynne (2001) found that the PGSI showed good internal consistency ($\alpha = .84$) and test-retest reliability ($r = .78$) and that it correlated highly with measures of problem gambling such as the *Diagnostic and Statistical Manual of Mental Disorders* (; American Psychiatric Association, 1994; $r = .83$) and the SOGS ($r = .83$; Ferris & Wynne, 2001). Results are also supported by other researchers who have found excellent internal consistency ($\alpha = .84$) and a high correlation with SOGS and *DSM-IV* criteria (McMillen & Wenzel, 2006; Wynne, 2003). Critics of the PGSI have cautioned that the instrument may not follow the public health model of problem gambling that examines the role of harms related to problem gambling (Delfabbro, 2013; McCreedy & Adlaf, 2006; Svetieva & Walker, 2008). Instead, they suggest that too many items reflect clinical pathological behaviours, which could make it problematic for estimating the prevalence of problem gambling in a non-clinical population. Other instruments have been developed that focus on the public health context, but these instruments also have their criticisms (Delfabbro, 2013; Svetieva & Walker, 2008).

Data Weighting

A common occurrence in many telephone surveys is the overrepresentation of females and older adults and the underrepresentation of minority (non-White) races in the survey samples. As in all surveys, the survey sample in the present study did not perfectly match its corresponding proportion in the population. This sample was also complex because surveys from the state sample could have overlapped with the regional samples. To adjust for these issues, we designed the study to use a post-stratification raking procedure in order to balance results for the target population and to ensure that the results were not biased from the oversampled counties (Battaglia, Izrael, Hoaglin, & Frankel, 2004). The rakes for the combined data set were based on region (five categories), race (three categories), gender (two categories), and age (15 categories). Categories were collapsed when cell sizes were too small (e.g., combining infrequently mentioned races into an “other” category). Demographic data from the 2010 U.S. Census were used for the raking procedure to create the weights.

Data Cleaning

Data cleaning was performed to validate the data set before analysis. A minority of the surveys (116 cases; 3.2%) were excluded from further analysis, resulting in a final sample of 3,507 valid surveys. Case exclusion occurred for various reasons (e.g., data were accidentally collected from states outside Ohio when participants took their phone numbers with them when they moved). Simple data entry errors (e.g., numbers outside of the valid range) were corrected when possible by reviewing the original data or were replaced with a missing value indicator when not possible.

Persons who did not know how to respond to a question or refused to answer a question were not included in analyses. These circumstances were relatively rare (<1%) for most questions; therefore, no attempt was made to impute the data.

Data Analysis

Stata (2013) version 13.1 and SPSS version 22.0 were used for analyses. The multi-stage nature of the sampling design required the correction of standard errors to adjust for design-based effects. Statewide cross-tabulations (e.g., prevalence estimates) performed with Stata used complex survey sample procedures with Taylor series linearization. This technique calculated linearized standard errors that more accurately estimated the variance than did more traditional methods, and it used an *F*-test to examine for statistically significant differences among cells (Stata, 2013). Calculations for the margin of error based on a 95% confidence interval were also generated to take sampling error into account, which may have resulted if a sample was not representative of the true population. PGSI categories had to be collapsed for analyses because some categories had few respondents. The unweighted number of problem gamblers (i.e., ≥ 8 on the PGSI) was very low ($n = 11$); thus, this category was combined with moderate-risk gamblers (i.e., 3-7 on the PGSI; $n = 74$). Persons scoring in the low-risk category on the PGSI (i.e., 1-2; $n = 201$) were combined with non-problem gamblers (i.e., 0 on the PGSI; $n = 3,221$). Therefore, most analyses between non-problem and problem gamblers are between persons scoring relatively low (i.e., 0-2 on the PGSI; $n = 3,422$) and persons scoring at moderate or high levels (i.e., ≥ 3 on the PGSI; $n = 85$) of problem gambling. Cross-tabulations with small cell sizes had higher linearized standard errors and should be interpreted with some degree of caution. Logistic regression was used to examine the odds of being a problem gambler compared with those of being a non-problem gambler given the socio-demographic characteristics and typical correlates of problem gambling. Variables that could potentially confound the analysis (e.g., the interaction of race and education) were investigated during model development, but none of these were statistically significant.

Results

Statewide Prevalence of Gambling Behaviour

Table 1 presents prevalence estimates for gambling behaviours among Ohio adults aged 18 and over in 2012. Nearly 60% of Ohioans, representing an estimated 5 million people, had gambled within the past 12 months. The overall statewide prevalence estimate of problem gambling was relatively low (1.4%; PGSI score ≥ 3); however, regions with casinos under development had higher prevalence rates than did the state as a whole. Regional estimates suggested Franklin and Hamilton counties had the highest prevalence estimates of problem gambling (both 5.0%; PGSI score ≥ 3), whereas Lucas and Cuyahoga counties had the lowest prevalence estimates (3.2% and 2.1%, respectively). Estimates of problem gambling at the statewide and regional levels must be interpreted with some degree of caution

Table 1
Estimated Prevalence of Past-Year Gambling for Non-gamblers and Gamblers, Ohio, 2012

Region	Estimate	Non- gambler	Non-problem gambler ^a	Problem gambler ^b
Statewide N = 3,495	Prevalence (lin. SE) ^c	41.4% (1.9)	57.2% (1.9)	1.4% (0.3)
	Population range	3,328,575–3,962,589	4,719,883–5,353,898	88,058–176,115
Cuyahoga County n = 536	Prevalence (lin. SE)	28.1% (2.3)	69.7% (2.3)	2.1% (0.7)
	Population range	297,793–	813,300–927,162	15,015–48,798
Franklin County n = 571	Prevalence (lin. SE)	37.1% (2.9)	57.9% (3.0)	5.0% (1.8)
	Population range	341,210–465,778	562,183–690,002	25,997–109,404
Hamilton County n = 566	Prevalence (lin. SE)	31.3% (2.4)	63.7% (2.6)	5.0% (1.6)
	Population range	228,862–309,134	499,568–586,672	22,203–79,418
Lucas County n = 548	Prevalence (lin. SE)	30.0% (3.3)	66.8% (3.3)	3.2% (0.9)
	Population range	101,596–155,780	254,413–308,597	7,620–22,859

^a Non-problem gamblers scored 0–2 on the Problem Gambling Severity Index (PGSI).

^b Problem gamblers scored ≥ 3 on the PGSI. ^clin. SE = linearized standard error; row percentages may not total 100 due to rounding error.

because the low number of problem gamblers resulted in relative standard errors that were greater than 25% for that subgroup (statewide 33%, Cuyahoga 53%, Franklin 62%, Hamilton 56%, Lucas 50%). More detailed estimates for the prevalence of at-risk gambling behaviour could be generated only for statewide data because of the small number of persons in each PGSI category; however, some of these estimates must also be interpreted with caution because of the large relative standard errors (>25%) in the moderate-risk and problem gambling subgroups. Data indicate prevalence rates were highest for persons who were at risk for problem gambling rather than for problem gamblers; 4.2% of Ohioans were estimated to be at low risk for problem gambling (PGSI score 1–2) and 1.1% were at moderate risk for problem gambling (PGSI score 3–7), with only 0.4% scoring high enough to be classified as problem gamblers (PGSI score ≥ 8).

Sociodemographic Characteristics of Sample

Table 2 presents the weighted statewide socio-demographics for Ohioans aged 18 and over by gambling status. Results from weighting the data with the statistical raking procedure typically were similar to the unweighted data. In both unweighted and weighted tabulations, a majority of participants were female (62.7% vs. 51.2%,

Table 2
Statewide Socio-demographics by Gambling Status, Ohio, 2012

Socio-demographic characteristic		Unweighted <i>N</i> (weighted %)	Prevalence of gambling, weighted % (lin. SE) ^a		
			Non-gambler	Non-problem gambler ^b	Problem gambler ^c
Gender (<i>N</i> = 3,495)	Men	1,304 (48.8%)	34.5% (2.9)	63.7% (2.9)	1.7% (0.5)
	Women	2,191 (51.2%)	47.9% (2.2)	51.0% (2.1)	1.1% (0.3)
Age (<i>N</i> = 3,495)	18–24	80 (12.5%)	42.7% (7.4)	55.3% (7.4)	2.0% (1.0)
	25–44	740 (32.9%)	39.4% (2.8)	58.9% (2.8)	1.7% (0.6)
	45–64	1,985 (36.2%)	37.1% (1.5)	61.3% (1.5)	1.6% (0.3)
	65+	690 (18.4%)	52.4% (6.5)	47.4% (6.5)	0.2% (0.1)
Race (<i>N</i> = 3,495)	White	2,750 (81.8%)	40.5% (2.1)	58.6% (2.1)	0.9% (0.2)
	Black	478 (12.1%)	47.2% (4.6)	48.1% (4.6)	4.7% (1.5)
	Other ^d	267 (6.1%)	42.0% (6.3)	56.8% (6.4)	1.3% (0.6)
Marital status (<i>N</i> = 3,482)	Married	2,070 (53.7%)	38.5% (2.1)	61.0% (2.1)	0.5% (0.2)
	Living with partner	173 (6.1%)	40.1% (6.5)	58.0% (6.5)	1.9% (1.0)
	Widowed	230 (8.1%)	59.3% (9.7)	40.1% (9.7)	0.6% (0.2)
	Divorced	451 (7.9%)	42.5% (4.6)	55.8% (4.6)	1.7% (0.6)
	Separated	72 (1.7%)	52.3% (8.5)	35.8% (7.7)	11.9% (5.7)
	Never married	486 (22.4%)	40.9% (4.5)	56.3% (4.5)	2.8% (0.9)
	Employment status (<i>N</i> = 3,488)	Employed full-time	1,504 (40.3%)	33.4% (2.1)	65.8% (2.1)
Employed part-time	351 (11.2%)	44.1% (5.3)	53.5% (5.3)	2.4% (1.3)	
Unemployed, but looking	202 (8.3%)	42.2% (8.9)	53.4% (9.3)	4.5% (2.0)	
Retired	849 (18.7%)	51.4% (5.0)	47.5% (4.9)	1.1% (0.4)	
Education (<i>N</i> = 3,491)	homemaker	253 (8.0%)	51.2% (5.5)	48.3% (5.5)	0.5% (0.2)
	Other	329 (13.4%)	42.1% (5.5)	56.1% (5.6)	1.8% (0.7)
	Some high school or less	130 (3.7%)	53.2% (7.2)	37.7% (6.8)	9.1% (3.8)
	High school diploma or equivalent	772 (25.1%)	50.8% (3.9)	47.9% (3.9)	1.3% (0.5)
	Some community college or some technical school	167 (5.0%)	50.8% (7.7)	47.4% (7.6)	1.8% (1.4)
	Completed community college or technical school	246 (6.5%)	32.3% (5.1)	64.4% (5.2)	3.3% (1.7)
	Some university	568 (19.4%)	35.0% (4.3)	64.2% (4.4)	0.8% (0.4)
Bachelor's degree	939 (25.4%)	40.8% (3.8)	58.3% (3.7)	0.9% (0.4)	
Graduate or professional degree	669 (15.0%)	32.3% (3.0)	67.2% (3.0)	0.5% (0.2)	
Religion (<i>N</i> = 3,425)	Protestant	1,040 (27.4%)	45.3% (4.5)	53.7% (4.5)	1.0% (0.3)
	Catholic	955 (24.7%)	32.5% (3.0)	66.3% (3.0)	1.2% (0.4)
	Other ^e	1,078 (36.6%)	44.0% (2.9)	54.4% (2.9)	1.6% (0.5)
	No religion	352 (11.4%)	43.2% (5.0)	54.9% (4.9)	1.9% (0.9)

^a lin. SE = linearized standard error.

^bNon-problem gamblers scored 0–2 on the PGSI.

^cProblem gamblers scored ≥3 on the PGSI.

^dOther race includes Asians, Native Hawaiians, Pacific Islanders, Native Americans, multi-racial, and unspecified other.

^eOther religion includes persons of Jewish, Muslim, Eastern tradition, and unspecified other faiths.

respectively) and White (78.7% vs. 81.8%, respectively). Participants were also more likely to be married (59.4% vs. 53.7%, respectively), employed full- or part-time (53.2% vs. 51.5%, respectively), have a high school diploma or greater (96.3% for both groups), and practice some form of religion (89.7% vs. 88.6%, respectively). The largest difference between the unweighted and weighted data was in the age stratification; a majority of participants in the unweighted data were between the ages of 25 and 44 (56.8%), whereas a majority of persons in the weighted data were between the ages of 45 and 64 (36.2%).

Differences Between Gamblers and Non-gamblers

Socio-demographic characteristics differed between non-gamblers and gamblers. Past-year prevalence rates for gambling were higher among men than among women (65.5% vs. 52.2%, respectively), $F(1, 3499) = 13.0, p < .001$. When we examined the prevalence of gambling among the different racial groups, we found that the rates were highest among Whites (59.6%), but that these rates were not significantly different from those of Blacks (52.8%) or other races (58.0%). Likewise, there were no significant differences among gambling prevalence rates when we stratified the data by age group. Nonetheless, the highest prevalence rates were among 45- to 64-year-olds (63.0%) and the lowest were for persons 65 and older (47.7%). Married persons had the highest prevalence rates for gambling behaviour (61.6%), and widowed persons had the lowest (40.7%), but these differences were not statistically significant. Persons employed full-time had significantly higher prevalence rates of problem gambling (66.7%) compared with persons of another employment status (range 48.7%–57.9%), $F(4.42, 15437.76) = 2.8, p < .05$. Gambling prevalence was significantly higher among persons with a graduate or professional degree (67.8%) compared with persons of another educational status (range 46.8%–67.7%), $F(5.46, 19068.73) = 3.6, p < .01$. Prevalence rates for gamblers and non-gamblers did not significantly differ by religion, although there was still an interesting variation: Catholics had the highest prevalence rates for gambling (67.5%) and Protestants had the lowest (54.8%).

Differences Between Non-problem Gamblers and Problem Gamblers

Socio-demographic characteristics also differed between non-problem gamblers and problem gamblers. Among those who gambled, nearly 9.0% of Blacks were problem gamblers, compared to roughly 2.0% of persons identifying as White or Other race were problem gamblers, $F(1.64, 3630.96) = 16.3, p < .001$. In the marital status category, 25% of separated persons and almost 5.0% of never married persons were problem gamblers, $F(4.03, 8915.08) = 14.5, p < .001$. The prevalence of problem gambling also significantly differed by educational level: 19.3% of persons with less than a high school education were problem gamblers, which was on average 13.8 times higher than that of other educational groups (range 1.2%–4.9%), $F(5.42, 12002.04) = 9.1, p < .001$. Under the employment category, nearly 8% of unemployed persons and 4% of persons employed part-time were problem gamblers (range 1.0%–3.0%), $F(3.82, 8452.82) = 4.0, p < .005$. No significant differences were found between non-problem gamblers and problem gamblers by sex, age group, or religion.

Participation in Specific Gambling Activities

Participation in gambling activities differed between non-problem and problem gamblers for some gambling activities (Table 3). Problem gamblers were significantly more likely to participate in the lottery than were non-problem gamblers, $F(1, 2218) = 38.9, p < .001$. Just over 90% of problem gamblers bought lottery tickets, whereas only 63.2% of non-problem gamblers bought lottery tickets, $F(1, 2217) = 27.4, p < .001$. Problem gamblers were also significantly more likely than non-problem gamblers (72.7% vs. 44.3%, respectively) to buy instant win or scratch tickets, $F(1, 2218) = 9.1, p < .01$. Although there was no significant difference between non-problem and problem gamblers when all forms of casino gambling were grouped together, some individual casino activities were more likely to be played by problem gamblers. Problem gamblers were 2.7 times more likely to play card games at casinos than were non-problem gamblers, $F(1, 2218) = 12.9, p < .001$, and they were 3 times more likely to play roulette, $F(1, 2218) = 6.6, p < .05$. Problem gamblers were also more likely to play craps than were non-problem

Table 3
Participation in Gambling by Gambling Type, Ohio, 2012

Classification	Specific gambling type	Level of risk, weighted % (lin. SE) ^a	
		Non-problem gambler ^b <i>n</i> = 2,138	Problem gambler ^c <i>n</i> = 85
Lottery	Lottery tickets (e.g., Mega Millions, PowerBall, Classic Lotto)	63.2 (2.5)	90.8 (3.0)
	Instant win or scratch tickets (e.g., Pick 3, Pick 4, Rolling Cash 5)	44.3 (2.3)	72.7 (8.2)
Casino	Slot machines/ Video lottery terminals (VLTs)	78.7 (3.1)	72.0 (15.6)
	Card games (e.g., poker, blackjack, baccarat)	15.5 (1.6)	41.7 (9.4)
	Roulette	3.0 (0.5)	12.0 (6.3)
	Craps	4.1 (1.0)	16.8 (8.1)
Other	Raffle or fundraising tickets	44.9 (2.3)	47.5 (9.3)
	Horse races	5.0 (0.7)	1.4 (0.8)
	Bingo	6.6 (1.0)	14.3 (4.9)
	Keno	5.4 (1.0)	15.9 (6.5)
	VLTs (other than casinos)	4.5 (1.0)	16.9 (6.9)
	Sports pools or sports lotteries	15.1 (1.4)	15.8 (6.5)
	Cards or board games with family or friends	23.2 (2.0)	38.4 (9.2)
	Games of skill such as pool, bowling, or darts	7.6 (1.3)	16.4 (6.6)
	Arcade or video games	4.2 (1.1)	16.3 (7.7)
	Internet	2.0 (0.7)	8.4 (5.3)
	Sports with a bookie	1.1 (0.6)	7.3 (6.1)
	Stocks, options, or commodity markets	25.6 (2.3)	12.1 (4.5)
Other	0.1 (0.1)	0.6 (0.6)	

^a lin. SE = linearized standard error. ^bNon-problem gamblers scored 0–2 on the Problem Gambling Severity Index (PGSI).

^cProblem gamblers scored ≥ 3 on the PGSI.

gamblers, $F(1, 2218) = 7.2, p < .005$. Problem gamblers were not more likely to participate in other forms of gambling when they were grouped together; however, there were significant differences when individual categories were examined. Nearly 15% of problem gamblers but only 6.6% of non-problem gamblers participated in bingo, $F(1, 2218) = 4.1, p < .05$. Almost 16% of problem gamblers played Keno versus 5.4% of non-problem gamblers, $F(1, 2218) = 5.9, p < .05$, and 16.9% of problem gamblers played non-casino VLTs versus 4.5% of non-problem gamblers, $F(1, 2218) = 8.3, p < .005$. Problem gamblers were also 3.9 times more likely than non-problem gamblers to bet on arcade or video games, $F(1, 2218) = 6.6, p < .05$. Gambling on the Internet was also more prevalent among problem gamblers than among non-problem gamblers, $F(1, 2218) = 4.4, p < .05$, as was gambling on sports with a bookie, $F(1, 2218) = 15.6, p < .05$. Non-problem gamblers were more likely than problem gamblers only to gamble at horse racing, $F(1, 2218) = 5.7, p < .01$, and to participate in the stock, options, or commodities markets, $F(1, 2218) = 4.6, p < .05$.

Associations Between Personal/Family History and Problem Gambling

Problem gamblers were more likely to have a family history of gambling problems. In fact, these gamblers were 3.7 times more likely than non-problem gamblers to report ever having a family member with a gambling problem, $F(1, 2173) = 13.5, p < .001$. More problem gamblers than non-problem gamblers also had a family member that had ever had an alcohol or drug problem, $F(1, 2200) = 14.4, p < .001$.

The impulse to engage in potentially harmful behaviours was also higher among problem gamblers than among non-problem gamblers. Nearly 30% of problem gamblers versus 2% of non-problem gamblers said they had the urge to gamble if something painful happened in their lives, $F(1, 2215) = 30.5, p < .001$. Problem gamblers were also over 4 times as likely as non-problem gamblers to have the urge to drink (6.5% vs. 1.4%, respectively), $F(1, 2207) = 20.5, p < .001$, and 6.4 times as likely to use drugs or medication (10.9% vs. 1.7%, respectively) if something painful happened in their lives, $F(1, 2213) = 27.5, p < .001$.

Use of alcohol and other drugs was higher among problem gamblers than among non-problem gamblers. Nearly 7% of problem gamblers said they had used alcohol or other drugs in the past 12 months while gambling, whereas only 1.3% of non-problem gamblers reported the same, $F(1, 2212) = 27.1, p < .001$. Of greatest concern, gambling while intoxicated or high was quite prevalent among this group; almost 12% of problem gamblers but only 1.5% of non-problem gamblers said they had gambled while drunk or high in the past 12 months, $F(1, 2214) = 33.6, p < .001$. Just over 10% of problem gamblers versus 1.8% of non-problem gamblers felt they may have ever had an alcohol or drug problem, $F(1, 2211) = 19.3, p < .001$.

Feelings of depression and related correlates were also significantly higher for problem gamblers than for non-problem gamblers. Nearly 4 times as many problem gamblers said they had been under a doctor's care because of physical or emotional problems brought on by stress within the past 12 months, $F(1, 2209) = 13.7,$

$p < .001$. Feelings of depression were also reportedly much more common in problem gamblers; over 8% of this group but 1.4% of non-problem gamblers said they felt seriously depressed, $F(1, 2211) = 27.7, p < .001$. Although more problem gamblers than non-problem gamblers said they had seriously contemplated or attempted suicide because of their gambling behaviours (9.1% vs. 2.4%, respectively), the differences were not statistically significant.

Odds of PGSI Score Based Upon Socio-demographic Characteristics and Gambling Correlates

Table 4 presents the odds of being a problem gambler. Problem gamblers were significantly more likely to be Black (odds ratios [ORs] = 1.25–8.56) and unemployed (ORs = 1.72–15.30) than were non-problem gamblers. The likelihood of being a problem gambler as opposed to being a non-problem gambler generally decreased as

Table 4
Odds of Being a Problem Gambler as Opposed to Being a Non-problem Gambler, Ohio, 2012

Variable	OR	95% CI	lin. SE ^a	<i>t</i>	<i>p</i> -Value
Race (White = Ref.)					
Black	3.26	[1.25, 3.15]	0.58	-0.05	0.959
Employment (Employed full-time = Ref.)					
Employed part-time	1.18	[0.37, 3.75]	0.70	0.28	0.776
Unemployed, but looking	5.13	[1.72, 15.3]	2.86	2.93	0.003**
Retired	1.72	[0.48, 6.15]	1.12	0.84	0.399
Homemaker	0.68	[0.17, 2.80]	0.49	-0.53	0.595
Other	1.89	[0.54, 6.60]	1.20	1.00	0.315
Education (Less than high school = Ref.)					
High school diploma or equivalent	0.14	[0.05, 0.40]	0.08	-3.60	0.000***
Some community college or technical school	0.26	[0.03, 1.98]	0.27	-1.30	0.193
Completed community college or technical school	0.25	[0.06, 1.08]	0.19	-1.86	0.064
Some university	0.58	[0.02, 0.19]	0.04	-4.65	0.000***
Bachelor's degree	0.14	[0.04, 0.55]	0.10	-2.81	0.005**
Graduate or professional degree	0.72	[0.12, 0.29]	0.05	-3.72	0.000***
Played lottery	6.63	[2.15, 20.43]	3.80	3.30	0.001**
Used alcohol or drugs while gambling (No = Ref.)					
Yes	3.80	[1.98, 7.30]	1.27	4.01	0.000***
Family member that has ever had a gambling problem (No = Ref.)					
Yes	2.63	[1.20, 5.74]	1.05	2.42	0.015*
Felt seriously depressed (No = Ref.)					
Yes	4.24	[2.04, 8.81]	1.58	3.88	0.000***
Constant	0.00	[0.00, 0.00]	0.00	-8.20	0.000***

Note. OR = odds ratio; CI = confidence interval; Ref. = reference category.

^alin. SE = linearized standard error; *odds ratio (OR) significantly ($p < .05$) greater among problem gamblers (≥ 3 on the Problem Gambling Severity Index [PGSI]) than among non-problem gamblers (0–2 on PGSI).

** $p < .01$.

*** $p < .001$.

education level increased. Persons with a high school degree or equivalent education or a greater level of educational attainment had significantly lower odds of being a problem gambler. Odds of being a problem gambler were significantly higher than of being a non-problem gambler for persons who used alcohol or drugs while gambling (ORs = 1.98 – 7.30), for persons with a family member that ever had a gambling problem (ORs = 1.20 – 5.74), and for persons who felt seriously depressed (ORs = 2.04 – 8.81).

Discussion

This survey represented the largest effort to date to understand the past-year prevalence of problem gambling in Ohio. An estimated 1.4% of Ohioans scored high enough on the PGSI to be classified as problem gamblers; however, regional estimates from four urban counties were somewhat higher (range 2.1%–5.0%). Ohio's statewide prevalence rate appeared to be significantly lower than the national average standardized rate of problem gambling (Williams et al., 2012). Prevalence rates in Ohio are likely lower than other national or state figures because of the limited availability of legalized gambling at the time of the study.

Since the opening of the casinos, some communities have incorporated an assessment for problem gambling into their community needs assessment through Alcohol and Drug Addiction and Mental Health Services Boards, which are local administrative organizations that guide funding and policy decisions at a county or multi-county level. A landline and cellphone study conducted in Montgomery County found that 3.8% of residents aged 18 and older were at low to moderate risk for developing problem gambling, while only 0.1% of residents scored high enough to be classified as problem gamblers (Stock, 2013). A needs assessment in Stark County also yielded interesting results, with 14.6% of respondents scoring at low risk and 4.1% at moderate risk for problem gambling and 1.5% of respondents scoring as problem gamblers (Alemagno, Oglesby, Shaffer-King, Budnik, & Greer, 2013). Unfortunately, it is unknown whether rates were this high before the opening of the casinos and racinos because no historical baseline data are available for these communities.

Results from this study largely supported the findings from other studies on gambling behaviour. Prevalence rates for problem gambling were highest among Blacks (Mancuso et al., 2005; Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg et al., 2006). Separated and never married persons also had much higher rates of problem gambling than did other groups (Mateja et al., 1998; Moore, 2006; Volberg, 2001; Wallisch, 1993). Moreover, associations between employment and problem gambling were found between persons who were either unemployed (Volberg, 2001, 2003; Volberg et al., 2006) or employed only part-time (Mateja et al., 1998; Spitzer & Carpenter-Palumbo, 2007). Persons with less than a high school education also had higher prevalence rates of problem gambling (Emshoff et al., 2007; Volberg, 1997). This study did not confirm findings from other studies that have found an increased risk of problem gambling among various age groups

(Emshoff et al., 2007; Ferguson et al., 2002; Mancuso et al., 2005; Volberg, 1997, 2001), which may be due to the limited opportunities for gambling.

This study supported common findings about the correlates of problem gambling. Problem gamblers were much more likely to have a family history of gambling problems (Clarke, 2004; King, Abrams, & Wilkinson, 2010; Oei & Raylu, 2004; Toneatto & Brennan, 2002). These gamblers were also much more likely to abuse alcohol, drugs, or other medication if something painful happened in their lives. Problem gamblers were even more likely to have used alcohol or other drugs while gambling (El-Guebaly et al., 2006). Like other studies, the present study showed that problem gamblers were more likely than non-problem gamblers to have feelings of depression (Blanco, Myers, & Kendler, 2012; El-Guebaly et al., 2006; Hounslow, Smith, Battersby, & Morefield, 2011).

The exploratory logistic regression model investigating the odds of being classified as a problem gambler was largely supported by the literature. Blacks, persons with less than a high school education, and persons playing the lottery had an increased risk of being a problem gambler as opposed to being a non-problem gambler (Mancuso et al., 2005; Reilly & Guida, 1990; Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg & Moore, 1999; Volberg et al., 2006). Problem gamblers were more likely to have been seriously depressed (Blanco et al., 2012; El-Guebaly et al., 2006; Hounslow et al., 2011) and to report a family history of problem gambling (King et al., 2010; Toneatto & Brennan, 2002). Unlike other studies, however, the present study showed that men were not more likely to be problem gamblers (Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg, 2001; Volberg et al., 2006).

This study had several important limitations. Most notably, participants had to answer landline telephones, meaning that persons limited to cellphones or to using a cell phone for some calls, persons living in group quarters or regulated environments (e.g., residential treatment and jail facilities), and the homeless would not be represented. The exclusion of cellphones may have artificially lowered the prevalence of at-risk and problem gambling in Ohio. Another limitation was related to the age differences between the recruited sample and the weighted sample. Despite statistical correction for differences, the weighting technique might not have fully accounted for age-related differences in gambling participation and problem gambling prevalence rates (i.e., it may not have been able to entirely correct for differences between persons recruited into the sample and those who were not recruited). Persons with language barriers are another limitation of the study; foreign-language-speaking persons with little knowledge of English would be underrepresented because the survey was not translated into other languages. Roughly 4% of Ohioans are foreign-born and nearly 7% speak a language other than English in the home (U.S. Census Bureau, 2015). Therefore, some of these persons may have opted out of the study based upon a language barrier. Finally, there were too few problem gamblers to separate out each at-risk category along with problem gambling, and so some of the at-risk and problem categories had to be combined for the analyses.

Future gambling studies should work to remedy these limitations in order to present an even more accurate picture of problem gambling within Ohio.

This survey provides a nuanced look at Ohio's need to provide effective prevention of problem gambling, to build capacity so that gambling disorders can be recognized and treated, and to tell the state where it should be focusing future research efforts. Prevention activities should be directed toward groups that are at greatest risk for problem gambling, including African Americans, unemployed and retired persons, unmarried or widowed persons, persons with low educational attainment, and persons with substance use disorders. The higher rate of depression among at-risk and problem gamblers compared with other groups is concerning, and the rates indirectly support the link between suicidal ideation and gambling (Newman & Thompson, 2003; Petry & Kiluk 2002). Clinicians should screen all persons being treated for gambling disorder for depression and refer them to the appropriate treatment centres as needed. The Ohio Department of Mental Health and Addiction Services should also continue to work with other partners to ensure appropriate messaging and outreach activities for the prevention of suicide.

The department and its partners are currently preparing for the 2016 Ohio Gambling Survey, which will provide results in 2017. This replication survey will give Ohio the first set of data for comparison of gambling attitudes and prevalence between 2012 and 2016 after all gambling venues and racinos have been opened throughout the state. Although gambling is not new to Ohio, the new destination venues may have an impact on overall gambling prevalence rates, which will have important implications for prevention and treatment.

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