INTERNET GAMING: REGULATING IN AN ONLINE WORLD

HEARING

BEFORE THE

SUBCOMMITTEE ON COMMERCE, MANUFACTURING, AND TRADE

OF THE

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C O N T E N T S

INTERNET GAMING: REGULATING IN AN ONLINE WORLD

FRIDAY, NOVEMBER 18, 2011

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COMMERCE, MANUFACTURING, AND TRADE,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 9:03 a.m., in room 2123, Rayburn House Office Building, Hon. Mary Bono Mack (chairman of the subcommittee) presiding.

Members present: Representatives Bono Mack, Bass, Harper, Lance, Cassidy, Guthrie, Olson, McKinley, Barton, Butterfield, and Towns.

Staff present: Paige Anderson, Policy Coordinator, CMT; Charlotte Baker, Press Secretary; Brian McCullough, Senior Professional Staff Member, CMT; Gib Mullan, Chief Counsel, CMT; Katie Novaria, Legislative Clerk; Shannon Weinberg, Counsel, CMT; Felipe Mendoza, Democratic Counsel; and Will Wallace, Democratic Policy Analyst.

Mrs. BONO MACK. The subcommittee will now come to order. Good morning, this is our second cover the waterfront hearing on whether Congress should allow Internet gaming to take sail. Today we will hear from three of our colleagues as well as from a respected panel of experts. Let me be clear about one thing from the beginning. I am taking a very careful approach when it comes to this issue, and I want to examine all of the relevant facts before deciding whether or not to proceed.

I now recognize myself for an opening statement.

OPENING STATEMENT OF HON. MARY BONO MACK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

When it comes to the debate over legalizing Internet gambling is it time for Congress to let the genie out of the bottle, or is the genie already out, online, with a pile of chips playing Texas Hold 'Em? As chairman of the subcommittee, this is an important issue which I have been following very closely in hopes of making certain that everyone involved is dealt a fair hand.

Today we know this, the vast majority of Americans have gambled at some point in their lives, and the number of people who tried gambling is going up every year. Currently the only two States without legalized gambling are Hawaii and Utah. Forty-eight other States allow charitable gaming, 43 States and the Dis-

trict of Columbia have lotteries, 40 States permit parimutuel betting, 29 States have Indian casinos, while another 28 States have standalone casinos or racetrack casinos.

Today as we continue to look at whether Congress should legalize Internet gambling, there are a number of questions we will be raising. For example, how effective is the current enforcement of online gaming in jurisdictions that have legalized it? How are States preparing to deal with the issue? What, if any, forms of interstate online gaming should Congress consider allowing? What consumer protections exist for online gaming, and what new protections are needed? How would any easing of legal restrictions on Internet gaming affect American consumers and other stakeholders, especially federally recognized Native American tribes.

Gaming policy and regulation is generally handled by the States, although the Federal Government has been involved in shaping the boundaries of what is permissible under current law.

In 1988, gambling across the United States began to proliferate after Congress passed the Indian Gaming Regulatory Act addressing the jurisdiction and authority of tribes to establish gaming on their lands. Since its passage, tribal gaming operations have seen tremendous growth with revenues last year exceeding $26 billion. Of the 565 federally recognized tribes across the U.S., nearly half of them operate casinos which provide a critically important source of funding for tribal operations and governance.

In my own congressional district tribal gaming has been a huge plus with seven casinos supporting thousands of jobs during these very difficult economic times. The tribes have been great neighbors, too, contributing regularly to charities and civic events.

So as this debate continues to unfold, it is very important to remember how tribal gaming has improved the lives of thousands of Native Americans and I want to make certain that they are not adversely impacted by online gambling, legal or otherwise.

Congress has had to step in before. In 2006 to combat proliferation of illegal Internet gaming, the Unlawful Internet Gambling Enforcement Act was adopted. This effectively outlawed interstate online gaming in the U.S. by prohibiting gambling related businesses from accepting payments in the form of checks, credit card payments or electronic funds transfers relating to unlawful Internet gambling. The law also establishes fines and penalties for banks and financial companies that process such payments.

In April of this year three of the top poker Web sites were shut down and 11 people indicted for bank fraud and for money laundering, raising new questions about the law.

Proponents argue that the statute has not reduced Internet gambling, it has simply driven it underground and offshore where shady operators play by their own rules.

Legalizing Internet gaming, they argue, would actually allow the government to provide greater protection for consumers. But those who want to keep the ban on Internet gambling in place argue that repealing the current law will expose more Americans to serious problems such as compulsive gambling. They are also worried about an increase in fraud, money laundering and organized crime. Still others have expressed concern that State budgets could be

harmed by the loss of lottery and gaming revenue, and they point to huge potential impact on existing legitimate gaming operations.

While most States have taken no action regarding online gaming, seven States, Illinois, Indiana, Washington, Louisiana, Oregon, Montana, and South Dakota, have now enacted express prohibitions on Internet gambling. Other States have interpreted Federal laws permitting intrastate online gaming, and they are beginning to authorize different forms of remote gaming. Nevada, for example, has already provided remote intrastate sports wagering through BlackBerry enabled mobile phone devices, and the State is also forging ahead with plans to begin licensing online poker sites.

So in many respects the genie is already out of the bottle. And now it is up to Congress to decide whether Internet gambling across State lines should be legal or illegal.

And I look forward to hearing all of today's testimony.

With that, I am happy to recognize the gentleman from North Carolina, Mr. Butterfield, the ranking member of the Subcommittee on Commerce, Manufacturing, and Trade, for his opening statement for 5 minutes.

[The prepared statement of Mrs. Bono Mack follows:]

When it comes to the debate over legalizing Internet gambling, is it time for Congress to let the genie out of the bottle? Or is the genie already online with a pile of chips playing Texas Hold-em?

As Chairman of this Subcommittee, this is an important issue which I have been following very closely in hopes of making certain that everyone is dealt a fair hand.

Today, we know this: the vast majority of Americans have gambled at some point in their lives, and the number of people who try gambling is going up every year. Currently, the only two states without legalized gambling are Hawaii and Utah.

- 48 other states allow charitable gaming.
- 43 states and the District of Columbia have lotteries.
- 40 states permit pari-mutuel betting.
- 29 states have Indian casinos, while another 28 states have stand-alone casinos or racetrack casinos.

Today, as we continue to look at whether Congress should legalize Internet gambling, there are a number of questions which we will be raising:

- How effective is current enforcement of online gaming in jurisdictions that have legalized it? And how are states preparing to deal with the issue?

- What, if any, forms of interstate online gaming should Congress consider allowing?

- What consumer protections exist for online gaming and what new protections are needed?

- How would any easing of legal restrictions on Internet gaming affect American consumers and other stakeholders, especially federally-recognized Native American tribes?

Gaming policy and regulation is generally handled by the states, although the federal government has been involved in shaping the boundaries of what's permissible under current law.

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In my own Congressional District, tribal gaming has been a huge plus, with seven casinos supporting thousands of jobs during these difficult economic times. The Tribes have been great neighbors, too, contributing regularly to charities and civic events. So as this debate

continues to unfold, it's very important to remember how tribal gaming has improved the lives of thousands of Native Americans, and I want to make certain that they are not adversely impacted by online gambling – legal or otherwise.

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Legalizing Internet gambling, they argue, would actually allow the government to provide greater protection for consumers.

But those who want to keep the ban on Internet gambling in place argue that repealing the current law will expose more Americans to serious problems such as compulsive gambling.

They are also worried about an increase in fraud, money laundering and organized crime.

Still others have expressed concern that state budgets could be harmed by the loss of lottery and gaming

revenue, and they point to a huge potential impact on existing, legitimate gaming operations.

While most states have taken no action regarding online gaming, seven states...Illinois, Indiana, Washington, Louisiana, Oregon, Montana, and South Dakota...have now enacted express prohibitions on Internet gambling.

Other states have interpreted federal law as permitting intrastate online gaming, and they are beginning to authorize different forms of remote gaming.

Nevada, for example, is already providing remote intrastate sports wagering through Blackberry-enabled mobile phone devices, and the state is also forging ahead with plans to begin licensing online poker sites.

So, in many respects, the genie is already out of the bottle, and now it's up to Congress to decide whether

Internet gambling across state lines is legal or illegal. I look forward to hearing today's testimony.

OPENING STATEMENT OF HON. G.K. BUTTERFIELD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NORTH CAROLINA

Mr. BUTTERFIELD. Thank you. I thank the chairman for holding this hearing and what I hope will be a series of hearings on this very important subject of Internet gambling. This is a very important issue. I think we can all agree on that, and it deserves careful consideration, as you referenced in your opening statement.

Let me thank the three witnesses, my colleagues, for coming today and we will try to make this as painless as possible.

According to one estimate, any action we take regarding the legal status of Internet gambling could impact an estimated 10 to 15 million people who already participate in Internet gambling on a regular basis.

Serious revenues estimated to be as high at $49 billion over 10 years could be realized at both the State and Federal levels. But we must remember the policy decisions we make here and in the full committee could also impact people who have never been exposed to Internet gambling, potentially opening the door for dependence and addiction. That is why it is so important, so important to address potential consumer consequences in any legislation that we consider.

With estimated revenues in the billions we must set aside a portion of that to reduce the social cost of problem gambling.

In our previous hearing on this topic I was particularly struck by Mr. Keith White's testimony. Mr. White indicated that 6 to 8 million adults and 1/2 million teens meet the criteria for gambling addiction, with ethnic minorities more likely to become addicted. He also estimated that the annual social cost of gambling related addiction at $7 billion, resulting from increases in crime, divorce and bankruptcy and other things. An ounce of prevention is worth a pound of cure, and any legislation must include, must include sufficient funds to carry out education, treatment and research services related to problem gambling.

We must also include common sense safeguards for consumers like a self exclusion list, gambling time limits, monetary deposit limits and privacy, and data security requirements, just to name a few.

Two of our colleagues, Mr. Campbell and Mr. Frank, are here today to testify about their bill. The Internet Gambling Regulation Consumer Protection Enforcement Act, H.R. 1174. That bill would give the Department of the Treasury the responsibility of implementing a national licensing regime for Internet gambling sites. This bill provides for fair and balanced entry into the Internet gambling marketplace and does not restrict permitted gaming to just poker. It would also would encourage State lotteries, Indian tribes and others to innovate their current businesses so they can take part in the new industry and further raise revenue.

H.R. 1174 is just one of the bills currently on the table, but regardless of which proposal we are looking at, any legislation that moves through this subcommittee and that could ultimately become law will involve tasking one or more Federal entities with implementation and oversight. It is critically important that in addition to the experts we have here today we also hear from those Federal

entities. These could include Treasury and Commerce, the Federal Trade Commission and the Consumer Financial Protection Bureau. We need to learn about any concerns that these agencies might have and potential consequences for them if they are tasked with implementing the new framework.

With an estimated 1,700 international Web sites allowing play and accepting wages from individuals in the U.S., it is critical that we act to protect American consumers by legalizing Internet gambling here. The tremendous revenue that would be realized through legalized Internet gambling at the local, State and Federal levels would be a tremendous boost to our budgets. And most importantly, American workers are poised to take advantage of this new industry through well paying jobs that could be created, software engineers and financial experts and consumer service representatives, web developers, scientists and electrical engineers who all would need to be supported by the industry.

Considering the fragile and struggling state of our economy, I strongly believe that all potential revenues should be considered to spur more robust economic growth. But if we are going to do this, Madam Chairman, if we are going to recognize gambling as legal, we must do our very best to get it right.

Thank you for listening. I yield back the balance of my time.

Mrs. BONO MACK. I thank the gentleman, and the chair now recognizes the chairman emeritus of the full committee, Mr. Barton, for 3 minutes.

OPENING STATEMENT OF HON. JOE BARTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. BARTON. Thank you, Madam Chairwoman. I am delighted to welcome our three colleagues here, Mr. Frank, Mr. Wolf, and Mr. Campbell. The bill that I have introduced builds on the work that Mr. Campbell and Mr. Frank have already done. And with regards to Mr. Wolf, I have worked with him on many issues over the years and am glad that I am not in the White House Office of Science, Space and Technology right now or he would be cutting my budget, too, and I am glad he is not.

Congressman Kenny Hulshof, former Congressman, is in audience and I think former Congressman John Porter is in the audience. We welcome those two former colleagues.

I want to make one comment on Mr. Butterfield's opening statement. I support everything he said. I want to point out that the bill that we are hoping to mark up in this subcommittee deals only with Internet poker, it does not deal with generic gaming or gambling, it is just Internet poker. And as everyone knows, poker is a game of skill. Over time the best poker player will win the most money. I am living proof of that, having been much poorer by trying to play against players better than myself and having them laugh as they take my money.

We have an interesting situation here in this country in that it is legal to play poker online, it is impossible, though, to handle the financial transactions winning or losing that result from it because of a law called UIGEA. UIGEA in my opinion is unenforceable, needs to be reformed. The bill that I have introduced will do that, H.R. 2366. I have had a number of meetings with all the stake-

holders and thanks to the skill of our chairwoman and ranking member we are going have a good cross-section of those on the second panel today.

I think there is general agreement there are still some things to be ironed out. I would point out the bill I have introduced is a States' right bill and it allows the States to make the decision whether citizens in their State can play poker online. If the State doesn't want to do that or an Indian tribe doesn't want to do that, they simply inform the Department of Commerce they don't want to participate. We are not trying to telling the States how to run their businesses, but for those States that do we are trying to have a comprehensive plan to make it fair and ethical for everyone.

So I look forward to the hearing, Madam Chairwoman. I want to thank the three Congressmen for taking their time to testify. I know how many things they could be doing and to have them give time, especially 9 o'clock on a Friday morning, is important.

I also want to welcome Mr. Frank Fahrenkopf, who will testify on the second panel. I have dealt with him on some political issues for many, many years. When I was a young Congressman he helped me quite a bit in some of my political travails earlier in my career, so I appreciate that.

With that, Madam Chairwoman, I yield back.

Mrs. BONO MACK. I thank the gentleman, and the chair is pleased to recognized Mr. Bass for 2 minutes.

OPENING STATEMENT OF HON. CHARLES F. BASS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW HAMPSHIRE

Mr. BASS. I thank the distinguished chairwoman for holding this hearing, important hearing. I also want to welcome my three colleagues to the main hearing room of the most powerful and finest committee in the Congress, welcome here. This is an important hearing.

On our second panel, we will be hearing from Charlie McIntyre, who is sitting in the front row here, Executive Director of the New Hampshire Lottery. As highlighted in my comments in a previous hearing, the New Hampshire lottery just delivered funding, almost a billion and a half dollars, for our State's education. It is the primary form of funding from the State level for education since its inception in 1964. So as our committee continues to examine online gambling, I believe that we should consider fully the experiences of existing forms of legal gaming. I am pleased to have Mr. McIntyre and our other witnesses available to us today to speak to the competencies of our gambling regulators, as well as the potential benefits and challenges posed by an online gambling world.

So I am looking forward to both panels and with that, Madam Chairman, I yield back.

Mrs. BONO MACK. I thank the gentleman. And we turn our attention to our panels. We have two panels today joining us. Each of our witnesses prepared an opening statement and it will be placed into the record. Each of you will have 5 minutes to summarize that statement in your remarks.

On our first panel we are very pleased and we welcome the Honorable Barney Frank of Massachusetts, the Honorable Frank Wolf

of Virginia, and the Honorable John Campbell of California. We welcome you all to the Subcommittee on Commerce, Manufacturing and Trade. We are very pleased you are here.

At this point we are happy to recognize Congressman Frank for 5 minutes for his opening statement.

STATEMENT OF THE HONORABLE BARNEY FRANK, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF MASSACHUSETTS

Mr. FRANK. Thank you. Thank you for having this hearing.

Mrs. BONO MACK. Can you make sure the mic is on?

Mr. FRANK. Sorry, it was not.

I thank you for this hearing and I appreciate the work of my colleague from Texas, Mr. Barton, in this. And yes, I will say to my neighbor from New Hampshire it is nice to be in the Energy and Commerce room and to be seated in front of a portrait of John Dingell, which I think is probably older than the average Member of Congress—the portrait, not Mr. Dingell.

I want to begin with the basic principle arguments. Obviously once we decide to do this, there are specific legislative details, and I think in a bipartisan way we can work them out. I will say Mr. Barton, Mr. Campbell and I have already had some meetings, and we think it is possible to come to an agreement on a lot of these specifics. But I say once we decide to do this, let's define what this is. This is allowing adult Americans to spend their own money as they wish in a form of recreation that they enjoy. I cannot understand how anyone would think that it is the role of the Federal Government to prohibit them from doing that. Regulating the way in which it is done, dealing with abuses, those are inevitable aspects of the economy we live in. But let's get to the threshold question, is it the business of the government to tell adults no, we don't think you should gamble with your own money? That is a principle which frankly I would think there should be bipartisan support on.

And I hear people talk about the nanny state. I hear people saying we should not be telling 8-year-olds what to eat for lunch. Leaving that aside, if we don't want to tell an 8-year-old what to eat for lunch, why are we telling the 8-year-old's parent, a 28-year-old, no, you can't gamble, we don't think that is appropriate?

Some of it I must say is moral disapproval, I know that creeps in sometimes. Apparently there are people who are better biblical scholars than I who have found somewhere in the Bible a prohibition on gambling. I haven't found it myself nor have I found a footnote to it which exempts bingo. But the fundamental principle remains the same.

The second problem we have here is that it violates a principle, I thought held very strongly, frankly even more so by my friends on the Republican side; namely, hands off the Internet. As somebody said, we are putting special restrictions on things done on the Internet. I thought that was the reverse of what people were talking about, because the legislation that unfortunately passed the Congress came out of the Committee on Financial Services enforces the prohibition on gambling, telling adults how dare you gamble with your own money, by restricting the use of the Internet. And again I am shocked by that.

Finally, the current regime is one of the most intrusive regulations on the banking industry that you can find. If you talk to the bankers, they very angry at this because the way in which we now make it illegal is to impose on financial institutions an impossible obligation; namely, to figure out what the payment was for. So again from the principles of my Republican friends, don't have a nanny state, don't interfere with the Internet, don't unduly burden private sector, I am very surprised that this is maintained.

Now, one of the arguments against making it illegal, some adults will abuse it and some children will do it. Let me start with the latter one. As I understand it, we have alcohol made available on the Internet, we have cigarettes made available on the Internet. The notion there are sex oriented materials that are for adults only, the notion we should ban in a society for everybody things that are OK for adults because children might get to them is the end of freedom. If we aren't able to maintain some distinction between adult permitted activity and things we want to prohibit to children, then a lot of us will have a lot of time on our hands because we will have banned a lot of things that adults ought to be able to do and it is in fact inconsistent. That is why I go back to say that inevitably it seems to me that an element of this notion that we should make gambling illegal altogether is a moral disapproval, which I think is inappropriate.

I have had people say, well, are you for the government being pro-gambling? No, let's be clear what the role of the government is in a free society. There are some things that are damaging to others and the government should prohibit. There are some things which are especially beneficial and the government should want to encourage. But the great mass of human activity is none of the government's business. We should neither encourage it nor discourage it. And not making something illegal is not an encouragement of it or an endorsement of it.

And I note the gentleman from New Hampshire mentioned a lot of reasons. I appreciate that, and we want to make sure that we draw on their experience. But some suggested that we should not allow this because it would detract from the revenues that lotteries get. The gentleman did not suggest that, I don't even put that word in his mouth, but again from the standpoint of my Republican colleagues any suggestion that we should ban private sector entities from engaging in activity because it might detract from the revenue that public sector entities get; in other words, we should give a monopoly to the public sector, would seem to be quite far from what I would hope would be the prevailing philosophy here.

I think we can deal with the addiction issue here. I will say that the addiction issue here does not seem to me different from the addiction issue with alcohol and other things.

And finally, I would say with regard to college students, there was an argument when we did it in our committee that somebody cited a study how terrible this was for college students and leading to suicides. The author of that study said, no, that is not what I said. And if we were going to ban things because students might get addicted to them, my guess is we would probably not start with Internet gambling, we would start with video games. There is a great problem of addiction of video games and the way a rational,

free society deals with addiction is to allow the great majority of people to do it and to try to treat and help the people who are addicted.

So I hope this committee will go ahead with the basic principle, and I look forward to our working out the specifics.

[The prepared statement of Mr. Frank follows:]

Testimony of Congressman Barney Frank

before the Subcommittee on Commerce, Manufacturing, and Trade

"Internet Gaming: Regulating in an Online World."

November 18, 2011

I am here today in support of licensing and regulating online gambling, primarily because I believe adults should be allowed to spend their own money as they see fit, free of governmental intrusion. And I also believe that licensing and regulation of internet gambling will provide real consumer protection in an area that is currently vulnerable.

In 2006, the Unlawful Internet Gambling Enforcement Act (UIGEA) was enacted, which restricted the use of the payments system for Americans who sought to gamble online. I believe that it is an inappropriate interference on the personal freedom of Americans, and should be undone. And the ban did not make consumers safe. On April 15 "Black Friday", the owners of Full Tilt poker were arrested and

subsequently indicted by a federal grand jury for fraud and money laundering.

I voted against the ban in 2006 and for the past three Congresses, I have sought to reverse that ban. I introduced legislation – the first version in 2007 – and the latest iteration, which is identical to what Financial Services reported out last year on a bipartisan vote – is led this year by my colleague and friend John Campbell. This legislation is designed to protect consumers without restricting their freedom. I have always believed that it is a mistake to tell adults what to do with their own money. Some adults will spend their money foolishly, but it is not the purpose of the Federal Government to prevent them legally from doing it. We should ensure that they have appropriate consumer protections and information, but otherwise allow people to pursue activities that they enjoy which do not harm others. As John Stuart Mill said in his essay, On Liberty in 1869:

> "The only freedom which deserves the name is that of pursuing our own good in our own way, so long as we do not attempt to deprive others of theirs, or impede their efforts to obtain it. Each is the proper guardian of his own health, whether bodily, or mental or spiritual. Mankind are greater gainers by suffering each other to live as seems good to themselves, than by compelling each to live as seems good to the rest."

I have also been very pleased to have strong support for this legislation from the Chairman of the Homeland Security Committee, Peter King, whose concern for public policies that protect us against terrorism is well known to many of us. His support for this effort is very important.

We believe that the legislation should be open to all operators – those who want to get into the business and can pass a rigorous background

check and comply with all of the regulations should be able to do so. Under our bill, any suitable person seeking to operate an Internet gambling may submit to a background investigation and apply for a license. I believe that having an open market fosters competition, promotes fairness, creates American jobs and is in the best interest of consumers.

I also strongly support, and am a cosponsor of Mr. Barton's internet poker bill, HR 2366, which is quite similar to our legislation in many respects, though it is limited to poker only. I look forward to continuing to work with him and the rest of the Committee as you consider these issues.

American consumers who wish to gamble online are currently without rigorous and consistent safeguards against fraud, identity theft, underage and problem gambling and money laundering. Some operators adhere to rigorous regulatory regimes in foreign jurisdictions, but U.S. customers have no local recourse if they have a problem. We need to

ensure that we protect American consumers by requiring that user funds are not commingled with operating funds, and obey strict regulatory protocols against fraud and cheating, with constantly updated standards, and audit requirements to ensure both the fairness of games and the soundness of financial operations.

One argument against online gambling is that there are some people, including compulsive gamblers, who should not gamble. I do not agree that just because some people should not engage in a behavior that it should be prevented for all. But I do believe that we should ensure that self exclusion protocols, gambling limits, and other anti-compulsive measures are required – which can be done even more effectively online than in the brick and mortar world. Moreover, I am a cosponsor of HR 2334, Congressman Wolf and Congressman Moran's bill to establish and implement programs for the prevention, treatment, and research of pathological and other problem gambling. I have been a cosponsor of this legislation for several Congresses – including its predecessor bill,

proposed by my former Massachusetts colleague, Marty Meehan. I also believe that this legislation should be made a part of any eventual package, and that its work should be funded out of a part of the revenue stream that is garnered from the tax provisions.

The tax provisions, which are contained in separate legislation authored by Congressman McDermott, have been jointly scored (along with the implementing legislation), and they should garner more than 42 billion dollars over ten years. Billions of dollars in taxes – both under existing law and those that would be established under Mr. McDermott's bill – currently remain uncollected in this area. And the revenue and jobs from this sector have been created overseas, due to the ban, rather than benefiting Americans.

Enacting legislation to license, regulate, and tax online gambling as well as implement problem gambling programs, would bring this industry out of the shadows, benefit consumers, create American jobs, capture

revenue and allow adults to enjoy freedom from unnecessary government interference.

I thank the committee for their consideration.

Mrs. BONO MACK. Thank you, Congressman Frank. And at this point, Mr. Wolf, thank you very much for coming today and you are recognized for 5 minutes.

STATEMENT OF THE HONORABLE FRANK R. WOLF, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF VIRGINIA

Mr. WOLF. Thank you, Madam Chair. I know that some members of the committee are aware of my strong concerns about the spread of gambling in our society. I can spend all day cataloguing story after story of ruined families, bankruptcies, suicides and official corruption. Gambling is harmful activity, and study after study has shown that many in our society there is no question it is strongly addictive. Following the enactment of the hard fought ban on Internet gambling in 2006, I never thought I would see a day that a Republican House would even consider weakening this law. For a party that champions families and traditional values, I assure you that Internet gambling is contrary to those values.

The legalization of Internet poker will enable the spread of gambling to every computer, every iPad, every iPhone, every BlackBerry, every Android and Windows phone in the country. It will send a signal to Americans that gambling is to be encouraged. It will be a windfall to the most powerful gambling interests in the country at the expense of American families and taxpayers.

There is no question that social and economic effects fall disproportionately on three groups, the poor, the elderly and the young. Notably these are the same groups of Americans that have been hardest hit by the recession.

Although some have championed this legislation as a potential budget windfall, I assure you that what tax revenues it will generate will overwhelmingly come out of the pockets of the vulnerable population. Gambling is no budget panacea. What little tax revenue it will generate taxpayers will pay out far more in the criminal justice systems, gambling treatment program and social services.

The New York Times July 2010 article said the social cost of gambling outweighs the revenue by 3 to 1. Reports done in both the 1990s and 2000s have shown the increase in legalized gambling have led to a significant increase in suicide rates. A 2008 report by a sociologist at Temple University found that, "The odds of suicide among Las Vegas residents was at least 50 percent greater than among residents elsewhere in each of the 3 decades we observed."

Gambling, according to the July 20, 2011, Daily Finance article:When it comes to severity, Americans' gambling addiction is not too far behind the Nation's drug problem. And it is growing. It says in 2007 Americans lost more than $92 billion gambling, about 9 times what they lost in 1982, and almost 10 times more than what movie goers in the U.S. Spent on tickets that year.

Bell University Professor Earl Grinols estimated that "addicted gambling cost the U.S. Between $32 billion and $58 billion a year.

I have long been concerned about the predatory nature of it and I strongly support the recommendations of the National Gambling Commission, including the 2006 Internet gambling ban.

This law was important because it dramatically limited convenience, I use the word "convenience", gambling in the U.S. The important distinction between destination gambling and convenience gambling is that by its very nature destination gambling is entertainment and is generally limited to vacations for most Americans. This limits the opportunity for addiction to develop and reduces the risk of regular gambling. However, online gambling is the ultimate, it is the ultimate in convenience gambling. Internet gambling is the crack cocaine of gambling, according to the CEO of Promises Treatment Center, the crack cocaine of gambling. It is like having a casino at your fingertips 24 hours a day, 365 days a year. People can gamble in their bathrobes, in their family rooms, at work or in college dorms.

And with the explosive growth of smart phones, tablets, mobile broadband, the potential availability of Internet poker has grown exponentially in the last 5 years since it was outlawed. People will be able to gamble whenever and wherever they want. In addition, pathological gamblers will become easily addicted to online gambling because of the Internet's easy access and instant results. It will result, it will result in an epidemic. We will read stories about this if this bill passes. It will be a constant theme.

According to CitizenLink, should the current law be overturned, "The estimated cost of Internet problem and pathological gambling addictions among adults each year in the U.S. will be 18 billion. It would be a total cost $7 billion for those under age 16.

Gambling leads to increases also in public corruption. Has this Congress forgotten the Abramoff scandal? Gambling was involved in the Abramoff scandal. Has the Congress learned anything from it or is it just like the Simon & Garfunkel song, man hears what he wants to hear and disregards the rest?

I have more, Madam Chairman, but in respect to the committee I see my stop sign has come in. I think the passage of this will increase addiction gambling and I think it will increase suicide and I think the Congress will rue the day if it ever passes.

I yield back.

[The prepared statement of Mr. Wolf follows:]

The Hon. Frank R. Wolf
Consequences of Undermining the Internet Gambling Ban
Subcommittee on Commerce, Manufacturing, and Trade
Energy and Commerce Committee
November 18, 2011

I would like to thank the chair, Mrs. Bono Mack, for the opportunity to testify this morning. I appreciate her willingness to let me discuss the dangers of legalizing Internet gambling, including poker, and the difference between destination gambling and convenience gambling.

I know that many members of this committee are aware of my strong concerns about the spread of gambling in our society. I could spend all day cataloging story after story of ruined families, bankruptcies, suicides and official corruption.

2

Gambling is a dangerous activity and study after study has shown that for many in our society, there is no question that it is strongly addictive.

Following the enactment of the hard-fought ban on Internet gambling in 2006, I never thought I would see that day that a Republican House would even consider weakening this law. For a party that champions families and traditional values, I assure you that Internet gambling is contrary to family values.

The legalization of Internet poker will enable the spread of gambling to every computer, iPad, iPhone, Blackberry, Android and Windows phone in the country.

It will send a signal to Americans that gambling is permissible and encouraged. And it will be a windfall to the most powerful gambling interests in this country at the expense of American families and taxpayers.

There is no question that the social and economic effects of gambling fall disproportionately on three groups; the poor, the elderly and the young. Notably, these are the same groups of Americans that have been hit hardest by the recent recession.

Although some have disingenuously championed this legislation as a potential budget windfall, I assure you that what tax revenue it generates will overwhelmingly come out of the pockets of the most vulnerable populations.

4

Gambling is no budget panacea – what little tax revenue it would generate, taxpayers would pay out far more in the criminal justice system, gambling treatment programs, and social services. In fact, according to a July 2010 *New York Times* article, the social costs of gambling outweigh the revenue by a factor of 3 to 1.

Reports done in both the 1990s and the 2000s have shown that increases in legalized gambling have led to a significant increase in suicide rates.

A 2008 report by a sociologist at Temple University found that, "the odds of suicide among Las Vegas residents was at least 50% greater than among residents elsewhere in each of the three decades we observed." There's no question that this is due to the regular access to gambling.

5

According to a July 2011 *Daily Finance* article, "When it comes to severity, America's gambling addiction isn't too far behind the nation's drug problem, and it's growing. In 2007, Americans lost more than $92 billion gambling, about nine times what they lost in 1982, and almost 10 times more than what moviegoers in the U.S. spent on tickets that same year."

Baylor University professor Earl Grinols estimates that "addicted gambling cost the U.S. between $32.4 billion and $53.8 billion a year."

I have long been concerned about the predatory nature of gambling and the corruption that is often associated with it and was the author of the legislation that created the National Gambling Impact Commission. I strongly supported its recommendations, including the 2006 Internet gambling ban.

This law was important because it dramatically limited convenience gambling in the U.S. The important distinction between destination gambling and convenience gambling is that, by its very nature, destination gambling is entertainment and is generally limited to vacations for most Americans. This limits the opportunity for addiction to develop and reduces the risk of regular gambling.

However, online gambling is the ultimate in convenience gambling. Internet gambling is "the crack cocaine of gambling," according to the CEO of Promises Treatment Centers.

With the explosive growth of smartphones, tablets and mobile broadband, the potential availability of Internet poker has grown exponentially just in the 5 years since it was outlawed in 2006.

7

It would be like having a casino at your fingertips 24 hours a day, 365 days a year. People would be able to gamble in their bathrobes, in their family rooms, at work or in college dorm rooms. People will be able to gamble whenever and wherever they want.

In addition, pathological gamblers will become easily addicted to online gambling because of the Internet's easy access, anonymity and instant results. This legislation will only fuel the epidemic of gambling addiction.

According to CitizenLink, should the current law be overturned, "the estimated costs of Internet problem and pathological gambling addictions among adults each year in the U.S. would be $18 billion. It would total $7 billion for those under age 18."

8

Finally, Internet gambling can provide a nearly undetectable harbor for criminal enterprises. The anonymity makes online gambling more susceptible to crime.

Gambling also leads to increases in public corruption. Remember, the Abramoff scandal all started with gambling.

The current law is working – and saving lives. According to the Annenberg Public Policy Center, within one year of the Internet gambling ban's enactment, "Card playing for money among college-age youth (18 to 22) has declined…Weekly use of the Internet for gambling also declined among this age group. Both declines are statistically significant."

I urge this committee to oppose any legislation that would weaken current law and expand online gambling, including poker. Should such a bill be reported out of this committee or, worse yet, be passed by the House, it would be a sad commentary.

Thank you.

Mrs. BONO MACK. Thank the gentleman. The chair is pleased to recognized my colleague from California, Mr. Campbell, for 5 minutes. Welcome.

STATEMENT OF THE HONORABLE JOHN CAMPBELL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. CAMPBELL. Thank you, Madam Chairwoman, Mr. Butterfield, members. I appreciate the invitation to be here. It is kind of funny that I am here because I actually don't gamble. Not because I think there is any evil about it, I just don't find any fascination with it. I don't even know the rules of poker, what is better than what, which means Mr. Barton wants to play with me all the time and thus far I have resisted those invitations.

But you know, we are not here to talk about what we personally want to do, we are always here to do what Americans want to do. The fact is that millions and millions, hundreds of millions of Americans enjoy gambling and they want to do it and they are doing it. And in 2006, as was mentioned, we passed UIGEA and basically banned or tried to ban Internet gambling. Since that bill was passed, and Mr. Wolf mentioned this in his comments, he said the availability of Internet poker and other things have exploded. More than the availability has exploded, the actual amount of Internet gambling has exploded. I think Mr. Butterfield mentioned 15 million people. There are millions and millions, tens of millions of Americans gambling online now after we passed a bill supposedly banning it. And what they are doing is they are using illegal offshore sites. When they do that, there is a lot of talk about revenue, not only do we obviously not get any revenue, but these people are unprotected. There is no regulation, there is no oversight. They don't know if they are going to get the money they are betting, they don't know if the game is fair, they don't know all kinds of things. But they are doing it and they will continue to do it because they want—it is an activity they want to do and they can access it online regardless of what we do or don't do here. And so we actually by banning it have expanded what is going on.

Now Mr. Wolf talks about problem gambling and I get that. In fact I am a cosponsor of his bill relative to problem gambling. There is problem gambling and there will be problem gambling whether we make Internet gambling legal or illegal. But we can deal with it much better if it is legal, if it is regulated, if it is understood, and if we know whose doing it, then in the current situation where people are going off on these totally unregulated sites—I mean there is been a lot of talk about this Full Tilt Poker and the recent Department of Justice invasion there. To me that is the reason we ought to be legalizing this, because millions of Americans were on that site and they were not being treated fairly. And we can make sure that they are going to be treated fairly.

Now when Mr. Wolf comments that we shouldn't allow this because there is problem gambling, you can look at drinking and many Americans don't drink, most drink responsibly, some have a problem. We tried making that illegal. We tried prohibiting it. It didn't work. We forced a lot of honest Americans, because they were going to do it anyway, into a dishonest and illegal practice.

And so prohibition was ended. We essentially have that kind of prohibition now. And we will have a better handle on the situation if we legalize it and regulate it than if we leave the current situation as it is.

And I understand the protections we can have online. You can have better protections than you do with brick and mortar gambling. If someone is a problem gambler you can put them on a list and you can have the Web site, the name, the credit card, various things on a list so that your regulated gambling sites have to not allow those people on their sites. We can verify age. There is technology now where we can verify the location, so those States, as the chairwoman mentioned, who wish to not have gambling in their States can not have gambling from their residents because the regulated sites can stop that from happening.

And they can be audited. In the bill that Mr. Frank and I have proposed the servers are required to be in the United States specifically so they can be audited, so that we know that the games are fair, that the amounts that gamblers are promised are being paid out, et cetera.

In conclusion, I want to give you four reasons I think whether it is the bill Mr. Frank and I have, the bill Mr. Barton has or something we have in between, that this committee should pass. First of all freedom. This is really about allowing adult Americans to do a practice that they have done for eons and want to do and will do.

The second is protection. They are going to do it, they ought to be able to do it in a protected and fair manner where they know what they are getting into and they understand the risks and rewards.

The other thing is jobs. We are talking about jobs around here. Right now all these things are off site. If we do this where the servers and everything has to be in the United States, which we can do in our bill and under WTO regulations, then we are actually going to create jobs in the United States.

And then the final reason is the one everyone mentions is revenue. I don't think it is the top reason, but it is one. There is no question that if you do this you can't tax it. Gambling in every jurisdiction it is, is taxed and that will bring in revenue to the Federal Government.

And with that, I appreciate being here and thank you, Madam Chairwoman.

[The prepared statement of Mr. Campbell follows:]

Testimony of The Honorable John B. T. Campbell, III
Before the House Energy and Commerce Committee
Subcommittee on Commerce, Manufacturing, and Trade
Topic: "Internet Gaming: Regulating in an Online World"

November 18, 2011

Madam Chairman and Members of the Subcommittee, my name is John Campbell and I am privileged to represent the people of California's 48th District here in Congress and before this committee today. I would also like to thank you for the opportunity to testify today on an issue that has long deserved consideration by Congress.

In 2006, we were challenged as a society to figure out how we should proceed with the confluence of a budding internet gambling industry and advancing internet technology. Millions of Americans had already begun using the Internet as a medium for play and dozens of firms, both domestic and foreign, were operating within our borders. We thought that by punishing those who took play, through the Unlawful Internet Gambling Enforcement Act (UIGEA), we would put an end to bad practices and the victimization of Americans who were wagering online. In the end, enforcement was difficult and inconsistent and number of Americans wagering online grew exponentially. As an example, Full Tilt Poker, who until just months ago was taking play from Americans, was indicted by a federal grand jury and charged with fraud and money laundering, among other things. In the wake of this and other incidents like it, what we need now is not an outright ban, but rather a safe, effective, and workable framework.

Let me be abundantly clear – I am not a gambler. I do not play poker, slot machines, cards, lotteries, or any other similar games. But millions of Americans do gamble, either in casinos, with state lotteries, or in the privacy of their own homes among family and friends. They do so for a variety of reasons, recreation and camaraderie among them. It is because I believe in a society that allows these Americans free choice to gamble online, and one that holds in high regard choice and personal responsibility, that I am advocating for us to revisit this issue today.

I, along with my friend and colleague, Mr. Barney Frank, have introduced H.R. 1174, the Internet Gambling Regulation, Consumer Protection, and Enforcement Act, which would better protect consumers without restricting their freedom. Our legislation would create a framework where Internet gaming operators can apply for licenses from the Treasury Department and federally approved state commissions, while agreeing to be strongly regulated by agencies in the United States. Under our bill, any suitable person seeking to operate an Internet gambling facility may submit to a background investigation and apply for a license. It is my belief that having an open market fosters competition, promotes fairness, and is in best interest of players.

Opponents of internet gambling legalization will claim that the activity isn't safe and will open the floodgates to allow Internet gaming operators to prey on young people and problem gamblers. Ironically, what they are describing is the "Wild West" of Internet gambling that is taking place today. Americans are placing wagers with companies located offshore and with facilities and systems that are unaudited and untested. They cannot be assured that the games are fair, that their funds are not being embezzled, and that the people operating the facilities are of

sound moral character. If anything, Internet gambling is less safe today because of the UIGEA ban, not in spite of it.

Bringing transparency, regulation, and order to this system is entirely possible. Advancements in technology have enabled other jurisdictions to verify that gamblers are of appropriate age, "geo-locate" users to ensure they are within the jurisdiction, audit the fairness of games, catch cheaters and scam artists, and ensure that user funds are segregated out from operating funds. This technology is live and there are firms capable of inspecting and auditing these institutions operating in the market today. In fact, the ability of the Department of Justice to crack down on internet gambling activities on "Black Friday" speaks to the availability, accuracy, and usefulness of these tools.

On the issue of problem gambling, I recognize that there are Americans who are not suited for any kind of gambling, including that which is conducted over the Internet. Unfortunately, there are Americans who are addicted to a whole host of products, including alcohol and tobacco. However, we, as policymakers, have chosen to trust people to consume these products responsibly and at their own risk, while providing mechanisms to mitigate the social costs incurred. To that end, I am also a cosponsor of H.R. 2334, the Comprehensive Problem Gambling Act of 2011. The bill, authored by my colleague, Mr. Frank Wolf, would allow agencies of the government to research, prevent, and address problem gambling. Furthermore, it is my expectation that part of the government's revenue streams from any resulting taxation of internet gambling be used for these purposes.

Passing legislation like ours would foster the development and growth of a new American industry, which would bring along with it thousands of jobs and billions of dollars of economic activity, the revenues of which could be taxed to assist our ailing federal budget. I would urge my colleagues in Congress to thoughtfully consider proposals to legalize, regulate, and tax internet gambling, and I look forward to working with each of you as this process moves forward.

Thank you for your time and I look forward to answering any questions you may have.

Mrs. BONO MACK. I thank all of our colleagues for your testimony this morning, and I will turn to the panel if any members have any questions for our panel. Mr. Barton, you are recognized for 5 minutes.

Mr. BARTON. Thank you. I will try to be brief.

Mr. Wolf, in your comments you repeatedly said gambling, you never once said poker. I mean you do recognize that poker is a game of skill I presume.

Mr. WOLF. If the gentleman would, I also want to say that in the testimony which I didn't finish, it said according to the Annenberg Public Policy Center within 1 year of the Internet gaming ban enactment card playing for money among college age youth 18 to 22 has declined; weekly use of the Internet for gambling also has declined among this age group. Both declines are statistically significant.

And it will not stop with this. If this bill passes, in 5 to 10 years you will now have come in fourth as many States——

Mr. BARTON. My question is do you understand——

Mr. WOLF. I think it will lead to other broader aspects and I think there will be problems with regard to corruption. And I think there will be a lot of problems.

Mr. BARTON. But that is not the answer to my question. You and I play poker. I don't know how good a poker player you are, but over time whichever one of us is the best——

Mr. WOLF. Actually I don't, but I don't think—let me just take the question. I am not here to tell you that poker is wrong. That is not my ability. What I am here to say is if you put this on Internet gambling in college dorms and people will literally in a few short minutes will be bankrupt and broken. And I believe, and I remember the case of the young kid from Lehigh University up in Allentown that committed suicide. It is not my role to say poker is not right or wrong. And God bless you, Joe, I think you are a fine Congressman. And so I am not in the position to be the judge. I think that Internet gambling will bring about suicide and problems, and so I hope you win the next time you play poker and I hope you can bring this guy in to play with you.

Mr. BARTON. Mr. Frank.

Mr. FRANK. Let me tell you first, I am not going to praise you because I agree with you. Around here you only praise people when you disagree with them. So there are no negative inferences. I just don't have to say how wonderful you are before I say you are wrong. But I would just make the point——

Mr. BARTON. You and I agree that each of us disagree about 98 percent of the time.

Mr. FRANK. On this issue, though, and obviously poker is different than other forms of gambling and it is much more skill and much less luck. But I would say I just want to emphasize what Mr. Wolf is saying. I had thought there was a consensus in this Congress, particularly strongly held by my Republican colleagues: Hands off the Internet, don't interfere with the Internet. The premise of this, as Mr. Wolf makes clear, is that there are activities that may be OK elsewhere in this society, but we should particularly ban them from the Internet, and he talks about convenience gambling. Well, I am not around here to make life inconvenient for

the people I represent, but that I want to make clear is the nub of this. Do we single out the Internet for specific prohibitions and restrictions? As I said, I thought that went contrary. By the way if you are going to do that for gambling, my guess is there are other things that people would say, well, it may be OK in general but don't we don't want them to be too convenient. And that is the major precedent that is set here. You set the precedent of putting specific and harsh restrictions on the Internet more than anywhere else in the society.

Mr. BARTON. Well, I am going to yield back, Madam Chairwoman, because I know we want to get to the second panel. But to the extent we have studies on problem gamblers and addictive gambling, it is somewhere between 1/2 of a percent and maybe as high as 2 percent. So it is an issue. Congressman Wolf is totally right to make it an issue, but it is not an overwhelming issue that cannot be dealt with, in my opinion. And this at least my bill is simply on Internet poker, it is not slot machines and roulette and scratch lotteries and all that. It is just Internet poker.

I yield back.

Mrs. BONO MACK. I thank the gentleman. The chair now recognizes Mr. Butterfield for 5 minutes.

Mr. BUTTERFIELD. Thank you very much, Madam Chairman. And again let me thank the three witnesses for their testimonies. I am going to start on my left. Mr. Frank is always on my left and so I am going to start with you and maybe end with you. But Mr. Frank. The bill that is proposed by our friend from Texas, Mr. Barton, would legalize only one form of Internet gambling and that is poker, and he painfully explains that every time that he speaks. His bill speaks to one, one form and that is poker.

The bill introduced by you and Congressman Campbell allows Internet sites that are licensed to accept bets and wagers without limiting it to poker. Only bets or wagers on sports events would be prohibited under your bill. The scope of gambling activities authorized under your bill is obviously much broader. Can you please discuss with us the broader scope of your bill and why you think allowing bets and wagers on activities other than poker is the preferred approach?

Mr. FRANK. Thank you. That is a very important question. First, let me say I agree with Mr. Barton and others. And I don't gamble myself and I don't play poker myself, but I am for letting other people do a lot of things I don't do. The fact is that I don't think we should ban either poker or anything else that is voluntary, doesn't hurt anybody else, including gambling.

Now, it does have a prohibition on sports betting. Frankly that was a practical fact. I was pushing this bill in the committee I chaired. We couldn't get it through over the objections of mostly the National Football League. I will report to you that the National Football League believes that if we were to allow Internet gambling people might start betting on football games. You might find that a shocking possibility, but I will tell you that that is the position of NFL. Let us not get into the position where people might start betting on football games. At any rate, I accepted that reality.

But beyond that, yes, our bill, Mr. Campbell's and mine, does say, as Mr. Campbell said, adults should be allowed to do on the

Internet what they prefer to do and I don't see any reason for banning gambling. There is a narrower issue on poker. I will say I am for as much freedom as I can get for people as long as they are not hurting others. If all we could get is poker, I would be for it. I am for the broader issue. I don't think we should be restricting people's freedom to do other things.

Mr. BUTTERFIELD. Thank you. Also, Mr. Frank, let's talk about oversight. The bill proposed by you and Mr. Campbell puts the responsibility for regulation on the Department of the Treasury. Under Mr. Barton's proposal it is the Department of Commerce that is tasked with this responsibility. Will you speak to that, please? Which is the preferred agency for oversight?

Mr. FRANK. Let me be very honest. The chairman of the Committee on Financial Services, which has jurisdiction over the Treasury Department, hates this bill and won't let it come up. The Department of Commerce is under the jurisdiction of this committee. And frankly I don't think it makes a great deal of moral or practical difference which agency does it. The reason, by the way, we originally talked about Treasury, is the concern here was that Internet gambling, like other Internet activities, could be a front for money laundering, for terrorism. I should note, by the way, as to that fear that it could be a front for international illegal activities, terrorism, et cetera. The chairman of the Homeland Security Committee, the gentleman from New York, Mr. King, is a strong supporter of our bill. So he believes that we have in fact solved that.

But the reason for doing Commerce rather than Treasury frankly is committee jurisdiction. I think it can be done as well in one place as another. I did it with Treasury because we did have this situation where there was a concern about money laundering, and that is under Treasury. Later on when it goes to the floor, committee jurisdiction is not binding, an amendment could be made in order if people thought it made more sense with Treasury. But it is in Commerce to get it before this very distinguished panel. Mr. Paul says this is the best committee that ever existed and I just was glad to have a chance to come here.

Mr. BUTTERFIELD. Thank you, Mr. Frank. This is my third question. A key concern for many online gamblers is that they be treated fairly and that operators minimize the risk that they will be defrauded by other players. After reviewing the testimony of another gentleman, it appears that the American Gaming Association is confident that the technology exists to prevent automated programs or poker bots from being used against unsuspected human players. It also seems judging from last month's testimony that site operators are similarly confident that their software can determine when collusion or fraud is taking place.

The Campbell-Frank bill indicates several requirements to ensure the integrity and fairness of the Internet gambling.

You have 20 seconds to respond.

Mr. FRANK. Well, first, I would say that we were so careful to put this kind of regulatory oversight in that I lost Mr. Paul's vote in committee because he as a libertarian thought we were getting too pushy with regulation, or he voted present. But secondly, yes, we do think, as Mr. Campbell said, a lot of this is going to go on,

we do know when you try to prohibit adults from doing what they want to do you to some extent just push it into illegal channels, et cetera. Prohibition of an entirely voluntarily activity rarely works in a free society, certainly with something as expansive and accessible as the Internet. We believe you will get much better consumer protection, you never get perfect, if it is lawful and therefore regulated than if it is totally unlawful.

I will say a lot fewer people die from bad booze today than died from bad booze in the twenties when we had prohibition. That doesn't mean there was never a problem, it does mean that legalization is the prerequisite for effective consumer protection regulation.

Mr. BUTTERFIELD. Thank you.

Mrs. BONO MACK. Are there members seeking time? With that, we thank our panel very much for being here today, and the subcommittee will take a very brief recess while we seat the second panel, and thank you to our colleagues for their testimony.

[Recess.]

So with that, we will resume the hearing. It was very, very brief. We welcome our second panel. Each of our witnesses has prepared their opening statement and it will be placed into the record. Each will have 5 minutes to summarize that statement in your remarks and we do try to stay as close to the 5-minute mark as humanly possible.

Joining us on our second panel are Mark Lipparelli, Chairman of Nevada Gaming Control Board; Charles McIntyre, Executive Director, New Hampshire Lottery Commission; Frank Fahrenkopf, Jr., President and CEO of the American Gaming Association; and Dr. Rachel Volberg, Senior Research Scientist at the University of Chicago.

Good morning to each of you, and thank you again for coming. You will be recognized for the 5 minutes. I think you can see the timers there and when it hits yellow that means to start getting close to wrapping it up. And please remember to turn your microphone on and bring it close to your mouth so that the TV audience, and C–SPAN or whoever might be viewing it eventually can actually hear you at home.

So with that, Mr. Lipparelli, we are pleased to recognize you for 5 minutes.

STATEMENTS OF MARK LIPPARELLI, CHAIRMAN, NEVADA GAMING CONTROL BOARD; CHARLES MCINTYRE, EXECUTIVE DIRECTOR, NEW HAMPSHIRE LOTTERY COMMISSION; FRANK J. FAHRENKOPF, JR, PRESIDENT AND CHIEF EXECUTIVE OFFICER, AMERICAN GAMING ASSOCIATION; AND DR. RACHEL A. VOLBERG, SENIOR RESEARCH SCIENTIST, NORC AT THE UNIVERSITY OF CHICAGO

STATEMENT OF MARK LIPPARELLI

Mr. LIPPARELLI. Thank you, Madam Chair, members of the committee. My name is Mark Lipparelli. I am Chairman of the State Gaming Control Board in Nevada, and I appreciate the opportunity to come and comment on what has become a very important topic in our State as well as the gaming industry in general.

My perspective is one from a regulator. I have been on the Gaming Control Board for 3 years now, appointed 3 years ago by our governor, and no sooner did I get appointed that the topic of Internet gaming became of high importance, given the interest in our industry and the potential for partnerships of our licensees in foreign markets.

It has been my experience in the last 3 years, traveling to many of the relevant jurisdictions that are known for Internet gaming, that there is a substantial amount of gaming going on in the United States today. As much as we would like to think that the laws that are passed today prevent such activity from occurring, the U.S. is seen as a robust marketplace for these Internet operators. And ironically from our experience as regulators, when we put our licensees through rigorous standards, rigorous audits, many of the operators in these foreign markets don't have the same kinds of obligations, nor do they have the same kinds of voluntary compliance that is at the bedrock of our activities as regulators.

In the State of Nevada in my comments I pointed out that almost $140 billion a year is put at risk in Nevada casinos that results in $10 billion in revenue. And over a span of time, over 30, 40, 50 years, we have enjoyed great success and increasing sophistication in the way we approach gaming regulation. I have found in my travels overseas that many of the fundamental kinds of regulations that we have in place don't exist in these foreign markets. Robust audits, suitability investigations of primary owners, and the protection of people from problem gaming, compulsive gaming, don't exist in the robust forms we have them today.

The challenge for our operators as they try to consider how to enter these markets is to compare how they will approach these marketplaces with that as part of their corporate culture, that as part of what they have developed with their patronage and bring those kinds of talents to the marketplace.

I just returned from a meeting with the International Olympic Committee just 2 days ago where the subject of Internet gaming was part of our conversations. The concern of the International Olympic Committee and many other sports leagues around the country, or around the world relates to how can they get a better handle on these Internet sites that are illegal. They are impressed by the controls that we have in place in regulated markets. And they were asking us as regulators how to impose those same kinds of standards on the sports leagues. So it is ironic that that meeting just occurred 2 days ago.

I think there was a comment made about Nevada's efforts to legalize Internet gaming within the State of Nevada, and it is true we have begun that process. We began through legislation 10 years ago legalizing Intranet gaming but there had never been an impetus to drive regulatory efforts to actually bring that about. Approximately a year ago, 2 years ago, our legislature actually passed a mandate that we adopt regulations. I am confident that the work we have put in to establishing regulatory reform, internal controls and technical standards that we have as part of our regular businesses in Nevada will be the basis for sound regulatory control of Internet gaming in the future.

A lot of questions have been raised about whether the areas of concern around Internet gaming can be effectively controlled. In my travels one of the things become noticeably interesting to me is that Internet gaming provides detailed information about gambling activity at the transaction level. When you get down to that level the ability for regulators to impose standards and requirements on operators is very robust. You can identify customers, you can identify play patterns, you can identify the people who are accessing the Internet from what device they are accessing the Internet. In the brick and mortar businesses that is very difficult. Gaming is a voluntary activity, it is often an anonymous activity, and we have substantial controls in place to look in large measure at what goes on in a casino environment.

In an Internet world it is down at the transaction level. Accounts are established, internal controls have been developed among Internet operators today to identify where someone is playing, from what machine or device they are playing. They can establish the play patterns of an individual from time of day to amount wagered. There is an ability to set up individually self-regulated controls over how much money can be wagered in a week, how much money can be lost in a day, how much money can be lost over a period of time. Those kinds of tools do not exist generally in the brick and mortar businesses.

My observations are with the combination of regulatory control, compliance programs, and sound regulation that these kinds of things can be done very successfully.

[The prepared statement of Mr. Lipparelli follows:]

WRITTEN REMARKS OF MARK LIPPARELLI

CHAIRMAN, STATE GAMING CONTROL BOARD, STATE OF NEVADA

BEFORE THE HOUSE SUBCOMMITEE ON COMMERCE, MANUFACTURING, AND TRADE

FRIDAY, NOVEMBER 18, 2011

Good morning and thank you for the invitation to provide testimony to the committee.

PERSONAL BACKGROUND

My name is Mark Lipparelli. I am the Chairman of the State Gaming Control Board in Nevada. As you may know, Nevada is the international home of gaming entertainment in the world.

I began a professional career in 1993 managing companies whose sole focus was the design, manufacture, and sale of technology based products for the casino gaming industry around the globe. The technology includes entertainment based products, such as slot machines (which many people associate with the traditional gaming experience), but also table games and a host of systems based products geared towards making casino operations more effective, more efficient, and more secure.

In the over 18 years in the industry and the last 3 years as a member of our Board, I have personally observed a material progression in the depth and breadth of gaming technology as well as the talent and expertise that has been drawn to the industry. Early in my career, many analysts pondered cautiously how far gaming might grow beyond just Nevada and Atlantic City.

Few would have been bold enough to predict gaming's uncommon expansion now found in various forms in 48 of the 50 states with a recent opening in Queens and casino openings in Ohio next year. Gaming today is a mainstream entertainment industry across the United States, from California to Maine, and from Washington State to the Gulf Coast. Indeed, gaming is now a mainstream form of entertainment around the entire globe, and increasingly in cyberspace.

Three years ago I was asked by then Governor Gibbons to serve on the three member Gaming Control Board and I was appointed Chairman of our agency in January of this year by Governor Sandoval. The Gaming Control Board has over 50 years of proud history and its over 400 employees are responsible for the regulatory oversight of all casino gaming activities in Nevada. Areas of focus range from law enforcement activities, suitability investigations, intensive audits, the collection of taxes, employee backgrounds and registration, and, among others, the review and certification of technology exposed to the millions of customers who consume gaming in our state. My industry experience has been of great value to me in my current role but is also balanced by our statutory public policy which expresses that gaming is critical to the well-being of our state. Not only do we focus on criminal elements and ownership, but we also are increasingly concerned about the interplay of technology, innovation, and the public welfare.

GAMING REGULATORY SUCCESS

I believe it is important to provide you some perspective about the success of gaming regulation in Nevada as well as several other domestic and international jurisdictions. As you likely know, our agency was borne out of a desire by state leaders over fifty years ago to

address the infiltration of undesirables into the ownership and management of casinos in Nevada. This colorful history is well documented and intriguing, however, it does not lend sufficient credit to the many professionals who have followed from those initial focused goals. Over a long span of time, past staff and leadership in Nevada and our regulatory colleagues around the country have recognized the dynamic positive internal changes in the industry while lending support to it by substantially enhancing many areas of gaming regulation. These enhancements include robust controls over casino accounting and auditing, surveillance of gaming activities, methodologies of patron dispute resolution, world class investigative techniques, and close scrutiny and certification of technologies ranging from slot machines, electronic table games, card shuffling devices, and a wide range of integrated computer monitoring systems.

The success of regulators can and should be measured by the fact that the regulated gaming industry has been relatively free of controversy despite the industry's substantial growth and expansion. The same cannot be said of gaming markets who have not been subjected to traditional gaming regulatory rigors. As further illustration, consider in Nevada alone the amount of money wagered or "put at risk" over an average year. In our fiscal 2011, this number exceeded $140 billion which translated to gaming revenues of approximately $10 billion. Think about the number of hands played, the number of slot handles pulled, the number of dice rolled to equal such a number. Compare those consequential sums measured in patron activity against what are a relatively few number of patron disputes or, worse, scandal. The combination of well-developed regulation along with industry participants who

endorse strong controls has been a very successful model and given patrons the sense they are getting a fair game.

I would not represent that this success means we, as regulators, achieve perfection nor do our licensees. Our regulation, at its core, relies heavily on strong voluntary compliance and reporting by operators and imposes a range of discipline options when such compliance falls short. As a privileged license holder, our licensees realize that a reputation of careless compliance will draw undesired attention by our agents, caution letters from our leadership, the potential for monetary fines and, in the worst case, revocation of their license. This framework is established in regulatory bodies throughout the US and is important, in context. Some of the questions you wrestle with around today's topics and hard to solve only in law and will, and should, in my view, be effectively managed through the process of regulation, technical standards, compliance plans, and ultimately in disciplinary actions.

INTERNET GAMING IS HAPPENING

As the Committee considers the topic of how to approach internet poker it is critical to acknowledge that even if no progress is made towards adoption of national legislation, unregulated gaming on the internet is, and will continue to take place in many forms (many not up for Congressional consideration). The reality of Internet gambling and the public policy issues it raises appear to be something both the supporters and opponents of regulated Internet gambling agree upon. In fact, I just returned to the US from Europe yesterday following meetings with a working group of the International Olympic Committee where a broad group of experts was queried about ways to combat illegal sports wagering on the

internet and the threat such unlicensed entities pose for sports leagues around the globe. The same group cited, in its discussion, great cooperation and enhanced law enforcement techniques among those markets where internet gaming is well-regulated. Quite unfortunately, the existing dynamic in the US around internet poker continues to reward bad actors who covet US patronage while exposing risk to the very same patrons who would benefit from the protections provided by sound gaming regulation. The recent well-publicized examples of unregulated internet operators failing to protect hundreds of millions of US customer deposits can largely be attributed to an absence of the kind of regulations we regularly enforce. As our foreign regulatory counterparts become more effective in their roles as regulators (and they are) through enhanced regulation, enforcement actions and blocking of access to our citizens, US patrons who engage in online poker are more and more likely to find fewer and fewer reputable operators in our markets, further exacerbating the problem. These rogue operators have a strong profit motivation and very little, if any, motivation to create sound internal controls or enlightened policies around underage or problem gaming.

Complicating matters is the relative difficult nature of law enforcement actions, under current law, associated with entities operating unlawful internet gaming sites. Traditional methods of law enforcement such as breaking up a hidden brick and mortar back room casino are not as simple when it comes to computer networks. Often we may be able to establish the existence of an illegal gaming site but finding the wrongdoer or sponsors can be problematic. Unlike our licensees, there is no motivation to be voluntarily compliant. In many cases, these sites do violate federal law and many, unknowingly, violate specific state laws of exposing a gambling

game without a license. However, the lack of clarity, in many minds, in the federal law leads to speculation that operating an internet gaming site can be legal.

Furthermore, following years of investment in their regulatory compliance systems, licensed gaming operators and manufacturers, who have remained relatively conservative in their exposure to fast growing international internet markets find themselves at a distinct unbalanced disadvantage. One highly reputable licensee lamented to me when considering entering a market in Europe, in paraphrase, "I have played by the rules, incurred the burdens of compliance, and supported my patrons only to observe the actions of unlicensed and untaxed competitors erode my strategic position in a growing important segment of our business."

NEVADA'S EFFORT TO CRAFT REGULATION

The Committee is likely aware Nevada has recently undertaken formal steps to adopt specific regulations, technical standards, and minimum internal control systems in response to state legislation passed over ten years ago and amended in our most recent legislative session. This important work is being lead by long tenured experts in our agency and has been enhanced by legal, accounting and technical professionals who have developed decades of knowledge practicing before our agency. It has further been bolstered by the generous assistance of my regulatory colleagues in foreign markets who have, for nearly ten years, regulated internet gaming. For over two years, I have been traveling to markets outside the United States to learn and see firsthand how internet gaming is conducted, as well as the regulatory frameworks that govern these operations.

The regulations and technical standards we have created closely follow existing successful mandates of our land based operators while giving special attention to the areas particular to online poker. I am confident that our framework will be one of the more robust if not the most robust regulatory frameworks for internet gaming in existence.

It is important to note that even if we adopt our regulations and begin considering applications for formal licensure, the State of Nevada will still need to overcome legal questions associated with online poker in the absence of Congressional action. This is a requirement in our regulations and will ultimately have to be ruled on by our final licensing authority, the Nevada Gaming Commission.

I would like to strongly emphasize that Nevada's progress on these matters, in no way, minimizes or diminishes our position of support for the work you are doing today and the goal of a well constructed national piece of legislation. I, as Chairman, Governor Sandoval and many other state leaders strongly believe that Congress should act to establish a framework for state regulatory bodies to investigate and find suitable qualified applicants to conduct internet poker, establish clear regulations and standards, as well as test and certify the technology supporting internet poker. It is our preference and, we believe, the best outcome. The complexity associated with a model of legalization driven *only* at the state level will be, I believe, a missed opportunity for Congress and will not achieve the base uniformity across markets which, again, ironically will likely benefit illegal operators and handicap licensed operators. As a prime example, European markets are struggling with this topic in real time. Several EU countries who formerly allowed patrons to play cross market have established ring fenced regulated

markets of their own. Very soon after such legalization, the same countries have realized the underlying long term success of their respective markets will undoubtedly bring them squarely back to the question of cross market play and how to do that effectively while giving respect to individual country objectives. Without action by Congress, we likely will find ourselves in the same quandary.

CAN PRIMARY CONCERNS BE EFFECTIVELY MANAGED

Several questions have been raised about the ability of industry and regulators to effectively deal with the policy questions posed by internet poker including underage gaming, problem gaming, money laundering and collusion. My answer to that question is an unconditional yes.

It is abundantly clear to me that internet gaming operations have matured meaningfully in the past ten years. It is also very clear to me the underlying systems associated with internet gaming is, in nearly every case, more advanced than the types of systems (as much as they have improved) we find in our land based casinos. While land based gaming entertainment around the country can be a relatively anonymous activity, each and every patron of an internet poker site must play via from a registered account and their actions down to key strokes and mouse clicks are logged and retained. From a money launderer's perspective, this is not an attractive fact. Moreover, as licensed internet operators mature (along with their fledgling regulator counterparts), enhanced analytical tools to identify and combat issues associated with underage gaming as well as problem gaming have been developed and more will come in the very near future. In the area of problem gaming, online systems allow for various elements of self restriction (such as loss limits, access time, and self exclusion) and analytical tools are in use

to identify material changes in play levels which can be elevated to customer service representatives for analysis.

Interestingly, the gaming industry is having real impact on underlying technology trends and movement online is adding to the momentum. Years ago this would not have been so likely as moving as many people online at relatively low cost were driving internet participation. With that success in the rear view mirror, the challenges of associated with identification of account users is becoming more relevant to other industries who are in as much need to ensure they know their customer and can provide adequate levels of security. These higher demands, while not historically as relevant to wider industry, have been commonplace in gaming for years.

Interestingly, while a great deal of focus on these challenges is warranted by all of us in this analysis phase, the actual operations I have observed would indicate to me they are quite comfortable and welcome the emphasis.

Additionally, while not true across the board, many enlightened internet licensees, who operate in highly competitive markets, have developed well-constructed policy statements and training programs similar to land based operators who realize their corporate reputations are on the line with their customers. Further, many licensees who I have met have developed robust risk management functions out of their own corporate self interest.

CONCLUSION

In conclusion, I commend the work you have started and taking on this debate. It is important. Additional analysis is needed to determine the best way forward in this growing element of the

gaming industry, but I would stress that the current backdrop provides cover to those who seek undue gain at the expense of those who invest heavily in adherence of our regulatory mandates, the communities where the operate, and the patrons who are exposed.

I offer my continued assistance to you as you progress beyond today's hearing and happy to answer any questions.

Mrs. BONO MACK. Thank you very much. Mr. McIntyre, you are recognized for 5 minutes.

STATEMENT OF CHARLES MCINTYRE

Mr. MCINTYRE. Good morning, Madam Chair. Good morning, Ranking Member Butterfield. If it please the subcommittee, I am Charlie McIntyre and I have the honor and privilege of being the Executive Director of the New Hampshire Lottery.

Let me boast for a second about the State I call home. New Hampshire is a state of firsts, the first presidential primary, and they hold that first in the Nation status religiously, fervently. To suggest that they are proud of it is an understatement.

In my area it is the first modern lottery in the U.S. the State representative from Keene, New Hampshire, after 5 tries and 10 years of efforts, passed a law in 1963 signed by Governor King to have the first lottery in the U.S., first modern lottery in the U.S.

Governor John King bought the first ticket which I brought with me, show and tell. This is the first lottery ticket in the U.S. that was purchased. Governor King bought it. Unfortunately he did not win. The director that sold it to him was named Ed Powers, a retired FBI agent. And he started what is a long tradition in the lottery world to have law enforcement, current or retired, serve as lottery directors, which I myself am a proud member of law enforcement. I served as senior state prosecutor of the State of Massachusetts with organized crime as my focus under District Attorneys William Delahunt and Willaim Keating, both having been, one, a former Member of this body and the second being a current Member of this august body.

Since 1964, when the lottery became enacted, New Hampshire has realized $1.5 billion in education funding, as Congressman Bass correctly out. And 100 percent of our profits go to education, 100 percent of our profits go to education.

When we needed to add liquidity to games, we joined with Maine and Vermont and created the first multi-state game in 1985, 26 years ago, and that game still exists today and we still run it today. New Hampshire now finds itself engaged in a casino debate in the right place, and it is now the twelfth year of the sixth legislative session in which that debate is being engaged. And whether it passes or it fails, it is being waged in the correct place, in the statehouse of New Hampshire; similarly, the question whether to expand gambling offerings on the Internet and via mobile devices should be decided by each individual State.

This belief and ideal has long roots within the confines of codified law regarding gambling. But its roots are even more basic than that. A State should maintain its right to determine its level of tolerance for the expansion of gambling within its own borders, being the moving party for that expansion.

As the history of New Hampshire points out, it took 10 years to become a lottery. Maybe the answer is no for a while until it is yes. But it should be posed to those whose lives it most directly affects, citizens of that State and those elected directly, which New Hampshire is quite large, being 40 members in the House of Representatives in New Hampshire.

Internet access is global. New Hampshire has the second highest penetration in the U.S. So each State, given that, should decide its own time and pace, its tolerance for that expansion. And as for the question of whether it is yes or no for the State of New Hampshire, then the operational questions can be asked related to payment, PCI compliance, age verification, compulsive gambling and geolocation.

The New Hampshire lottery for almost 50 years has been in control of lottery gambling within its own boards and all manner of operation and consistent with wishes of the State without significant controversy or issues. The lottery has adopted and integrated changes in technology over that time, and if the State of New Hampshire elected officials allows we will consider the Internet the next step on that path.

An important point not to be overlooked. Please. As director of the State lottery in New Hampshire, I am required to transfer $70 million of net profit by this fiscal year, $72 million next fiscal year. Any impact, any encroachment upon that gambling space in New Hampshire without execution and planning materially places those revenues at risk.

Mr. MCINTYRE. Finally, this committee is an excellent example of the tolerance, the spectrum upon which gambling exists—Utah, having no lawful gambling within her borders, and New Jersey having robust gambling presence. But both exist within each State's determination as to what is best for the citizens.

I certainly thank the committee for its time here today and certainly welcome any questions or comments you may have. Thank you, Madam Chair and Ranking Member.

Mrs. BONO MACK. Thank you, Mr. McIntyre.

[The prepared statement of Mr. McIntyre follows:]

Good morning members of the Commerce, Manufacturing and Trade subcommittee. I am Charlie McIntyre and I have the honor and privilege of serving as the executive director of the New Hampshire Lottery.

Please indulge me for a moment, in boasting of the place I call home and the lottery I am honored to work for. New Hampshire is a state of firsts, most importantly, the first presidential primary in the United States. As a transplant I was unaware of how fervently and how deeply the people of New Hampshire hold their role in the process of selecting a president – but in New Hampshire – the time surrounding the first primary is sacred. To say that New Hampshire citizens are proud of their first in the nation status virtually defines understatement.

Following in the tradition of firsts, New Hampshire was home to the first modern lottery in the United States. After five attempts and ten years of trying, Larry Pickett, an intrepid legislator from Keene NH, oversaw the passage of legislation in 1963 which permitted the first modern lottery in the US to begin selling tickets a year later; despite fears of corruption, social issues and the end of civilization as the opponents then knew, the bill became law. Gov. John King bought the first New Hampshire ticket from its first director Edward Powers, on March 12, 1964 which I have here today. Mr. Powers was a retired FBI agent, and many US lottery directors have followed that lead and come from long and distinguished careers in law enforcement. I, myself, was a senior state prosecutor in Massachusetts specializing in organized criminal conduct for a number of years, serving under District Attorneys William Delahunt and William Keating, the former having served and the latter being a current member of this august body.

Since that first day in 1964, the New Hampshire lottery has provided almost $1.5 billion in education funding to the public schools of New Hampshire. Currently, we provide approximately 7% of the state's education funding and – 100% - of our profits go to educate NH school children

New Hampshire, along with sister states Maine and Vermont, was also the first to create a multi-state lottery game. Three governors, three separate legislatures and three lotteries banded together by compact to form a game in 1985 which we still conduct to this day. This innovation served as the precursor to the lottery games known as Mega Millions and Powerball, that effort in '85 constituted the first multi-state collaboration of its kind in the US.

New Hampshire now finds itself engaged in a debate over whether or not to legalize full casino gambling. This is the twelfth year that the debate has been conducted, the sixth legislative session to consider expanded gambling. Each time, during each session, the question of expansion is debated and thoroughly studied by the elected officials, the press and the citizens. Whether or not expanded gambling passes, the important point is that it has been put to a full and public hearing before those whose lives may be impacted.

Similarly, the question of whether to expand the gambling offerings into the internet and via mobile devices should also be decided by each individual state. This belief - this ideal - has long roots within the confines of codified law regarding gambling, but its roots are even more basic than that. Your state should maintain its right to determine its level of tolerance for the expansion of gambling, within its own borders, by being the moving party for that expansion. As the history of New Hampshire points so vividly, a question may be put to the state a number of times before the answer is yes; and sometimes the answer may be no. Nevertheless, the question should be posed only to those most directly elected by the citizens, which is admittedly in New Hampshire a far greater number than most places – New Hampshire boasts the second largest legislative body in the United States at 400 members in her house of representatives.

The internet would allow access to virtually every home for gambling. Each state must decide, on its own time and pace, what the tolerance it has for that expansion. Only after that question is answered in the affirmative can the state determine all of pertinent operational questions

including: payment, PCI compliance, age verification, compulsive gambling issues and geo-location. The New Hampshire lottery, for almost 50 years, has maintained control of lottery gambling within the borders and has handled all marketing, regulation, promotion and expansion in a manner consistent with the wishes of the state leaders; and without significant controversy or issues. The lottery had adopted and integrated changes in technology over that time; and if the state of New Hampshire's elected officials allowed, we would consider the internet another step along that path, comfortable that it could be successfully managed and regulated in state.

An important point not to be overlooked, as the director of the state lottery, I am responsible for transferring to the New Hampshire education trust fund $70 million dollars this fiscal year in net proceeds and $72 million next fiscal year. Any impact, any encroachment upon the gambling space in New Hampshire without deliberate execution and careful planning will materially place those revenues at risk.

Finally, the question of gambling and expansion has always been reflected in each individual state's approach to governing. The tolerance of a state for gambling is in direct correlation to that states position on expansion and this committee is a wonderful example of the spectrum upon which gambling rests across the United States. At one end of the spectrum is Utah, which has no lawful gambling within her borders that I am aware of; on the other end is the state of New Jersey, which has an active casino presence, a mature and robust lottery, horse racing, charitable gaming and is currently attempting to start both sports betting and internet wagering on its own. Both exist based upon each state's determination as to what is best for their citizens. But regardless of where each state rests on that line, it was determined after a deliberate process that occurred within the state.

I certainly thank the committee for your time and efforts in this matter, and I welcome any questions or comments you may have.

Mrs. BONO MACK. Welcome, Mr. Fahrenkopf, you are recognized for your 5 minutes.

STATEMENT OF FRANK J. FAHRENKOPF, JR.

Mr. FAHRENKOPF. Thank you, Chairman Bono Mack and Ranking Member Butterfield for the opportunity to provide testimony today on behalf of the American Gaming Association which represents the commercial casino entertainment industry here in Washington.

Our industry operates in 22 States, directly and indirectly is responsible for the employment of 875,000 men and women, and accounts for about $114 billion in spending last year, which equaled nearly 1 percent of the entire 14.5 trillion U.S. GDP. We support Federal legislation that will allow States and other appropriate authorities to license and regulate online poker, while also ensuring that each State, such as New Hampshire, has the right to determine whether such activity should be permissible by residents of their State.

We believe the best approach to making that happen is to modernize and strengthen the Wire Act of 1961 with conforming amendments to the Unlawful Internet Gaming Enforcement Act to unambiguously outlaw and hopefully eliminate illegal Internet gambling. The AGA asks that any gambling legislative proposal establish Federal guidelines so there are consistent regulations for online poker in all jurisdictions that choose to have them.

In addition, the AGA asks that the legislation pass three tests. Number one—and I think this is very important—it must not create competitive advantages or disadvantages between and among legal commercial casinos, Native American casinos, State lotteries, and parimutuel wagering; no form of gaming that is currently legal should be made illegal; and the legislation must respect fundamental States rights in an appropriate manner.

Now, we for many years were opposed to all forms of Internet gambling because we did not believe the technology existed to properly regulate it with appropriate law enforcement oversight. That has changed in the last few years. There are now new technologies and processes that have proven effective for regulating and overseeing Internet gambling in First World Nations such as Great Britain, France, Italy; within the next month, Spain and Denmark, and in provinces of Canada today.

The registration processes and advanced technologies used are very similar to those used by Major League Baseball and CBS, for example, to determine game blackout areas as well as Apple, Amazon, and the online banking industry to facilitate secure eCommerce. These new registration processes and advanced technologies allow the online poker company to determine where the player is located via advanced geolocation technology and determine whether the person playing is who they say they are, using advanced biometrics or other tools to prevent underage gaming.

There is urgency to this issue, as you have heard from a number of the witnesses already, because 10 to 15 million U.S. consumers annually bet online and are at risk and have been exploited, as we know from the full-tilt activity against them by the Justice Depart-

ment. By these unregulated offshore companies, licensing and regulation would ensure U.S. residents areprotected.

Now our member companies who are interested in providing these services have agreed to abide by a code of conduct which incorporates the key elements of the successful regulations which are followed now by U.S. land-based casinos. That code requires companies to do the following: submit to extensive background investigations of the company and key personnel; ensure proper identification of every U.S. online poker player; submit to regular testing and auditing of online poker software; implement effective player exclusion processes; incorporate the effective, responsible gaming protections; and implement effective anti-money-laundering procedures.

I would like, before I conclude my testimony, to take the opportunity to address this question of problem gambling that came up with the earlier panel and which was before you in the last hearing.

It is settled science—and I say that again, it is settled science—that at any given time about 1 percent of the U.S. adult population are pathological gamblers, and that is a figure that has not changed despite the dramatic expansion of gaming opportunities during the last 35 years. Researchers also have found no evidence that online gamblers are more likely to be pathological gamblers when appropriate allowances are made for participation in other gambling activities.

In fact, a major British study found no increase in the rate of pathological gambling between 1999 and 2007, even though Internet gambling became widely available during that period. Similar studies emerged in a study of Swedish gamblers, but the most definitive and recent research on this topic has been conducted by the Division of Addictions at the Cambridge Health Alliance, an affiliate of Harvard Medical School.

Their study of the actual transactions and behaviors of 40,000 online gamblers directly contradicts the belief that Internet gambling breeds excessive and problematic gaming behavior. This comprehensive research, the largest study of its kind, found that the mast majority of online gamblers play responsibly and can moderate their behaviors.

Researchers have also found that online gaming participation decreases over time, saying that they did not find evidence to support claims that Internet gambling will cause escalated or even sustained rates. I have got more, but my time is up and perhaps during the questions and answers we can get to them.

Mrs. BONO MACK. Thank you, Mr. Fahrenkopf.

[The prepared statement of Mr. Fahrenkopf follows:]

AMERICAN GAMING ASSOCIATION

Written Testimony of
Frank J. Fahrenkopf Jr., President and CEO
American Gaming Association

Submitted to the U. S. House Committee on Energy and Commerce
Subcommittee on Commerce, Manufacturing, and Trade
Hearing entitled: "Internet Gaming: Regulating in an Online World."
November 18, 2011

Thank you Chair Bono Mack, Ranking Member Butterfield and the subcommittee members for the opportunity to provide testimony on behalf of the American Gaming Association (AGA). Allow me a brief introduction of our organization. The AGA represents the commercial casino-entertainment industry by addressing federal legislative and regulatory issues affecting its members, their employees and customers.

The commercial casino industry operates in 22 states, directly employs nearly 400,000 men and women and is responsible for an additional 475,000 jobs through the additional economic activity we generate across the country. In total, our industry accounted for about $114 billion in consumer spending last year – nearly one percent of the entire $14.5 trillion U.S. Gross Domestic Product.

Clearly, our industry is squarely in the mainstream of the U.S. economy.

Today, of course, we're here to talk about online poker. I know this is the second of two hearings this subcommittee has held on the topic. At the last hearing, you asked

whether licensing and regulation of online poker is a safe bet. Our industry believes it is.

The risky bet would be to leave unchanged current law that leaves consumers, minors and those with gambling problems vulnerable to unregulated offshore companies.

As you may know, the AGA has not always taken this position. For much of the time since online gaming was first introduced, AGA members were not convinced that online poker could be regulated to protect Americans against fraud, money laundering and other illegal activities, or to prevent minors from gambling online and protect problem gamblers.

New technology and new processes have changed that. We live in a digital world where people can purchase everything from groceries to automobiles online. These e-commerce companies have developed new technology and processes to help them facilitate sales, protect customers and, in some cases, prevent minors from purchasing their products. The same types of technological and process advancements are being used in countries such as Great Britain, France, and Italy and in provinces of Canada to effectively regulate and oversee Internet gambling.

Because of those changes, the AGA now supports federal legislation that will allow states to license and regulate online poker. We believe the best approach to making

that happen is to modernize and strengthen the Wire Act of 1961 with conforming amendments to the Unlawful Internet Gambling Enforcement Act (UIEGA) that would unambiguously eliminate illegal internet gambling.

We support this for online poker only because poker is a game that vast numbers of Americans have historically played and that millions of Americans still play. It is also a game of skill, unlike other forms of Internet gambling, and it is played between or among individuals, whereas in other forms of Internet gambling the customer is playing against the "house."

The AGA asks only that any legislative proposal establish federal guidelines so there will be consistent regulations for online poker in all states. Without a federal overlay, there will be a patchwork quilt of rules and regulations that will prove confusing for customers and difficult for law enforcement to manage.

Additionally, the AGA has a long-standing policy of putting any gaming legislative proposal through three tests: 1) The legislation must not create competitive advantages or disadvantages between and among legal commercial casinos, Native American casinos, state lotteries and pari-mutuel wagering operations; 2) No form of gaming that currently is legal shall be made illegal; and 3) The legislation must respect fundamental states' rights in an appropriate manner. Any online poker legislation must pass these three tests to gain AGA support.

The fact is practically every adult in the country has played poker at one time or another, and today the preferred venue for millions of poker players is the Internet.

There is urgency to this issue, because each day millions of U.S. consumers are playing online at risk. Last year, in the United States, an estimated 10 million to 15 million people bet billions of dollars online, even though it is illegal for companies to offer real-money Internet gambling in the U.S. Americans will continue to bet online as long as there are sites they can access, and we can expect that there will always be sites they can access as long as there are billions of dollars to be made.

Even the indictments of executives from several online poker companies last April did not stop Internet gambling. Offshore operators will continue to develop new techniques to circumvent the barriers we put in place. The volume may fluctuate with each closed website and set of indictments, but demand will prevail in the end.

And it's likely that online gaming operators who fill this void will be even less regulated and less trustworthy than their predecessors, which will only hurt American consumers.

Put simply, the current environment puts American online players at risk. It is practically impossible to ensure that children are not gambling online and that the online gaming companies are acting responsibly towards those who cannot gamble responsibly. These companies, by illegally operating in the U.S., are flouting our laws; they are doing it

where law enforcement cannot reach them and where, in many cases, there is little to no regulatory oversight.

Consumers could be saved from this risk if Congress enacts federal legislation to modernize and strengthen the Wire Act of 1961 with conforming amendments to the Unlawful Internet Gambling Enforcement Act to unambiguously eliminate illegal internet gambling. Such legislation should allow states that wanted to could license and regulate online poker to do so, following federal guidelines. And it should create a level playing field so that all segments of the gaming industry have an opportunity to participate.

We know U.S.-licensed gaming companies, following time-tested gaming regulations, would provide safe, honest, responsible sites for the use of the men and women who want to play online poker. A strengthened UIGEA also would protect Americans from unscrupulous operators and would have the added advantage of bringing the jobs and revenues associated with this billion-dollar industry back to the United States.

The creation of the infrastructure to support a licensed and regulated online poker industry would create an estimated 10,000 high-tech jobs and generate $2 billion in tax revenue, primarily at the state level, every year.

To realize these benefits will require action by Congress, beginning with this committee. The AGA does not support any specific legislation, but there are certain provisions that any change should include:

- Each state should have the right to determine whether online poker should be legalized within their jurisdictions and who should be allowed to operate the sites.
- Due to the interstate nature of Internet transactions, federal guidelines should be established that states must follow to ensure a consistent regulatory and legal framework.
- U.S. law enforcement should be provided with the ability to go after illegal operators and successfully prosecute them.

In addition, online poker companies licensed in the U.S. should adhere to the same stringent level of regulation that governs brick-and-mortar casinos in this country. Our companies have a strong history of regulatory compliance. The regulations we follow are time-proven and if online poker companies are required to comply with them, it would ensure American consumers are playing in a fair and secure environment provided by a responsible operator.

The AGA introduced a Code of Conduct for U.S. Licensed Online Poker Companies that incorporates the key elements of the successful regulations followed by U.S. casinos. To be licensed, companies should agree to:

- Submit to extensive background investigations of the company and key personnel
- Ensure proper ID of every U.S. online poker player
- Submit to regular testing and auditing of online poker software
- Implement effective player exclusion processes
- Incorporate effective responsible gaming protections
- Implement effective anti-money-laundering procedures

Legislation that incorporates the provisions above and the elements of the Code of Conduct would effectively protect U.S. consumers and state licensing and regulating would eliminate illegal websites operated by offshore companies. Fortunately, new technology and processes can address those concerns. This can be accomplished through:

- A rigorous registration process;
- Technology-assisted fraud and collusion monitoring;
- Anti-money-laundering technology and processes; and,
- Promotion of responsible gaming by providing players the ability to manage their game play in real time.

Let's take a look at these safeguards.

Registration processes and advanced technology very similar to those used by companies such as Major League Baseball, CBS and Apple would allow the online poker company to:

- determine where the player is located,
- determine whether the Social Security number used is valid and is actually the player's own, which would prevent underage gambling,
- and find out if the player has any sanctions by state, federal or international governments.

Geo-location will be a key to ensuring an online poker player is abiding by the laws of the state in which he or she resides and is not playing online in a state where it is not permitted. The first step in this process is verifying the customer's location during the initial player sign-up or registration. In those cases where there are discrepancies in information or it is determined the player resides in a location where online poker is illegal, the player's registration would be rejected, and they would be unable to open an account.

The second step in the geo-location process takes place every time a customer logs on to an existing account. Each time he or she attempts to sign in, geo-location technology

would be applied to determine the IP address of their internet connection, thus determining exactly where the computer is located. Additional tools can ensure an Internet connection is not attempting to mask its location, and in some cases, real-time verification techniques can be employed when there is any ambiguity about the location.

The same database service providers that assist with geo-location processes also allow operators to verify the age of online players. This can be accomplished by confirming personal information, such as previous addresses or cars registered, through a series of challenge questions the player must answer correctly in order to log on. Additional age verification steps can also include a confirmation letter with a personal identification number sent to the address listed on government-issued identification. The PIN would then have to be entered on the operator's site to enable the account.

Preventing cheating, whether by humans or software programs, is made easy through the use of fraud and collusion monitoring technology, coupled with reporting of suspicious play by other players.

For example, operators have tremendous technological tools with which to effectively address the use of bots, or computer programs that automatically play poker hands based on a certain algorithm that the cheater believes provides them with an advantage.

Bots typically cannot match the unique traits of human players, and monitoring their mouse and cursor movements on the screen is an operator's first line of defense. Once identified as a potential bot, the player is subjected to a CAPTCHA challenge during which they must re-type a series of distorted letters and numbers on the screen in order to verify they are a human player. Further, operators can also apply subtle pixel changes to the player's screen that will cause a bot program to freeze up and thereby allow the operator to identify the cheater and seize the account.

Technology coupled with strong regulation also can prevent money laundering online. Efforts to launder money are detected through a number of reports and checks used exclusively by the gaming industry, as well as other processes that are common in financial institutions. Player verification, operator monitoring, the recording of all transactions and other activities combined with strict compliance with federal anti-money laundering laws make a well-regulated online poker site highly unattractive to launderers.

Technology also allows players to manage their gambling in real time by doing things such as designating a set amount of money or time they can spend on the site, asking for a cooling off period and, if they feel they have lost control of their gambling, choosing to self-exclude.

With these processes and the technology that supports them in place, patrons could play poker online in a safe, honest place. Law enforcement would be helped by operators' ability to quickly identify possible fraud and other criminal activities. And, the public could be confident that operators are taking bets only from jurisdictions where it is legal, keeping minors from gambling and providing assistance to problem gamblers.

Eighty-five countries have legalized online gaming, and the technology and processes described above are being used in many of them, including Western Europe and Canada, where years of experience are proof positive that the risks formerly thought to be a companion to online poker can be effectively managed.

Before concluding this testimony, I would like to take the opportunity to address in more detail the question of the impact of online poker on problem gambling.
It is settled science that at any given time that about 1 percent of the U.S. adult population are pathological gamblers, a figure that has not changed despite the dramatic expansion of gambling opportunities during the last 35 years. In fact, the most recent (2008) national prevalence study found a lifetime rate of pathological gambling of 0.6 percent.

Researchers also have found no evidence that online gamblers are more likely to be pathological gamblers. In fact, a major British study found no increase in the rate of pathological gambling between 1999 and 2007, even though Internet gambling became

widely available during that period. Similar results emerged in a study of Swedish gamblers.

More recently, in a 2010 article in *Addiction Research and Theory,* Dr. Howard J. Shaffer, director of the Division on Addictions and associate professor of psychiatry at Harvard Medical School, and his colleagues offered a comprehensive look at the research conducted to date, including summaries of their own investigations of the gambling patterns of customers of bwin.party, one of Europe's largest Internet gambling companies.

Professor Shaffer and his colleagues have pioneered new methods for studying Internet gambling by virtue of their access to the actual wagering transactions of 40,000 online gamblers, including every keystroke of every person who subscribes to the bwin.party website. These data, which reflect *actual* gambling patterns, provide "objective detailed information about betting behavior and the conditions under which gamblers place wagers."

The analysis of the bwin.party data has produced more than 10 peer-reviewed publications that contradict the notion that Internet gambling breeds excessive and problematic gambling. (A summary of the findings along with full copies of the studies mentioned above have been included with this submission.)

Although the prevalence of pathological gambling is low, and even though there is no evidence that Internet gambling would change that pattern, it is still important that online poker companies should implement responsible gaming programs just as brick-and-mortar casinos do.

By requiring licensed websites to include social responsibility protections, legalization of online poker would actually improve efforts to assist pathological gamblers. Today, without any U.S. regulation, there are no uniform requirements for player protection tools at gambling websites. Indeed, many foreign jurisdictions require no such tools, so gambling operators located in those jurisdictions often do not provide them. In addition, states can designate a portion of Internet gambling tax revenues and license fees to be directed to research about pathological gambling, as well as to treatment and to public education on the subject. For these reasons, the report by Shaffer et al. concluded that "regulators should be able to design sufficient protections to prevent any significant growth in problem gambling that results from legalization."

In conclusion, states should be allowed to license and regulate online poker following federal guidelines. Such action would protect U.S. consumers, keep children from gambling on the Internet, and provide the tools law enforcement needs to shut down illegal online operators. It would also create new high-tech jobs and tax revenue at a time when both are sorely needed.

Thank you for your time and consideration.

AMERICAN GAMING ASSOCIATION

EXECUTIVE SUMMARY – RESEARCH ON INTERNET GAMBLING BEHAVIORS

The body of research on Internet gambling has grown over the past few years, due in part to Harvard professor Howard J. Shaffer, Ph.D., and colleagues (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010). Their work pioneered new methods for studying online gambling by virtue of their access to the actual wagering transactions of 40,000 online gamblers, including every keystroke of every person that subscribes to the *bwin* Interacative Entertainment (*bwin)* website, one of the largest online gaming companies in the world. Using this data reflecting *actual* gambling patterns, rather than relying on self-report, provides "objective detailed information about betting behavior, and the conditions under which gamblers place wagers" (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010, p. 277).

The Harvard research has produced more than 10 peer-reviewed publications that outline several key findings about Internet gambling behaviors listed below. These findings highlight an overarching result: they contradict the belief that Internet gambling breeds excessive and problematic gambling behavior.

For a baseline comparison, the most commonly accepted prevalence rate for pathological gambling is 1 percent of the adult population, which was first established by Dr. Howard J. Shaffer and his colleagues (1997, 1999), and confirmed by the National Research Council of the National Academy of Sciences (1999). These rates have remained consistent despite the expansion of gaming, as shown in the Harvard Medical School Department of Health Care Policy's analysis of the National Comorbidity Survey Replication (NCS-R) in 2008 (Kessler et.al, 2008), which found a lifetime pathological gambling prevalence rate of 0.6 percent.

KEY FINDINGS INCLUDE:

A Majority of Online Gamblers Exercise Responsible Gaming Practices by Moderating Their Gambling Behavior

In a 2009 study conducted by Dr. Debi LaPlante and colleagues from the Division on Addictions, Cambridge Health Alliance, a division of Harvard Medical School, researchers studied the behavior 3,445 Internet poker players for a period of six months. Their results showed:

- Online poker players automatically separated themselves into two types of gambling behavior patterns, similarly reflecting the science-based prevalence rates of responsible gamblers and problem gamblers for other types of gambling activities:
    - 95 percent of players gambled an average of 12 Euros worth of chips at each of two poker sessions per week.
    - 5 percent of players were more involved (or "over-involved"), gambling an average of 89 Euros at each of 10 sessions per week.
- Both groups of poker players (the majority group and those who were "over- involved"), also showed the ability to moderate their gambling behavior based upon their wins and losses – as the players lost more, they spent less time in their online poker session and wagered less money.

Those Who Gamble Online Have Shown that They Can Limit Their Behavior

Overall, the Harvard researchers found only small subgroups of gamblers who appeared to be over-involved in gambling. In 2009, researchers Xuan and Shaffer studied 226 *bwin* sports bettors who reported that they experienced gambling-related problems and voluntarily closed their accounts.

- Even though they were more likely to make (and lose) a higher wager, those who closed their account were less likely to exhibit a clear sign of pathological gambling: chasing their losses. Instead, they were more likely to make wagers that were more conservative than other players.

Dr. Sarah Nelson and her colleagues (2008) also studied 567 sports bettors on the *bwin* website that placed limits on the amount that they could deposit to the online gambling website. Researchers discovered that, after self-imposing deposit limits, online players reduced their gambling activity and the time spent gambling online.

Internet Gambling Participation Decreases Over Time

Similar to research showing that gambling participation will decline after the initial spike in participation when a new game or casino is introduced to a population (LaPlante & Shaffer, 2007), Dr. LaPlante and her colleagues discovered the same trends among online gamblers when they studied online sports betting behaviors daily for 18 months (2008).

- Online gamblers rapidly subscribed and placed online bets within the first few days of the study period. Gambling activity peaked by the eighth day of the study, rapidly declined thereafter for the first 90 days and continued to fall for the remainder of the 18-month period.
- Researchers summarized that they "did not find evidence to support concerns that Internet gambling will overwhelm populations of gamblers, causing escalating rates of participation, or even sustained rates of participation" (p. 2410).

Internet Gamblers Respond to Industry's Efforts to Encourage Responsible Play

Internet sports betting operator *bwin* also partnered with the Division on Addictions to study how harm-reduction techniques can work when operators impose limits on players' gambling behavior.

- Researcher Anja Broda and colleagues (2008) discovered that, when *bwin* imposed a limit of how much money an online sports better can put in their playing account, only 0.3 percent of 47,000 online players exceeded the deposit limits once.
- The researchers believed that one reason the deposit limits were rarely exceeded might be that "sports bettors are highly responsible gamblers who bet for fun and spent relatively low amounts on betting."

College-Aged Adults Have Reported Low Participation Rates of Internet Gambling

Two national surveys of gambling behaviors among college-aged students and young adults in the United States have looked at Internet gambling in this subpopulation and found very low rates of participation.

- In a survey of more than 10,000 college students, researchers found that almost 2.5 percent had ever gambled on the Internet, and only 0.6 percent did so monthly or more frequently (LaBrie, Shaffer, LaPlante, & Wechsler, 2003).
- In a telephone survey and interviews of 1,000 participants aged 18 to 21, approximately 1 percent of college-aged students reported that they gambled on the Internet (Barnes, Welte, Hoffman, & Tidwell, 2010).

REFERENCES

Barnes, G. M., Welte, J. W., Hoffman, J. H., & Tidwell, M.-C. O. (2010). Comparisons of gambling and alcohol use among college students and noncollege young people in the United States. *Journal of American College Health: J of ACH, 58*(5), 443-452. doi:10.1080/07448480903540499

LaBrie, R. A., Kaplan, S. A., Laplante, D. A., Nelson, S. E., & Shaffer, H. J. (2008).Inside the virtual casino: A prospective longitudinal study of actual Internet casino gambling. *European Journal of Public Health, 18*(4), 410-416.

Labrie, R. A., Laplante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007). Assessing the playing field: A prospective longitudinal study of Internet sports gambling behavior. *Journal of Gambling Studies, 23*(3), 347-362.

LaPlante, D. A., Kleschinsky, J. H., LaBrie, R. A., Nelson, S. E., & Shaffer, H. J. (2009). Sitting at the virtual poker table: A prospective epidemiological study of actual Internet poker gambling behavior. *Computers in Human Behavior, 25*(3), 711-717.

LaPlante, D. A., Schumann, A., LaBrie, R. A., & Shaffer, H. J. (2008). Population trends in Internet sports gambling. *Computers in Human Behavior, 24,* 2399 – 2414.

LaPlante, D. A., & Shaffer, H. J. (2007). Understanding the influence of gambling opportunities: Expanding exposure models to include adaptation. *American Journal of Orthopsychiatry, 77*, 616-623.

LaBrie, R. A., Shaffer, H. J., LaPlante, D. A., & Wechsler, H. (2003). Correlates of college student gambling in the United States. *Journal of American College Health, 52*(2), 53-62.

National Research Council (1999). *Pathological Gambling: A Critical Review.* Washington, D.C.: National Academy Press, p. 89.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canoda: A meta-analysis.* Boston: Presidents and Fellows of Harvard College.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89,* 1369 – 1376.

Shaffer, H. J., Peller, A. J., LaPlante, D. A., Nelson, S. E., & LaBrie, R. A. (2010). Toward a paradigm shift in Internet gambling research: From opinion and self-report to actual behavior. *Addiction Research & Theory, 18*(3), 270-283.

Welte, J. W., Barnes, G. M., Tidwell, M.C. O., & Hoffman, J. H. (2009). The association of form of gambling with problem gambling among American youth. *Psychology of Addictive Behaviors, 23*(1), 105-112. doi:10.1037/a0013536

Xuan, Z., & Shaffer, H. J. (2009). How do gamblers end gambling: Longitudinal analysis of Internet gambling behaviors prior to account closure due to gambling related problems. *Journal of Gambling Studies, 25*(2), 239-252.

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A Taxometric Analysis of Actual Internet Sports Gambling Behavior

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This article presents findings from the first taxometric study of actual gambling behavior to determine whether we can represent the characteristics of extreme gambling as qualitatively distinct (i.e., taxonic) or as a point along a dimension. We analyzed the bets made during a 24-month study period by the 4,595 most involved gamblers among a cohort of 48,114 people using an Internet service to gamble on sporting events. We applied two taxometric procedures (i.e., MAMBAC and MAXCOV) to three indicators of betting behavior: total money lost, total number of bets, and total money wagered. The results fail to provide support for the view that the most involved Internet sports gamblers include a distinct category of gamblers. More research is necessary to clarify the similar features of recreational and extreme gamblers and the dimensions that scientists can use to measure these behaviors. Finally, we discuss the implications of these findings for clinical, research, and public policy activities.

Keywords: latent structure, taxometric analysis, Internet gambling, addiction, pathological gambling

Among the most long-standing debates in the psychopathology literature is whether researchers and clinicians can describe mental disorders (e.g., pathological gambling) as extreme expressions of continuously distributed traits or as qualitatively distinct patterns (Beauchaine, 2007). Participants in this debate describe the continuously distributed view as dimensional and the qualitatively distinct view as categorical, or taxonic.

To illustrate: Gambling is a common form of entertainment that the vast majority of people enjoy without any adverse consequences. However, approximately 2%–5% of those who have participated in gambling activities experience mild to serious gambling-related problems at some point during their lifetime (Kessler et al., 2008; Petry, Stinson, & Grant, 2005; Shaffer & Hall, 2001; Shaffer, Hall, & Vander Bilt, 1999; Shaffer & Korn, 2002; Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004; Welte, Barnes, Tidwell, & Hoffman, 2008; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). Conceptually, a dimensional view of gambling would locate gambling disorders at the end of a continuum, and despite the quantitative distinction, this extreme behavior would be qualitatively similar to behaviors located at other points along the continuum. Alternatively, a categorical view of gambling would locate disorders within a qualitatively distinct and extreme interval such that the behaviors would be sufficiently different (i.e., a unique taxon) from behaviors outside the interval.

Although this area of research is not without debate, there is evidence that some disorders (e.g., unipolar clinical depression) are categorical (Solomon, Ruscio, Seeley, & Lewinsohn, 2006). Evidence argues that other disorders (e.g., personality disorders) are extensions of normal behavior and, therefore, are best described as dimensional (e.g., Livesley, Schroeder, Jackson, & Jang, 1994; Markon, Krueger, & Watson, 2005; Widiger & Mullins-Sweatt, 2005). Diagnostic definitions (e.g., as the American Psychiatric Association offers in its *Diagnostic and Statistical Manual of Mental Disorders*), although not inherently categorical and often based on dimensional criteria, tend to reflect a categorical approach. This approach enhances the reliability of psychometric assessment scores and clinical evaluations. Diagnostic manuals often encourage clinicians to diagnose cases by identifying and then quantifying adverse behaviors. However, this system of classification, based on endorsing atypical behaviors, does little to advance our understanding about a target disorder's construct validity. Consequently, there is a paucity of evidence informing clinicians, researchers and policy makers about whether the fundamental precept underlying a deviant behavior reflects a unique latent architecture (Barron, 1998; Carson, 1991; Grove & Meehl, 1996; Vaillant & Schnurr, 1988; Widiger & Sankis, 2000). To date, and perhaps because pathological gambling is a relatively new diagnostic class, most clinicians and researchers have defined and treated pathological gambling as a categorical illness, preferring nosological schemes that consider this excessive behavior pattern as a distinct disorder (Beauchaine, 2007).

The goal of this study is to examine the betting characteristics of heavily involved Internet sports gamblers for the presence of a distinct category or taxon of betting characteristics. Evidence of a taxon would imply that some heavy gamblers are qualitatively different from more involved recreational Internet gamblers.

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Only three studies have focused on gambling typology and the latent structure of gambling behavior. These studies appeared during the past 2 years, indicating a growing recent interest in the conceptual architecture that represents disordered gambling. The studies include the following: (a) research focusing on older adults and gambling (Hong, Sacco, & Cunningham-Williams, 2009); (b) an investigation of community-recruited gamblers (Cunningham-Williams & Hong, 2007); and (c) a longitudinal study about the gambling activities of college students (Goudriaan, Slutske, Krull, & Sher, 2009). All of these studies used latent class analysis procedures that identified two to eight various gambler types depending on criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., Text Revision [*DSM–IV*]; American Psychiatric Association, 2000; Cunningham-Williams & Hong, 2007; Hong et al., 2009), type of games played (Goudriaan et al., 2009), source of money, or International Classification of Diseases–10 (ICD-10; World Health Organization, 1993) criteria (Cunningham-Williams & Hong, 2007). These studies used statistical techniques with important limitations for distinguishing between the presence and absence of a single categorical boundary (interested readers should see Ruscio & Ruscio, 2004a, for a brief review and a list of limitations). Therefore, no study has directly addressed the question of whether excessive gambling represents a unique category or taxon or, the alternative, a point along a continuum consistent with a dimensional view of excessive gambling.

Taxometrics and Nosology

Meehl and his colleagues developed the taxometric method to identify the presence or absence of taxonic (i.e., categorical) latent structure among psychiatric disorders (Meehl, 1999; Meehl & Yonce, 1996). Taxometric method includes specific statistical tools designed to determine whether deviant behavior belongs to a unique taxon or simply represents points along one or more dimensions. A categorical view suggests that distinct psychological features characterize deviant behavior and that these distinctive features are not shared with "normal" cases. The dimensional view suggests that normal behavior shares psychological features with deviant behavior but that the deviant group has more and perhaps more intense features. Taxometric statistics measure the interaction among several indicator variables. For example, consider the following: Researchers are interested in determining whether gender-related traits represent a unique category or a dimension. The correlation between voice pitch and hair length is negligible within a sample that includes only male or only female participants. However, within a mixed-gender sample, we can expect to find a substantial correlation—those who tend to have longer hair also are likely to have higher voices. This strategy, testing whether different associations among variables exist for different groups of observations defined by the values of index variables, underlies taxometric statistics. A review of taxometric statistics is beyond the scope of this article. However, readers interested in learning more about taxometrics should review the following resources as an entry to this literature (Meehl, 1995; Ruscio, Haslam, & Ruscio, 2006; Schmidt, Kotov, & Joiner, 2004; Waller & Meehl, 1998).

Taxometrics is "an increasingly popular approach for determining whether a dimensional or a categorical model of classification is more valid" (Widiger & Samuel, 2005, p. 48). More than 150 studies applied taxometric procedures to evaluate the latent structure of various psychopathological and behavioral constructs (Haslam, in press; Haslam & Kim, 2002). However, no studies have applied taxometric procedures to the study of excessive gambling behavior.

Until recently, scientists did not have the opportunity to study actual gambling behavior. Consequently, the current nosological system, as evidenced and operationalized by *DSM–IV* and ICD-10 criteria, rests mostly on self-report. A portfolio of new research focusing on actual gambling behavior is now available (e.g., Braverman & Shaffer, 2010; LaPlante, Schumann, LaBrie, & Shaffer, 2008; Xuan & Shaffer, 2009). A series of studies conducted with behavioral variables (e.g., total amount wagered, bet size, total amount lost, frequency, etc.) defined and described the behavior of subgroups of most involved gamblers (LaBrie, Kaplan, LaPlante, Nelson, & Shaffer, 2008; LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007). The present study extends the research experience with actual betting behavior to answer the question of whether problematic gambling is best considered a quantitative (dimensional) or qualitative (categorical) classification.

The Present Study

Our research collaboration with an Internet gambling service provider, bwin Interactive Entertainment AG (hereinafter referred to as bwin), provides access to valuable information. Our longitudinal database was uniquely well suited to answering the research question. The database consists of actual bets made during a 2-year period by a cohort of 48,114 gamblers who enrolled at bwin Interactive Entertainment AG during February 2005. The use of actual betting records avoids the potential inaccuracies introduced by self-report. The large size of the cohort and the 2-year accumulation of data are sufficiently massive to permit confident investigation of a low-prevalence disorder. We have published a portfolio of studies that examined this longitudinal cohort's aggregated gambling behavior. This work summarizes the parameters of betting such as size, frequency, and so forth (Braverman & Shaffer, 2010; Broda et al., 2008; LaBrie et al., 2008; LaBrie, LaPlante, et al., 2007; LaPlante, Kleschinsky, LaBrie, Nelson, & Shaffer, 2009; LaPlante et al., 2008; Nelson et al., 2008; Xuan & Shaffer, 2009). This longitudinal cohort enrolled at a time when bwin's principal focus was on sports gambling. Only a small fraction (i.e., less than 3%) of the cohort did not engage in betting on sports. Our research is the first to investigate the latent structure of actual Internet gambling behavior. We used the characteristics of sports gambling to address whether the nosological structure of intemperate gambling behavior is categorical or dimensional. We applied taxometric techniques successfully used by others to determine whether a taxon of Internet sports gamblers could be identified in our analysis. If our analyses were to identify group of heavily involved gamblers who display similar behaviors that are unique and distinct from the larger group of recreational gamblers, we will have identified the characteristics of a gambling taxon. Evidence that either supports or does not support a taxon for disordered Internet sports gambling will help clinicians and policy makers more effectively identify, prevent, regulate, and treat individuals with gambling-related problems.

Method

Participants

The participants for this study derive from a cohort of 48,114 people who opened an account during February 2005 with the Internet gambling service provider, bwin Interactive Entertainment AG. Their information includes records of betting behavior from enrollment through February 2007. This longitudinal cohort supplied information for several other studies of actual gambling behavior (Broda et al., 2008; LaBrie et al., 2008; LaBrie, LaPlante, et al., 2007; LaPlante et al., 2009; LaPlante et al., 2008; Nelson et al., 2008; Xuan & Shaffer, 2009). The average age of individuals in this cohort was 31 years (SD = 10.0) and most (91.6%) were male. The players in this cohort were from 85 countries. The 40,406 cohort members who engaged in sports betting for more than 3 days comprised the analytic sample that we used to identify and select the betting behavior indicators for the taxometric analyses.

Taxometric analysis is particularly powerful when the potential proportion of taxon members comprise at least 10% of the analytic sample (Schmidt et al., 2004).[1] The prevalence estimates of current disordered gambling among the general population are consistently low, 0.6% to 2% (Kessler et al., 2005; Shaffer, Hall, & Vander Bilt, 1997). Previous analysis of the longitudinal cohort of sports gamblers (LaBrie, LaPlante, et al., 2007) revealed a large number of occasional bettors who are unlikely to be members of a disordered gambling taxon. Consequently, a research sample with the suggested proportion of disordered gamblers would become available only after selecting participants with certain characteristics from the total longitudinal cohort. As an illustration, gambling problems are often associated with excessive betting involvement. Therefore, we increased the likelihood of including the suggested proportion of pathological gamblers in the cohort by including only excessive gamblers in the analytic sample. We defined an excessive gambler as one whose behavior was in the upper 5% on any one or more of the selected indicator variables. A description of these measures follows.

Measures

Previous analyses of individual Internet sports bets yielded eight aggregates describing participant-level gambling involvement (LaBrie, Nelson, et al., 2007). These measures were the following: (a) total amount wagered, (b) total number of bets, (c) average bet size (i.e., total amount wagered divided by total number of bets), (d) duration of betting (i.e., the difference in days between a participant's first and last betting day), (e) frequency of betting (i.e., the number of betting days divided by the duration); (f) number of bets per day (i.e., the total number of bets divided by the number of betting days); (g) total amount lost (i.e., losses minus winnings); and (h) percent lost (i.e., total amount lost divided by total amount wagered). Having too many indicators complicates the interpretation of results, presents substantial calculation loads (Strack, 2006), and decreases the power of the analysis if the indicators happen to be redundant (Ruscio et al., 2006). The taxometric method requires a minimum of three indicators that should be positively and nontrivially correlated with each other. However, many instances of psychopathology are multidimensional concepts; that is, mental disorders often contain characteristics that belong to multiple diagnostic "domains" that are negatively related or independent (e.g., positive and negative symptoms of schizophrenia; Cuesta, Ugarte, Goicoa, Eraso, & Peralta, 2007). For this reason, some taxometric researchers have used items from a single domain to select a set of appropriately related indicators for use within the taxometric analysis (Olatunji, Williams, Haslam, Abramowitz, & Tolin, 2008). In this study, to select the appropriate indicators, we identified the underlying independent domains (i.e., factors) among the existing variables. We performed a principal-components analysis followed by an orthogonal rotation using the complete longitudinal cohort of 40,406 Internet sports bettors. Next, we selected items from within a single factor to ensure that we have positively correlated indicators for the taxometric analysis.

Taxometric Procedures

To identify the latent structure of actual sports gambling behavior, we used two distinct taxometric procedures: MAXCOV and MAMBAC. We used Ruscio's taxometric R program (http://www.tcnj.edu/~ruscio/taxometrics.html) to produce taxometric plots and perform all calculations (Ruscio et al., 2006).

We applied the MAXCOV(maximum covariance) procedure to the three selected variables. Each variable, in turn, acts as an index variable. The index variable is ordered, and the observations are divided into groups, termed windows, according to their index variable value. For each of these groups, the procedure computes the covariance between the other two variables. For the MAXCOV, we used the maximum possible number of intervals with the recommended minimum of 25 cases per interval. The larger the number of intervals, the more likely the procedure will reveal a taxonic latent structure (Ruscio et al., 2006; Ruscio et al., 2010). By dividing our sample (N = 4,595) into equal intervals, we obtained 184 intervals: 183 intervals of 25 cases each and one interval with 20 cases.

We calculated and plotted the covariance between the two other indicators for each interval as defined by the input variable. We performed three iterations using a different input variable for each iteration. To ensure reliability of the results and to minimize the sampling error (Ruscio et al., 2006), we conducted the MAXCOV using 50 internal replications. Internal replications are particularly useful when a fixed number of cases define the intervals because cases with the same score might be distributed into several different adjacent intervals. To ensure that this arbitrary assignment did not affect the reliability of our results, we replicated the random assignment of like observations 50 times[2] (Ruscio et al., 2006). To improve the clarity and interpretability of the results, we applied a smoothing technique using the locally weighted least squares (Cleveland, 1979) method to all curves.

MAMBAC (mean above minus below a cut) is an external consistency test of the MAXCOV procedure. A MAMBAC anal-

[1] Recent studies demonstrated the possibility to discover taxa with much lower base rates given favorable data conditions (Ruscio & Marcus, 2007; Ruscio & Ruscio, 2004b; Ruscio, Walters, Marcus, & Kaczetow, 2010).

[2] Originally, Meehl did not specify the equal-N condition as a part of the MAXCOV procedure.

ysis requires only two variables. One variable acts as the index variable to MAXCOV and divides the range of its values into intervals with the same number of observations. The other variable is the output variable and provides the taxonic measurement. In MAXCOV, the measure was the covariance between and among variables. In MAMBAC, the mean is the taxonic measure, and differences in size are added to the search for taxons. The observations in each interval constitute a group, and adjacent intervals can be combined to form a larger group. MAMBAC starts with the first interval and defines observations in that group as below the cut and all other observations as above the cut. The difference between the averages of the output variable above and below cut is calculated and plotted against the value of the index variable. The procedure is repeated by including subsequent intervals in the group below the cut. We applied MAMBAC using the same 184 intervals used for the MAXCOV analyses and for the six combinations of two of the three measures alternating the index and output variables in each pair.

Taxonic Plots

Each taxometric procedure yields several plots. MAXCOV results in three plots, one for each of the three study variables as the index variable. MAMBAC produces six plots to accommodate all pairs of the three variables and alternating the index variable used in each pair. We constructed a single aggregated plot for each procedure to summarize the outcomes of the taxonic analysis.

To accommodate the effect of data characteristics on the shapes of taxonic plots, we used the bootstrap procedure developed by Ruscio and his colleagues (Ruscio & Kaczetow, 2009; Ruscio, Ruscio, & Meron, 2007). The bootstrap method generates plots for idealized taxonic and dimensional outcomes derived from the actual analytic data. These idealized data sets share important features with the actual data set such as indicator correlations, data skew, and kurtosis.

Curve Fitting

The comparison curve fit index (CCFI) measures the similarities between the plots of taxonic test results and both the idealized taxonic and idealized dimensional distributions. The several taxonic results produced by different combinations of variables are aggregated into a single plot for each procedure. CCFI values range from 0.0, indicating agreement with the ideal dimensional curve, to 1.0, indicating agreement with the ideal taxonic curve. Ruscio et al. (2007) suggested that CCFI values in the range of 0.4 to 0.6 be interpreted with caution.

Results

Index Variable Selection[3]

Factor analysis of a Spearman correlation matrix comprising the total set of eight gambling behavior measures (i.e., total amount wagered, total number of bets, bet size, duration, frequency, number of bets per day, total amount lost, and percentage lost) followed by an orthogonal rotation to a simple structure revealed four factors. The fourth factor included only a single measure, percentage lost. This measure was confounded by the large difference in the designed house advantage between fixed odds bets (about 10%) and live action bets (about 3%) and by the need to be immediately involved during the course of a game to place live action bets. Because of its uniqueness and conceptual remoteness from other measures of gambling activity, we excluded percentage lost from the input variables and repeated the factor analysis and rotation with the remaining seven measures of gambling behavior. Entering these seven variables, this analysis revealed three factors measuring the dimensions that we describe as Activity (number of bets, total amount wagered, total amount lost, and bets per day), Amount Risked (bet size), and Time Spent (frequency and duration). This solution explained 82% of the variance. The only factor that contained more than three variables was Activity, which was the largest of the three factors, explaining 43% of the variance. We selected the four variables that loaded .5 or more on this factor to select the research sample.

Research Sample

The research sample of 4,595 sports gamblers comprised 11% of the total longitudinal cohort. These bettors were among the 5% of the total sample with the largest values on one or more of the analytic variables (i.e., total amount wagered, total amount lost, total number of bets, and bets per day) This sample was not different from the total sample by age ($M = 32$, $SD = 10.2$) or gender (91% males) and represented 51 different countries. As Table 1 shows, this group displayed behaviors that are an extreme departure from the entire longitudinal sample.

Using the final analytic cohort, the analysis of Spearman[4] correlation coefficients revealed nontrivial positive correlations among three indicators: total amount wagered, total amount lost, and number of bets. These statistically significant ($p < .01$; $N = 4,595$) correlation coefficients ranged from .34 (between total amount lost and number of bets) to .35 (between number of bets and total amount wagered) to .56 (between total amount lost and total amount wagered). The fourth indicator—bets per day—was negatively correlated with total amount lost and total amount wagered. Taxometric analysis requires positive correlation between the indicators; therefore, we excluded bets per day from the following taxometric procedures.

As Table 2 shows, the distributions of all indicators were positively skewed and evidenced substantial kurtosis.

Taxometric Analysis

MAXCOV. The MAXCOV procedure yielded three plots; these are presented in Appendix A, each using one of the three variables as an index variable. A visual inspection of the individual plots did not indicate the outcomes to be characteristic of an underlying taxonic structure. As Figure 1 illustrates, the aggregated plot was more similar to the dimensional comparison data. However, the CCFI (Ruscio et al., 2007) was ambiguous (.49),

[3] We extend special thanks to John Ruscio and William Grove for providing valuable suggestions regarding indicator selection and general interpretation of the results.

[4] We used Spearman correlation to adjust for abnormal distribution of the data and to match the previously published analysis (Shaffer & Hall, 2001). However, Pearson correlation analysis produced similar results.

Table 1
Means (and Standard Deviations) for Research Sample and Total Cohort of Internet Sports Bettors

Variable	Analytic sample (n = 4,595)	Remainder of cohort (n = 35,811)
Total amount wagered	€26,511 [$34,355] (€58,735 [$76,117])	€964 [$1,249] (€1,644€ [$21,295])
Total amount lost	€2,307 [$2,987] (€5,313 [$6,879])	€116 [$150] (€319 € [$413])
Total number of bets	2,601 (4,683)	198 (274)
Bets per day	17 (19)	4 (3)

Note. € = Euro. Approximate monetary equivalents are provided in U.S. dollars.

failing to provide evidence to support either a taxonic or a dimensional view of Internet sports gambling.

MAMBAC. The MAMBAC procedure produced six plots as shown in Appendix B. As with the MAXCOV procedures, a visual inspection of the MAMBAC plots failed to yield evidence of a characteristic underlying taxonic structure. In addition, as with the MAXCOV analysis, the CCFI (Ruscio et al., 2007) was ambiguous (.56) and consistent with the comparison aggregate curve presented in Figure 2, which does not clearly indicate the research data to be similar to either prototype. Taken together, these results fail to provide evidence supporting either a taxonic or a dimensional view of Internet sports gambling.

Discussion

This study is the first taxometric analysis of actual Internet sports gambling behavior. The results of two taxometric procedures failed to provide support for the presence of a taxonic structure underlying Internet sports gambling. The essence of taxometric analysis lies in the consistency among and within different procedures. Neither taxometric procedure in this study demonstrated clear evidence of taxonicity.

Researchers sometimes interpret the lack of consistent evidence of taxonicity as evidence for a dimensional latent structure (Cuesta et al., 2007; Frazier, Youngstrom, & Naugle, 2007; Ginestet, Mitchell, & Wellman, 2008; Silove et al., 2007). Given that this is a new area of inquiry, we prefer a more conservative interpretation. More research is necessary to clarify whether other measures of gambling activity and/or other aggregation methods (e.g., maximums and periods of peak activity) and/or other types of gambling might reveal several taxa or an underlying taxon of excessive gambling.

Identifying taxa is a complex process that can yield mixed results. For example, the taxometric research focusing on nicotine and alcohol dependence provides conflicting results regarding the latent structure of these disorders. Ginestet et al. (2008) demonstrated dimensional structure of nicotine dependence; however, other researchers reported that smoking variables might reflect both an underlying categorical structure and an underlying dimensional one (Goedeker & Tiffany, 2008). Similarly, Slade et al. identified a dimensional structure underlying alcohol dependence (Slade, Grove, & Teesson, 2009), but other researchers report that a taxonic structure better represents this disorder (Walters, Hennig, Negola, & Fricke, 2009). Disordered gambling can be added to nicotine and alcohol dependence as disorders needing further research to clarify their underlying nature.

Table 2
Indicator Distribution Skew and Kurtosis

Variable	Skew	Kurtosis
Total amount wagered	8.03	102.03
Total amount lost	5.93	65.04
Total number of bets	7.57	91.50

The goal of this study was to examine whether there is a distinct category or taxon associated with extreme Internet gamblers as defined by their betting characteristics. Evidence of such a taxon would imply that recreational Internet gamblers are qualitatively different from those who gamble excessively. Understanding the distinct categories and characteristics between recreational and disordered gamblers would help to guide researchers and clinicians alike to the important influential associations between excessive gambling and player attributes. For example, a taxon is likely to reflect distinct patterns of comorbidity, neural substrates, and neuropsychological and genetic correlates associated with recreational gamblers compared with disordered gamblers. Identifying the characteristics of a taxon for disordered gambling would have important implications for clinicians, policy makers, regulators, the health care industry, and the gaming industry. For example, currently few gamblers receive insurance reimbursement for the treatment of pathological gambling despite its inclusion in the *DSM–IV*. Identifying a uniquely, and qualitatively different group of gamblers compared with recreational gamblers suggests that disordered gambling has an underlying architecture similar to other taxonic psychopathologies. For example, schizotypy (Golden & Meehl, 1979; Korfine & Lenzenweger, 1995; but seeRawlings, Williams, Haslam, & Claridge, 2008, for dimensional results) and autism-related cognitive dysfunction (Munson et al., 2008) have a strong evidence base supporting a categorical perspective. As with these other disorders, if a discrete taxonic structure reflects the features of disordered gamblers, this finding holds important implications for accurate diagnosis, effective treatment, early identification of risk, and improved understanding of etiology (Beauchaine, 2007). Armed with such a finding, researchers and clinicians should be able to stratify disordered gamblers and their unique characteristics to better inform treatment, gambling-related public policy, neurogenetic research, and treatment outcome measures.

Alternatively, a dimensional view of Internet sports gambling would suggest that there is no qualitative distinction between the characteristics of recreational and disordered gamblers. This conclusion would have important implications for public policy, the

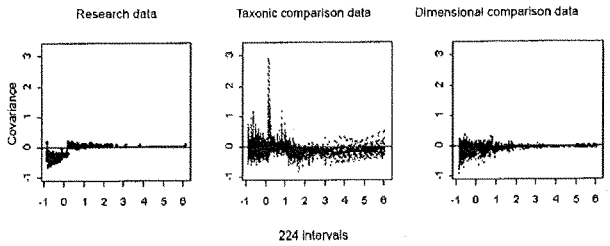


Figure 1. MAXCOV plots: Parameter matched research, simulated taxonic, and simulated dimensional data.

gaming industry, research, and clinical practice. For example, finding a clear dimensional structure of gambling behavior encourages the development of public policy that targets responsible gambling programs, which should encourage new technology that can limit excessive patterns of play instead of trying to identify players with distinctive personal risk characteristics. These responsible gambling programs also might emphasize limits to gambling opportunities. Similarly, researchers need to develop and implement continuous measures of gambling to replace the more common existing categorical diagnostic tools that are traditionally included in most psychiatric classification systems. As an illustration, the *DSM–IV* typically uses a categorical diagnostic approach for most psychiatric disorders, including pathological gambling; that is, an individual either has the disorder or does not. However, a dimensional view of gambling suggests that nosologists need to develop tools that can identify the quantitative differences among gamblers with mild, subdiagnostic signs and symptoms compared with gamblers who have more moderate or severe signs and symptoms. Advancing an improved understanding of these dimensional differences will permit clinicians to refine treatment planning distinctions so that they can allocate clinical resources to patients with different levels of need.

A dimensional model of Internet sports gambling also would have important implications for the treatment of gambling and co-occurring problems (Widiger & Mullins-Sweatt, 2005). Research shows that, in some cases, dimensional models provide more valid explanations of comorbidity than do categorical models (Widiger & Samuel, 2005). For many disorders, including alcohol dependence, substance dependence, and pathological gambling, comorbidity is more common than not (Cunningham-Williams, Cottler, Compton, Spitznagel, & Ben-Abdallah, 2000). A dimensional model of disordered gambling implies that co-occurring gambling, alcohol, and drug use disorders might reflect a single addiction syndrome (e.g., the syndrome model of addiction (Shaffer, LaPlante, et al., 2004) instead of co-occurring distinct and separate psychopathologies. Dimensional findings would encourage clinicians to assess pathological gambling, like most anxiety and mood disorders, using behavioral features that are shared by the general population.

In the absence of definitive results, it is important to emphasize that there is value to both a categorical and a dimensional view of gambling (Peralta & Cuesta, 2007). Clinicians can integrate the categorical and dimensional approaches; they should apply each for specific purposes (Kraemer, Noda, & O'Hara, 2004). For example, the dimensional perspective can guide clinicians and researchers to track symptom intensity and severity during treatment or when evaluating the efficacy of prevention efforts. A dimensional approach can help clinicians prepare patients for long-term treatment outcomes: gambling and risk taking are inherent in many aspects of life, so researchers should evaluate treatment outcomes and prevention efficacy against a continuous landscape of risk taking instead of a gambling–no gambling dichotomy. Alternatively, a categorical approach is useful to solve the pragmatic administrative needs associated with patient grouping, insurance billing, or public health program resource allocation.

The categorical interpretation of dimensional data may have important public health value. For example, there are commonly

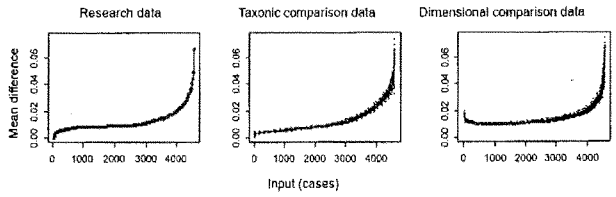


Figure 2. MAMBAC plots: Parameter matched research, simulated taxonic, and simulated dimensional data.

applied cutoffs for cholesterol and blood pressure used to identify patients who need treatment. In our research, we are making similar efforts to identify cutoffs to distinguish gamblers who need early interventions.

Limitations and Strengths

As with all research, this study is not without its limitations. Similar to the research focusing on other potential expressions of addiction (e.g., nicotine and alcohol use), our findings were ambiguous, failing to provide evidence for a disordered gambling taxon. This uncertainty might be the result of methodological considerations, such as indicator selection, data distribution abnormalities, and/or the multidimensionality of the phenomenon under investigation. The results indicating whether disordered gambling behavior is continuous or categorical depend on the selection of indicators. Our indicator selection was informed by previous studies (LaBrie et al., 2008; LaPlante et al., 2008) and the data reduction analyses specific to this study. Therefore, it is possible that other indicators (e.g., duration, frequency) might be more sensitive indices of an underlying categorical structure. We have no external criteria such as diagnostic criteria of *DSM–IV*-based gambling-related problems) that could be examined for concurrent validity of the indicators. Our data have strong positive skews for all variables, and gambling behavior is liable to substantial kurtosis. However, several simulation studies demonstrated the robustness of MAMBAC and MAXCOV procedures using skewed indicators (Cleland & Haslam, 1996; Haslam & Cleland, 1996; Ruscio & Kaczetow, 2009).

Taxometric analyses of low base-rate behaviors can be problematic. Schmidt et al. (2004) recommended that members of the assumed taxon compose at least 10% of the analytic sample. General population surveys, however, reveal that the prevalence of people who currently satisfy clinical criteria to qualify as disordered (e.g., pathological) gamblers is considerably less than 10% (Kessler et al., 2005; Shaffer et al., 1997). However, these surveys did not indicate the relative prevalence of disorder among Internet sports gamblers. Absent such a prevalence estimate, we considered it necessary to limit the analytic sample to increase the proportion of potential taxon members: those Internet gamblers most likely to qualify as pathological gamblers. Further, because excessive financial costs often accompany characteristics of disordered gambling, we limited the analytic sample to the most heavily involved bettors because this group loses the most money. Nevertheless, these efforts do not guarantee that the analytic sample has an adequate mix of taxonic and nontaxonic gamblers. If the sample was composed almost exclusively of one group or the other, we could not identify a taxonic outcome.

In this study, we measured gambling involvement by aggregating behaviors over time. Among behavioral problems, measures of total involvement or consumption might not identify excessive episodic behavior (e.g., binge drinking.) Aggregations also might not recognize people who were once heavily involved but who adapt and continue to gamble moderately or people with a long history of moderate gambling who are just beginning to enter a period of excessive play. Although these conditions might allow some disordered gamblers to escape detection, excessive financial burdens generally exhaust resources and force gamblers to discontinue play. bwin does not extend credit or arrange for other than cash and cash equivalent bets.

Previous taxometric studies frequently used another taxometric procedure—MAXEIG—in addition to MAXCOV and MAMBAC. However, recent research demonstrated almost complete redundancy between MAXEIG and MAXCOV procedures (Ruscio et al., 2010; Walters & Ruscio, 2010). Consequently, we decided to report the results of only two procedures.

Despite these limitations, this study has many important strengths. One of the substantial advantages of our analysis is the use of a large sample. Increasing the sample size is the best solution for avoiding many hazards associated with taxometric analyses, including the difficulty of graph interpretation (Schmidt et al., 2004). However, even with a large sample size, it is important to recognize the importance of indicator validity and indicator correlations within putative groups for the analysis. Another important advantage of this study is that we used continuously distributed indicators. Taxometric analyses often fail because of the absence of continuous measures. For example, psychiatric research often uses Likert-type interval scales as operational measures of one or more variables (Schmidt et al., 2004). Interval scales typically divide indicator variables into few intervals; this decreases the power of the taxometric analysis and limits the likelihood of identifying a taxon. To provide a robust taxometric test of excessive gambling, we used continuous measures of gambling behavior (i.e., total number of bets, total money wagered, and total money lost). With a substantial sample size and continuous measures, our study had appropriate design parameters for its investigative objectives.

Conclusion

Despite optimizing the opportunity to identify the taxonic latent structure underlying excessive gambling, our results failed to support a categorical understanding of excessive Internet sports gambling behavior. Given the limitations of the analyses and the fact that this article represents the first attempt to address the question of latent structure of actual Internet sports gambling data, it is important to use caution while interpreting these results. It might be too early to declare that excessive gambling behavior is not qualitatively different from recreational sports gambling. Current evidence suggests that excessive gamblers share the behavioral features of gambling with their recreational gambling counterparts and that disordered gamblers reside at the extreme of the dimensions that underlie the distributions that characterize these behaviors.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (Text rev., 4th ed.). Washington, DC: American Psychiatric Association.

Barron, J. (Ed.). (1998). *Making diagnosis meaningful: Enhancing evaluation and treatment of psychological disorders*. Washington, DC: American Psychological Association. doi:10.1037/10307-000

Beauchaine, T. P. (2007). A brief taxometrics primer. *Journal of Clinical Child and Adolescent Psychology, 36*, 654–676. doi:10.1080/15374410701662840

Braverman, J., & Shaffer, H. J. (2010). How do gamblers start gambling: Identifying behavioural markers for high-risk Internet gambling. *Euro-*

pean Journal of Public Health. Advance online publication. doi: 10.1093/eurpub/ckp232

Broda, A., LaPlante, D. A., Nelson, S. E., LaBrie, R. A., Bosworth, L. B., & Shaffer, H. J. (2008). Virtual harm reduction efforts for Internet gambling: Effects of deposit limits on actual Internet sports gambling behavior. *Harm Reduction Journal, 5.* doi: 10.1186/1477-7517-5-27

Carson, R. C. (1991). Dilemmas in the pathway of the *DSM–IV. Journal of Abnormal Psychology, 100,* 302–307. doi:10.1037/0021-843X.100.3.302

Cleland, C., & Haslam, N. (1996). Robustness of taxometric analysis with skewed indicators: I. A Monte Carlo study of the MAMBAC procedure. *Psychological Reports, 79,* 243–248.

Cleveland, W. S. (1979). Robust locally weighted regression and smoothing scatterplots. *Journal of the American Statistical Association, 74,* 829–836. doi:10.2307/2286407

Cuesta, M. J., Ugarte, M. D., Goicoa, T., Eraso, S., & Peralta, V. (2007). A taxometric analysis of schizophrenia symptoms. *Psychiatry Research, 150,* 245–253. doi:10.1016/j.psychres.2006.01.019

Cunningham-Williams, R. M., Cottler, L. B., Compton, W. M., Spitznagel, E. L., & Ben-Abdallah, A. (2000). Problem gambling and comorbid psychiatric and substance use disorders among drug users recruited from drug treatment and community settings. *Journal of Gambling Studies, 16,* 347–376. doi:10.1023/A:1009428122460

Cunningham-Williams, R. M., & Hong, S. I. (2007). A latent class analysis (LCA) of problem gambling among a sample of community-recruited gamblers. *Journal of Nervous and Mental Disease, 195,* 939–947. doi:10.1097/NMD.0b013e31815947e1

Frazier, T. W., Youngstrom, E. A., & Naugle, R. I. (2007). The latent structure of attention-deficit/hyperactivity disorder in a clinic-referred sample. *Neuropsychology, 21,* 45–64. doi:10.1037/0894-4105.21.1.45

Ginestet, C. E., Mitchell, K., & Wellman, N. (2008). Taxometric investigation of the latent structure of nicotine dependence: An epidemiological sample. *Nicotine & Tobacco Research, 10,* 833–841. doi:10.1080/14622200802023874

Goedeker, K. C., & Tiffany, S. T. (2008). On the nature of nicotine addiction: A taxometric analysis. *Journal of Abnormal Psychology, 117,* 896–909. doi:10.1037/a0013296

Golden, R. R., & Meehl, P. E. (1979). Detection of the schizoid taxon with MMPI indicators. *Journal of Abnormal Psychology, 88,* 217–233. doi: 10.1037/0021-843X.88.3.217

Goudriaan, A. E., Slutske, W. S., Krull, J. L., & Sher, K. J. (2009). Longitudinal patterns of gambling activities and associated risk factors in college students. *Addiction, 104,* 1219–1232. doi:10.1111/j.1360-0443.2009.02573.x

Grove, W. M., & Meehl, P. E. (1996). Comparative efficiency of informal (subjective, impressionistic) and formal (mechanical, algorithmic) prediction procedures: The clinical–statistical controversy. *Psychology, Public Policy, and Law, 2,* 293–323. doi:10.1037/1076-8971.2.2.293

Haslam, N. (in press). The latent structure of personality and psychopathology: A review of trends in taxometric research. *Scientific Review of Mental Health Practice.*

Haslam, N., & Cleland, C. (1996). Robustness of taxometric analysis with skewed indicators: II. A Monte Carlo study of the MAXCOV procedure. *Psychological Reports, 79,* 1035–1039.

Haslam, N., & Kim, H. C. (2002). Categories and continua: A review of taxometric research. *Genetic, Social and General Psychology Monographs, 128,* 271–320.

Hong, S.-I., Sacco, P., & Cunningham-Williams, R. M. (2009). An empirical typology of lifetime and current gambling behaviors: Association with health status of older adults. *Aging & Mental Health, 13,* 265–273. doi:10.1080/13607860802459849

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of *DSM–IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62,* 593–602. doi:10.1001/archpsyc.62.6.593

Kessler, R. C., Hwang, I., LaBrie, R. A., Petukhova, M., Sampson, N. A., Winters, K. C., & Shaffer, H. J. (2008). *DSM–IV* pathological gambling in the National Comorbidity Survey Replication. *Psychological Medicine, 38,* 1351–1360. doi:10.1017/S0033291708002900

Korfine, L., & Lenzenweger, M. F. (1995). The taxonicity of schizotypy: A replication. *Journal of Abnormal Psychology, 104,* 26–31. doi: 10.1037/0021-843X.104.1.26

Kraemer, H. C., Noda, A., & O'Hara, R. (2004). Categorical versus dimensional approaches to diagnosis: Methodological challenges. *Journal of Psychiatric Research, 38,* 17–25. doi:10.1016/S0022-3956(03)00097-9

LaBrie, R. A., Kaplan, S. A., LaPlante, D. A., Nelson, S. E., & Shaffer, H. J. (2008). Inside the virtual casino: A prospective longitudinal study of Internet casino gambling. *European Journal of Public Health, 18,* 410–416. doi:10.1093/eurpub/ckn021

LaBrie, R. A., LaPlante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007). Assessing the playing field: A prospective longitudinal study of Internet sports gambling behavior. *Journal of Gambling Studies, 23,* 347–362. doi:10.1007/s10899-007-9067-3

LaBrie, R. A., Nelson, S. E., LaPlante, D. A., Peller, A. J., Caro, G., & Shaffer, H. J. (2007). Missouri casino self-excluders: Distributions across time and space. *Journal of Gambling Studies, 23,* 231–243. doi:10.1007/s10899-006-9037-1

LaPlante, D. A., Kleschinsky, J. H., LaBrie, R. A., Nelson, S. E., & Shaffer, H. J. (2009). Sitting at the virtual poker table: A prospective epidemiological study of actual Internet poker gambling behavior. *Computers in Human Behavior, 25,* 711–717. doi:10.1016/j.chb.2008.12.027

LaPlante, D. A., Schumann, A., LaBrie, R. A., & Shaffer, H. J. (2008). Population trends in Internet sports gambling. *Computers in Human Behavior, 24,* 2399–2414. doi:10.1016/j.chb.2008.02.015

Livesley, W. J., Schroeder, M. L., Jackson, D. N., & Jang, K. L. (1994). Categorical distinctions in the study of personality disorder: Implications for classification. *Journal of Abnormal Psychology, 103,* 6–17. doi: 10.1037/0021-843X.103.1.6

Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: An integrative hierarchical approach. *Journal of Personality and Social Psychology, 88,* 139–157. doi:10.1037/0022-3514.88.1.139

Meehl, P. E. (1995). Bootstraps taxometrics: Solving the classification problem in psychopathology. *American Psychologist, 50,* 266–275. doi: 10.1037/0003-066X.50.4.266

Meehl, P. E. (1999). Clarifications about taxometric method. *Applied & Preventive Psychology, 8,* 165–174. doi:10.1016/S0962-1849(05)80075-7

Meehl, P. E., & Yonce, L. J. (1996). Taxometric analysis: II. Detecting taxonicity using covariance of two quantitative indicators in successive intervals of a third indicator (MAXCOV procedure). *Psychological Reports, 78,* 1091–1227.

Munson, J., Dawson, G., Sterling, L., Beauchaine, T., Zhou, A., Koehler, E., . . . Abbott, R. (2008). Evidence for latent classes of IQ in young children with autism spectrum disorder. *American Journal on Mental Retardation, 113,* 439–452. doi:10.1352/2008.113:439-452

Nelson, S. E., LaPlante, D. A., Peller, A. J., Schumann, A., LaBrie, R. A., & Shaffer, H. J. (2008). Real limits in the virtual world: Self-limiting behavior of Internet gamblers. *Journal of Gambling Studies, 24,* 463–477. doi:10.1007/s10899-008-9106-8

Olatunji, B. O., Williams, B. J., Haslam, N., Abramowitz, J. S., & Tolin, D. F. (2008). The latent structure of obsessive–compulsive symptoms: A taxometric study. *Depression and Anxiety, 25,* 956–968. doi:10.1002/da.20387

Peralta, V., & Cuesta, M. J. (2007). A dimensional and categorical architecture for the classification of psychotic disorders. *World Psychiatry, 6,* 100–101.

Petry, N. M., Stinson, F. S., & Grant, B. F. (2005). Comorbidity of *DSM–IV* pathological gambling and other psychiatric disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry, 66,* 564–574. doi:10.4088/JCP.v66n0504

Rawlings, D., Williams, B., Haslam, N., & Claridge, G. (2008). Taxometric analysis supports a dimensional latent structure for schizotypy. *Personality and Individual Differences, 44,* 1640–1651. doi:10.1016/j.paid.2007.06.005

Ruscio, J., Haslam, N., & Ruscio, A. M. (2006). *Introduction to the taxometric method: A practical guide.* Mahwah, NJ: Erlbaum.

Ruscio, J., & Kaczetow, W. (2009). Differentiating categories and dimensions: Evaluating the robustness of taxometric analyses. *Multivariate Behavioral Research, 44,* 259–280. doi:10.1080/00273170902794248

Ruscio, J., & Marcus, D. K. (2007). Detecting small taxa using simulated comparison data: A reanalysis of Beach, Amir, and Bau's (2005) data. *Psychological Assessment, 19,* 241–246. doi:10.1037/1040-3590.19.2.241

Ruscio, J., & Ruscio, A. M. (2004a). A nontechnical introduction to the taxometric method. *Understanding Statistics, 3,* 151–194. doi:10.1207/s15328031us0303_2

Ruscio, J., & Ruscio, A. M. (2004b). Clarifying boundary issues in psychopathology: The role of taxometrics in a comprehensive program of structural research. *Journal of Abnormal Psychology, 113,* 24–38. doi:10.1037/0021-843X.113.1.24

Ruscio, J., Ruscio, A. M., & Meron, M. (2007). Applying the bootstrap to taxometric analysis: Generating empirical sampling distributions to help interpret results. *Multivariate Behavioral Research, 42,* 349–386.

Ruscio, J., Walters, G. D., Marcus, D. K., & Kaczetow, W. (2010). Comparing the relative fit of categorical and dimensional latent variable models using consistency tests. *Psychological Assessment, 22,* 5–21. doi:10.1037/a0018259

Schmidt, N. B., Kotov, R., & Joiner, T. E. (2004). *Taxometrics: Toward a new diagnostic scheme for psychopathology* . Washington, DC: American Psychological Association. doi:10.1037/10810-000

Shaffer, H. J., & Hall, M. N. (2001). Updating and refining meta-analytic prevalence estimates of disordered gambling behaviour in the United States and Canada. *Canadian Journal of Public Health, 92,* 168–172.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canada: A meta-analysis.* Cambridge, MA: The President and Fellows of Harvard College.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89,* 1369–1376. doi:10.2105/AJPH.89.9.1369

Shaffer, H. J., & Korn, D. A. (2002). Gambling and related mental disorders: A public health analysis. In J. E. Fielding, R. C. Brownson, & B. Starfield (Eds.), *Annual Review of Public Health, 23,* pp. 171–212.

Shaffer, H. J., LaBrie, R. A., LaPlante, D. A., Nelson, S. E., & Stanton, M. V. (2004). The road less traveled: Moving from distribution to determinants in the study of gambling epidemiology. *Canadian Journal of Psychiatry, 49,* 504–516.

Shaffer, H. J., LaPlante, D. A., LaBrie, R. A., Kidman, R. C., Donato, A. N., & Stanton, M. V. (2004). Toward a syndrome model of addiction: Multiple expressions, common etiology. *Harvard Review of Psychiatry, 12,* 367–374. doi:10.1080/10673220490905705

Silove, D., Slade, T., Marnane, C., Wagner, R., Brooks, R., & Manicavasagar, V. (2007). Separation anxiety in adulthood: Dimensional or categorical? *Comprehensive Psychiatry, 48,* 546–553. doi:10.1016/j.comppsych.2007.05.011

Slade, T., Grove, R., & Teesson, M. (2009). A taxometric study of alcohol abuse and dependence in a general population sample: Evidence of dimensional latent structure and implications for *DSM–V. Addiction, 104,* 742–751. doi:10.1111/j.1360-0443.2009.02498.x

Solomon, A., Ruscio, J., Seeley, J. R., & Lewinsohn, P. M. (2006). A taxometric investigation of unipolar depression in a large community sample. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 36,* 973–985.

Strack, S. (2006). *Differentiating normal and abnormal personality* (2nd ed.). New York, NY: Springer.

Vaillant, G. E., & Schnurr, P. (1988). What is a case? A 45-year study of psychiatric impairment within a college sample selected for mental health. *Archives of General Psychiatry, 45,* 313–319.

Waller, N. G., & Meehl, P. E. (1998). *Multivariate taxometric procedures: Distinguishing types from continua.* Thousand Oaks, CA: Sage.

Walters, G. D., Hennig, C. L., Negola, T. D., & Fricke, L. A. (2009). The latent structure of alcohol dependence in female federal prisoners. *Addiction Research & Theory, 17,* 525–537. doi:10.1080/16066350801968740

Walters, G. D., & Ruscio, J. (2010). Where do we draw the line? Assigning cases to subsamples for MAMABC, MAXCOV, and MAXEIG taxometric analyses. *Assessment, 17,* 321–333.

Welte, J. W., Barnes, G. M., Tidwell, M.-C. O., & Hoffman, J. H. (2008). The prevalence of problem gambling among U.S. adolescents and young adults: Results from a national survey. *Journal of Gambling Studies, 24,* 119–133.

Welte, J., Barnes, G., Wieczorek, W., Tidwell, M.-C., & Parker, J. (2001). Alcohol and gambling pathology among U.S. adults: Prevalence, demographic patterns and comorbidity. *Journal of Studies on Alcohol, 62,* 706–712.

Widiger, T. A., & Mullins-Sweatt, S. N. (2005). Categorical and dimensional models of personality disorders. In J. M. Oldham, A. E. Skodol, & D. S. Bender (Eds.), *Textbook of personality disorders* (pp. 35–53). Washington, DC: American Psychiatric Press.

Widiger, T. A., & Samuel, D. B. (2005). Diagnostic categories or dimensions? A question for the *Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition. Journal of Abnormal Psychology, 114,* 494–504. doi:10.1037/0021-843X.114.4.494

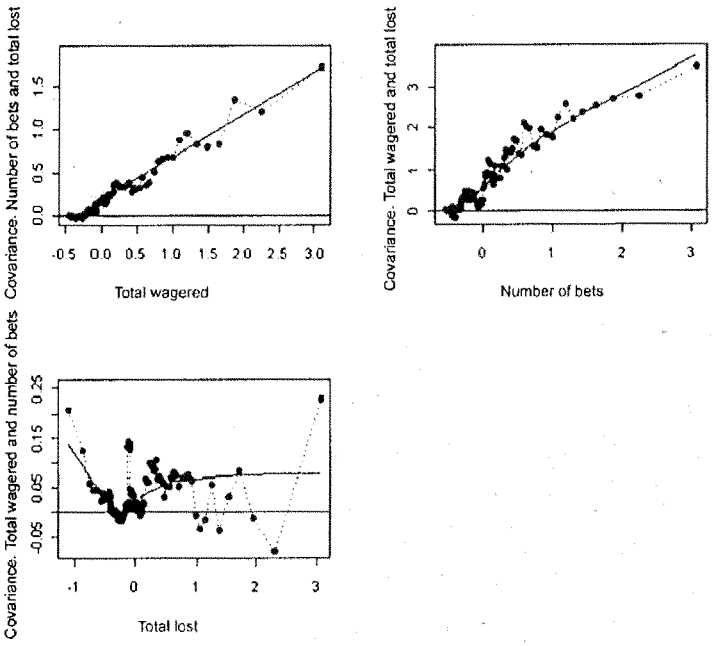
Widiger, T. A., & Sankis, L. M. (2000). Adult psychopathology: Issues and controversies. *Annual Review of Psychology, 51,* 377–404. doi:10.1146/annurev.psych.51.1.377

World Health Organization. (1993). *The ICD-10 classification of mental and behavioural disorders: Diagnostic criteria for research.* Geneva, Switzerland: Author.

Xuan, Z., & Shaffer, H. (2009). How do gamblers end gambling: Longitudinal analysis of Internet gambling behaviors prior to account closure due to gambling related problems. *Journal of Gambling Studies, 25,* 239–252. doi:10.1007/s10899-009-9118-z

Appendix A

MAXCOV Curves Plots

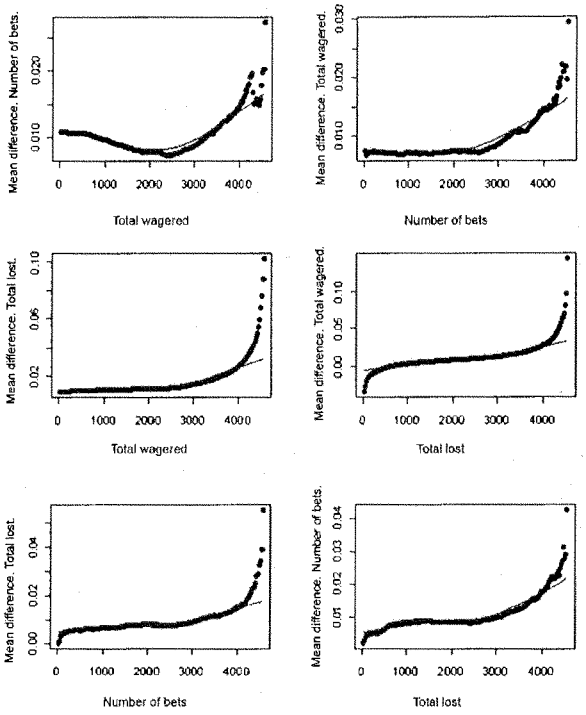


Note. Ind = Indicator.

(*Appendices continue*)

Appendix B

MAMBAC Curves Plots



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RESEARCH ARTICLE

Identifying behavioral markers of disordered Internet sports gambling

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Objective: To identify patterns of sports gambling that discriminate sports bettors with self-reported gambling-related problems from sports bettors without such difficulties.
Methods: Secondary data analysis of the actual betting behavior observed during the first 2 years of a longitudinal study of 47,134 subscribers to an Internet sports gambling site. This sample included the gambling behavior of 679 bettors who self-reported the reason for closing their accounts during that period. We contrasted the behavior of those who closed their accounts because of gambling-related problems ($n = 215$, 32%) to the behavior of other account closers (ACs) who were either not satisfied with the service ($n = 113$, 17%) or no longer interested in betting ($n = 351$, 52%).
Results: Exploratory multivariate discriminant function analyses identified a sub-group of approximately half the ACs with gambling-related problems who exhibited a homogeneous and distinct pattern of sports-betting behavior. Compared to other ACs, this sub-group made more and larger bets, bet more frequently, and were more likely to exhibit intense betting soon after enrollment. The group estimation formula derived from this prototype applied to an independent sample of ACs confirmed the prevalence of this distinct gambling pattern.
Conclusion: Because Internet gambling provides a unique opportunity to study actual gambling behavior, it is possible to identify betting patterns that can lead to the development of gambling-related problems. This pattern recognition can inform the development of interventions to help disordered gamblers recognize their risky behavior and avoid further problems.

Keywords: *Gambling, Internet, Internet gambling, gambling problems, self-exclusion, disordered gambling, sports betting*

INTRODUCTION

Internet gambling is one of the fastest growing gambling-related industries (Christiansen Capital Advisors, 2006). Research now shows that in many jurisdictions, participation in Internet gambling has grown during the past 10 years. For example, a survey conducted during 1999 and 2000 (Welte, Barnes, Wieczorek, & Tidwell, 2004) reported that 0.4% of US adults had gambled on the Internet during the last year. During 2005 through 2007, the same research group conducted a survey of US adolescents and young adults; they observed that 2% of the sample reported Internet gambling experience (Welte, Barnes, Tidwell, & Hoffman, 2009). Using the 2007 British survey data, Griffiths, Wardle, Orford, Sproston, and Erens (2009) reported that 6% of those surveyed used the Internet to gamble in the last year (i.e., they reported gambling online, betting online, and/or gambling using a betting exchange).

The rapid expansion of Internet gambling access stimulated public health concerns among policymakers (e.g., Richtel, 2004) and advocates (e.g., No More Gambling, 2004–2005). Researchers have echoed similar concerns (e.g., Smeaton & Griffiths, 2004) and raised additional worry that some Internet gambling features, such as ease of access, privacy of use, and gaps in the regulation of online betting services, pose special risks for the development of gambling-related problems (Griffiths, 2003).

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Risk detection and markers for Internet gambling problems

Medical science makes use of biomarkers to signal normal or abnormal processes, or to identify the presence of a condition or disease. Biomarkers can measure the progress of a disease or reflect a response to treatment. The logical parallel to molecular markers is behavioral markers. Clinicians observe behavioral markers associated with disease states to aid diagnosis and treatment; later, behavioral markers can measure response to interventions. The syndrome model of addiction (Shaffer et al., 2004), for example, includes risk factors, temporally distal or proximal biomarkers, and behavioral markers for addiction. Some behaviors, such as betting patterns, can be proximal to the development of gambling-related problems. Potential primary sources of information related to risk factors and disease markers include the literature focusing on (1) gambling problems emanating from land-based gambling activities and (2) Internet gambling. Land-based gambling provides self-reported information about betting activity from gamblers traveling to public venues. Internet gambling provides actual records of betting activity from gamblers with immediate, private access to gambling. The similarities and the differences for the risk factors and disease markers between these information sources hold significant potential to enhance our understanding of gambling addiction and treatment.

Research about Internet gambling

Our recent search of the literature (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010), using the PubMed and PsychINFO search engines with the search terms "Internet [AND] gambling," identified 111 articles released through March 7, 2008, excluding our own Internet gambling publications. Ten of these articles met criteria for original quantitative empirical studies of Internet gambling. These original studies used convenience samples: three sampled Internet gamblers (Wood & Williams, 2007; Wood, Williams, & Lawton, 2007; Woolley, 2003), two free care medical and dental patients (Ladd & Petry, 2002; Petry et al., 2006), two college students (Petry & Weinstock, 2007; Wood, Griffiths, & Parke, 2007), one college athletes (Kerber, 2005), one casino patrons (Woodruff & Gregory, 2005), and one employees of a university health center (Petry & Mallya, 2004). We updated this search to include publications available through the end of January 2009; we also identified an additional qualifying report (not authored by us) that is the only study of Internet gamblers from a nationally representative sample (i.e., the 2007 British Gambling Prevalence Survey, Griffiths et al., 2009). The fact that the gambling behavior represented in this study is based on self-report limits and compromises our ability to draw sound conclusions from this research.

Our literature search yielded a single study in the peer-reviewed literature that used actual gambling behavior recorded within an Internet environment. Fiedler and Rock (2009) examined data from the records of poker hands to help determine whether poker is a game of skill or chance – a topic not relevant to our interest in disordered gambling.

Studies of actual gambling behavior

Internet gambling yields records of unprecedented detail: computer systems accurately record and store virtually every keystroke. Recognizing the opportunity for research, the Division on Addictions and *bwin* Interactive Entertainment, AG formed a research collaboration (detailed in Shaffer et al., 2010) to promote responsible gambling. The computer resources integral to the Internet permit a new research paradigm that can revolutionize data collection, in general, and gambling patterns, in particular, by focusing on actual behavior rather than only self-report. Within this collaborative, *bwin* provides access to various Internet gambling information, including both the placing of bets on the outcome of sporting events and participation in various games (e.g., casino-type games, other games and lotteries, and poker). During the data collection period reported here, *bwin* was primarily a sports betting venue. More than three-quarters of the self-excluders in this study wagered a majority of their monies on sports. Compared to other betting opportunities offered by *bwin*, sports betting is more easily characterized and measured. At the moment, *bwin* offers 85 casino-type games ranging from simulated slot machines to baccarat. Similarly, there are 61 other games including backgammon and virtual horse racing. The large number of game types yields a wide range of characteristics, such as house-odds and time required to complete a game. Poker is more standardized but in this data collection, there were too few self-excluders with gambling-related problems (i.e., $n = 10$) for analysis. This study and others mentioned below used information gathered from Internet sports gamblers.

A major goal of the *bwin*-division collaborative research project is to identify procedures to protect Internet gamblers who are at risk for developing problems. For example, in one study (Broda et al., 2008), we examined the effect of *bwin*'s defined deposit limits of €5000 within a 30-day period, and €1000 within 24 hours. That study showed that deposits seldom approached the house limits and, when exceeded, subsequent gambling behavior did not change from previous behavior. The collaborative project has already produced betting system modifications designed to promote responsible gambling. For example, our study of *bwin*'s system change that allows players to install their own limits on deposits (Nelson et al., 2008) revealed that sports gamblers who elected to lower their allowed deposits played a wider variety of games and placed more bets than prior to imposing their own limits. After imposing limits, self-limiters reduced their gambling frequency, but increased the amount they wagered per bet. A study of behavior

during the last month before sports gamblers closed their accounts because of gambling-related problems (Xuan & Shaffer, 2009) revealed a similar pattern of increasingly risk-averse behavior of escalating stakes on propositions with shorter odds. Time spent gambling and less selective betting, not just money spent, appear to be important risk factors or behavioral markers for developing gambling problems.

The evolution of our research on actual gambling behavior has established the foundation for examining patterns of behavior that deviate from general tendencies and have the potential to cause harm.

THIS STUDY

This study begins a program of research that seeks to recognize disordered gambling at the earliest moments and remediate these difficulties. In this study, we prospectively examine sports gambling behavior patterns consonant with excessive or maladaptive gambling behavior sufficient to cause *bwin* subscribers to self-exclude themselves from further betting. A behavioral marker of gambling-related problems is the decision by a gambler to self-exclude from gambling opportunities. Studies of self-exclusion from land-based casinos demonstrate that the very large majority of people who elect to self-exclude satisfy clinical criteria for a gambling disorder (Ladouceur, Jacques, Giroux, Ferland, & Leblond, 2000); in addition, self-excluders are a segment of the total population of people in need of gambling-related treatment (LaBrie et al., 2007).

The Internet equivalent of land-based casino self-excluders is account closers (ACs) who identify the reason for excluding themselves as having problems due to gambling (problem gambling account closers (PGACs). We expect PGACs, like their land-based casino counterparts, recognize that their gambling behavior is becoming unhealthy and are taking steps toward remediation: in this case, closing their account. However, unhealthy behavior is not synonymous with excessive risks and intolerable losses. For example, Internet sports bettors who chose to limit the amount of money they could bet (Nelson et al., 2008) included self-limiters who did not exhibit excessive betting behavior prior to the decision to limit play. Similarly, we expect that some PGACs will not exhibit recognizably extreme betting patterns and might include winners. Neglecting other responsibilities to gamble and excessive time spent deciding on a bet are examples of non-monetary problematic behaviors. It is also possible that positive betting outcomes at *bwin* were inconsistent with large losses at other gambling venues. However, excessive and intolerable losses are the most common causes of problems for bettors and their significant others, and these patterns are observable in betting records. We hypothesize that there will be PGACs who share common, exaggerated gambling behaviors that are distinct from the behavior of people who gamble without problems. The Internet's data collection capabilities allow scientists to analyze the accurate records of actual gambling behavior unconstrained by the problems associated with self-recall (e.g., Baumeister, Vohs, & Funder, 2007; Nisbett & Wilson, 1977) and self-reporting (e.g., Shaffer et al., 2010; Williams & Wood, 2004). This study represents the first ever investigation of actual gambling dynamics that mark a path to the emergence of Internet gambling-related problems. Our goal was to determine whether it is possible to identify individuals who self-identify as having gambling-related problems based on their Internet gambling behavior. We hypothesized that sports gamblers who decided to exclude themselves from further gambling for gambling-related reasons would: (1) include sports gamblers who exhibit shared problematic gambling behaviors; (2) represent an homogeneous gambling pattern that would be distinct from the gambling behavior of their counterparts who also identified gambling-related problems as a reason for excluding themselves; and (3) be distinct from people who excluded themselves from further gambling for other reasons. The research objective for this study was to generate a predictive formula that could mark patterns of Internet sports gambling behaviors that lead to gambling-related problems. We further hypothesized that application of this strategy to an independent validation sample would confirm that these behavioral markers were not unduly influenced by sample-bound idiosyncrasies.

METHODS

There are many clustering strategies and procedures that might achieve the research objectives of this study. In all cases, we would need to analyze the resulting groups (i.e., clusters of people with similar characteristics) further to define the characteristics that discriminate these groups. For example, we can identify defining characteristics that distinguish groups by submitting them to a multivariate discriminant function analysis (MDFA). In this exploration for distinct PGACs, we created the three group study sample by using the three different reasons for account closing. We used MDFA to identify the homogeneous groups within PGACs by first analyzing the differences between PGACs and other ACs and then comparing the PGACs who could be discriminated from other ACs to PGACs who were not distinct. The objective of this analysis is to define a "pure group." A "pure group" analysis hypothesizes that there exist homogeneous groups of individuals whose gambling-related behavior distinguishes them from other gamblers in a reliable and predictable way. This strategy yields a set of markers for the development of gambling-related problems by successively identifying and removing from consideration the groups of individuals whose sports gambling behavior is NOT distinctive and therefore not able to be discriminated from other

sports gamblers. When repeated discriminative analyses no longer identify for removal any indistinct groups of individuals, the remaining individuals represent a "pure group," ready for characterization and testing. In this case, testing means determining that the behavior of the group is distinct and that the members are part of a defined group of interest; here, self-identified problem gamblers. Gamblers who chose not to identify themselves as having problems may also exhibit this distinct behavior. The variables, or clusters of variables, which completely discriminate the "pure group" from similar others represent predictive markers for the development of gambling-related problems.

Participants

During the first 2 years of the collaborative longitudinal study, *bwin* had a procedure in place that offered ACs the opportunity to choose one of the three reasons for closing their account. This procedure provided us with the opportunity to acquire purposive samples of ACs who did and did not endorse gambling-related problems as their motive for closing their accounts. This study relies on two samples: (1) a model development sample and (2) a model validation sample. Figure 1 presents the procedure that resulted in the model development sample of 689 ACs identified during the 2-year follow-up of the longitudinal cohort of 48,114 sports bettors. As Figure 1 shows, we employed four selection criteria to identify study participants: (1) formally closing an account before the end of the 2-year study period; (2) at the closing, choosing to offer the reason for closing by selecting one of the three proffered choices (i.e., they were not satisfied with *bwin* services or they had no further interest in gambling, or gambling-related problems); (3) being a sports bettor, operationally defined as making bets on sporting events for more than 3 days and placing the majority of total stakes on sporting events; and (4) experiencing a net loss in sports bets. As noted earlier, we did not expect that all PGACs closed their accounts because of intolerable losses. Some PGACs ($n = 21$, 10%) were net winners. We eliminated the net winners because they could not contribute to the focus of this study. Consequently, the sample for analyses of betting behavior that might mark gambling-related problems is composed of 113 unsatisfied ACs, 351 no longer interested ACs, and 215 ACs with self-identified gambling-related problems.

The validation sample comprised of an independent but matched group of *bwin* sports bettors who were not members of our already established longitudinal cohort. We evaluated a cohort of sports bettors who enrolled in *bwin* during March 2005, using the same criteria as our longitudinal cohort. This process identified 65 ACs who closed their accounts for gambling-related problems during the same period of observation as the original longitudinal sample. This validation sample is smaller due to the monthly variation in total enrollments experienced during the early days of *bwin*'s development.

Measures

The dependent measures of gambling behavior summarize the participants' daily aggregates of betting activity from the bettors' first to last day of sports betting for the 2 years of observation beginning February 1, 2005. *bwin* offers two types of bets within their sports betting propositions: fixed-odds bets on the outcomes of sporting events or games and live-action bets on propositions about outcomes within a sporting event. This study aggregated the bets made on both fixed-odds and live-action type bets. The daily betting activity records include winnings credited to the bettors' accounts on that day and can include outcomes from wagers made on previous days.

We employed four composite measures of gambling behavior that summed the daily information: (1) the total Number of Bets; (2) Total Money Wagered; (3) Total Winnings; and (4) Active Days, the total number of days with a recorded transaction. We computed the Duration of sports gambling involvement as the number of days from the date of the first bet to date of the last bet. The Frequency of involvement is the percent of Active Days within the Duration period. We calculated the average bets per day (Bets per Day) by dividing the total Number of Bets made by the Active Days and the average size of bets (Average Bet) by dividing the Total Money Wagered by the total Number of Bets. The net result of gambling (i.e., Net Loss) is the difference between Total Money Wagered and Total Winnings. The dominant outcome is a loss and, by subtracting Total Winnings from Total Money Wagered, positive values of Net Loss indicate the total cost of gambling. Converting Net Loss to a percent of Total Money Wagered (i.e., Percent Lost) provides an index of losses that is independent of the total amount wagered. The large number of cohort members who wager infrequently and moderately skew these measures of betting behavior (LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007). We removed the skew by converting measures to natural logs.

Statistical analyses

We applied a series of MDFAs to investigate the presence of a sub-group of PGACs whose betting behavior would accurately discriminate them from other PGACs. A stepwise discriminant function analysis entered measures from the battery of 10 gambling measures. We entered each measure in the order of its contribution to discrimination as measured by Wilks Lambda (SPSS Inc., 2008). This procedure entered dependent measures until the contribution to discrimination of the best remaining measure was not statistically significant. At that point, the classification procedure grouped subjects according to their discriminant scores from the estimation equation assuming equal *a priori* probabilities of group membership

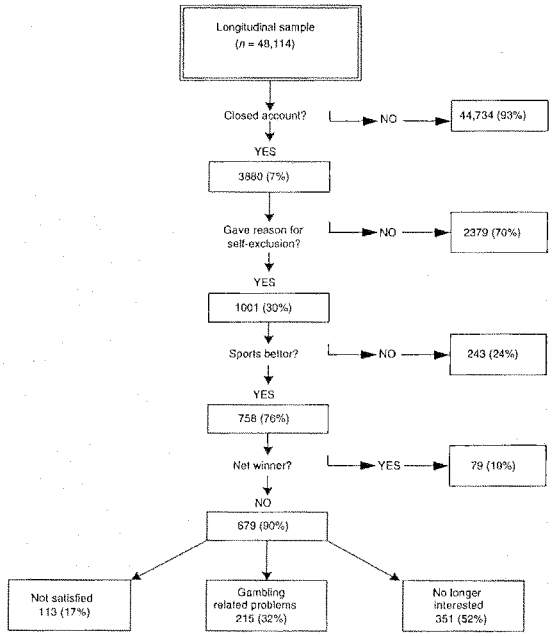

Figure 1. Sample selection (*N* and % of previous node).

(i.e., independent of differences in the size of the groups). This report provides descriptive statistics of the gambling measures for the unique and non-unique groups of PGACs and the correlations between the statistically significant discriminant variables for each group.

To measure potential shifts in the accuracy of estimation due to sample-bound idiosyncrasies, we applied the final discriminant model to the validation sample of *bwin* participants who were not members of the original longitudinal sample; we described this group earlier.

RESULTS

Modeling distinctive sports gambling behavior

We conducted the first exploratory MDFA to identify the variables that discriminated the three groups of participants, categorized by their self-reported account closing reason. This analysis identified two statistically significant discriminators, Duration and Total Winnings. The group of bettors who closed their accounts because they were not satisfied with the service they received could not be discriminated from the other groups. Because of the poor contrast to the other groups presented by this non-homogeneous group, we eliminated them from subsequent analyses.

The second MDFA compared ACs who reported that they were no longer interested in *bwin* services with the PGACs. Eliminating the non-distinct ACs who reported their dissatisfaction with the service had little effect and the two-group analysis selected the same significant discriminators as before, Duration and Total Winnings. This model correctly estimated the membership of two-thirds ($n = 236$, 67.2%) of the no longer interested ACs. Half ($n = 108$, 50.2%) of the PGACs

Table I. Discriminating gambling behavior of participants who closed their accounts for gambling-related problems (ACs) grouped by distinct ($N = 97$) and non-distinct ($N = 100$) patterns of behavior.

	Distinct ACs			Non-distinct ACs				
Measure	Mean	SD	Median	Mean	SD	Median	$F(1,195)$**	Effect
Frequency	3.6	0.6	40.7%	2.2	0.8	10.2%	234.4	2.19
Bets per Day	2.1	0.8	7.6	1.3	0.7	3.8	59.6	1.11
Average Bet[a]	2.0	1.4	€6.4	1.4	1.0	€3.8	13.4	0.52
Active Days	4.1	1.1	64 days	3.4	0.9	30 days	25.1	0.72

Notes: SD, Standard deviation.
[a]In Euros.
**Groups significantly different ($p < 0.01$) on all measures.

had distinct behaviors that discriminated them from the no longer interested ACs and the remaining half of the PGACs.

The next MDFA compared the distinctive PGACs ($n = 108$) to the other PGACs ($n = 107$). In this model, four measures contributed significantly to estimation: Frequency, Bets per Day, Duration, and Total Wagers. The classification correctly identified 92% of the participants as distinctive or not. The accuracy of classification was similar across groups: 93% (100 of 108) for distinctive PGACs and 91% (97 of 107) for other PGACs. As noted earlier, to identify a marker of potential risk for developing gambling-related problems, we sought a completely accurate formulation of the distinctive behavior. To that end, we eliminated the misclassified ACs and conducted another MFDA. This reformulation again identified Frequency, Bets per Day, Duration, and Total Wagers as significant discriminators. This MFDA yielded slightly modified discriminant function weights, and accurately classified the 100% of the PGACs as distinctive or not. The final discriminant function reduced the number of no longer interested ACs that exhibited the distinctive PG-related behavior from 115 to 96.

Describing the distinctive sports gambling behavior

Table I presents descriptive statistics for the final MFDA measures that distinguish the distinct and non-distinct PGACs. To orient these statistics to the original metrics, the gambling behavior of the two PGAC groups differed significantly on all MFDA measures. The effect sizes derived from the univariate test statistics indicate a large group effect for all behaviors. To orient the behavioral characteristics to the original metric, Table I also includes the median values of the untransformed measures. The distinct PGACs exhibit more intense gambling activity condensed into a shorter betting period.

In addition to differences in magnitude, MDFA uses differences in intercorrelations to discriminate among groups. Table II shows that the correlations between pairs of discriminating variables are markedly different

Table II. Pearson correlations between log-transformed discriminating measures for participants who closed their accounts for gambling-related problems grouped by distinct ($N = 97$, above the diagonal in bold) and non-distinct ($N = 100$, below the diagonal) patterns of behavior.

Measure	Frequency	Bets per Day	Average Bet	Active Days
Frequency	–	**−0.03**	**−0.32****	**−0.09**
Bets per Day	−0.21*	–	**−0.12**	**+0.40****
Average Bet	−0.33**	+0.04	–	**+0.18**
Active Days	+0.80**	−0.04	−0.15	–

Note: *$p < 0.01$; **$p < 0.001$.

for several measures. The correlations between Frequency and (1) Bets per Day and (2) Active Days are statistically significant for non-distinct PGACs but not for the distinctive PGACs. Conversely, distinctive PGACs exhibit a significant positive relation between Active Days and Bets per Day; non-distinct PGACS exhibit no correlation between these measures.

The standardized discriminant function coefficients (SC) indicate each variable's relative contribution to discrimination and the association with the distinct behavior pattern. Frequency of play made the largest contribution to discrimination (SC = 1.077). The distinct PGACs made more Bets per Day (SC = 0.598) and larger Average Bets (SC = 0.556) than the non-distinct PGACs. The total number of Active Days had a smaller, negative coefficient (SC = −0.322). The discriminant function identifies distinct gamblers by the combination of Frequent play days in relative briefer periods of play compared to their non-distinct counterparts. The discriminant scores for the non-distinct group ranged from −4.60 to −0.06 and for the distinct group from 0.06 to 4.53. This formulation defines negative discriminant scores as associated with non-distinct PGACs and positive scores associated with PGACs who have a distinctive betting behavior.

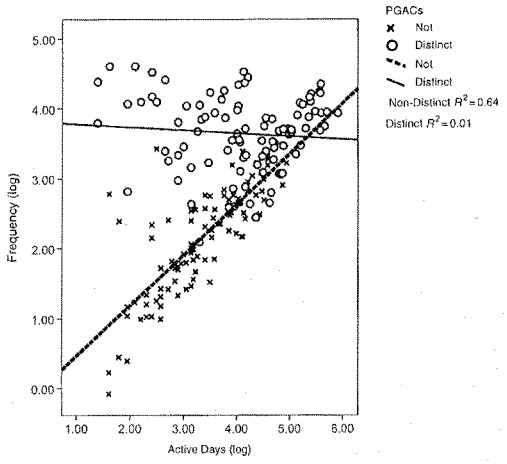

Figure 2. Scatter plot and regression line of Frequency by Active Days for PGACs with distinct and non-distinct disordered gambling behavior marker.

Application to the validation sample

We applied the discriminant function to the validation group, i.e., PGACs in the cohort of *bwin* sports bettors who enrolled during the month after the original longitudinal sample enrolled. The discriminant scores for 32 PGACs (49.2%) were negative (−4.18 to −0.11) and indicated that they exhibited non-distinct patterns of gambling behavior. The other 33 PGACs (50.8%) had positive discriminant scores (0.07–4.32) consonant with the distinctive betting pattern. As with the original longitudinal sample, the discriminant function scores of the two groups of PGACs in the validation sample did not overlap (i.e., there were no scores in the region between the largest score in non-distinct group score, −0.11, and the smallest score in the distinct group, +0.07).

DISCUSSION

This study illustrates the process of identifying behavioral markers for health risks, in general, and pathological gambling, in particular. By taking advantage of an opportunity to acquire a targeted (i.e., purposive) sample of Internet sports gamblers who closed their gambling accounts and identified having gambling-related problems as the reason for doing so, we identified a pattern of behavior unique to about half of the ACs. A discriminant function based on four empirically derived behaviors was 100% accurate in estimating membership in the two groups. The behavioral markers in this model were: (1) placing more bets; (2) placing larger bets; (3) betting more frequently; and (4) betting intensely soon after enrollment. We applied the behavioral markers to an independent validation sample and confirmed that we could replicate the identification of the distinct behavior pattern associated with the onset of gambling-related problems. The prevalence of ACs with the behavioral marker in the independent sample matched the prevalence in the original sample, thus confirming that the original formulation was not unduly influenced by sample-bound idiosyncrasies.

The distinct PGACs risked and lost more money than non-distinct PGACs. The distinct PGACs lost more money in a shorter period (i.e., a median of 252 days from the first to the last bet compared to 353 days for other PGACs) by betting more frequently (i.e., a median of 64 days compared to 30 days). Figure 2 shows Frequency (the percent of days active within the total duration of play) distributed by Active Days (total betting days from the first to the last betting day). Figure 2 illustrates a behavior that is characteristic of the more intense players. Distinct PGACs rarely let a day go by without betting. Frequent betting is clearly

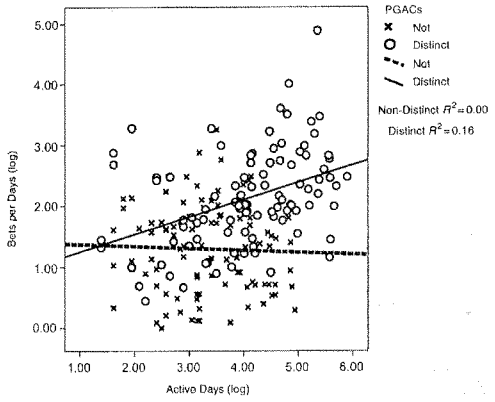

Figure 3. Scatter plot and regression line of Bets per Day by Active Days for PGACs with distinct and non-distinct disordered gambling behavior marker.

marked for the distinctive group with relatively few total days of betting. Figure 3 shows another measure, Bets per Day, distributed by Active Days. The distinct PGACs make more Bets per Day than the non-distinct PGACs. In this case, the distinct group with relatively more total days of betting also tends to place more bets, an acceleration not exhibited by the other PGACs. These figures suggest that the distinct patterns of gambling behavior associated with PGACs might be recognizable after relatively few betting days for some players because of their very frequent play. The pattern of play also has measures that are distinct among PGACs with relatively many days of active play.

The discussion above indicates how cumulative sports betting records identify a homogeneous group of people who got into trouble because of their behavior. However, the discussion above suggests that some problem gamblers evidenced behavioral markers early in their gambling pattern. Their number of bets and the size of those bets are markedly larger than gamblers without these markers. For example, betting every other day is unusual given the tendency for many sporting events to take place weekly. For some distinct PGACs their intense gambling was telescoped into a relatively short period of time. The discriminant function provides scores that indicate how likely the observed measures match those of the distinctive PGACs. An application of these findings could be used to calculate discriminant scores of players at specific and successive accumulations of behavior. Once calculated, these markers permit proprietors to alert individuals whose successive scores move in the direction of gamblers with problems of that their behavior is beginning to resemble that of a group of bettors who had to quit gambling because of problems related to gambling.

The data in this study represent the cumulative record of betting from the beginning to the end of play at *bwin*. Live-action sports bets provide betting choices with variable odds (i.e., the proposition that a tennis game will be won at love has higher odds than a win at add). Previous research with *bwin* ACs (Xuan & Shaffer, 2009) used live-action sports bets to examine "chasing" during the days immediately preceding account closing. PGACs lost more money due to placing larger bets, but contrary to conventional expectation, they selected more conservative betting propositions with shorter odds.

It is possible that we might observe the distinct multivariate profile of cumulative betting behavior exhibited by some PGACs among continuing sports bettors. Among the somatic illnesses, there are many reasons why a marker might fail to identify an illness. Similarly, players might have large resources, and excessive losses do not result in problems. Further, the disordered behavior might be episodic and not revealed in the total cumulative behavior; the behavior might have been only recently adopted; participants exhibiting the pattern might not close their account but simply not use this portal for gambling activities; the pattern of gambling evidenced by distinct PGACs might be adopted by players with large personal resources for

whom the financial burden is not a problem, etc. However, this study's primary research objective was to identify a behavioral marker or set of markers that could accurately identify behavior patterns that led bettors to seek relief from gambling-related problems by closing their accounts. Classifying cases according to etiological markers is a worthy goal for contemporary public health workers. Evidence-based medicine, as an enterprise, reflects this objective by offering empirical evidence to guide diagnostic and treatment activities. As scientists begin to identify biological and behavioral markers with better precision, new and earlier interventions become possible. The behavioral patterns of Internet gamblers provide an important opportunity to apply the strategy of identifying and using behavioral markers to intervene and interrupt developmental psychopathology. The estimated probability of group membership produced by a multivariate discriminant function does not depend solely on the quantities of the measures. The multivariate classification method does not convert into a system of univariate thresholds. A practical application of this study's discriminant function for monitoring ongoing behavior would apply the function to a bettor's cumulating betting history to detect progress toward the distinct profile exhibited by players who sought relief from gambling-related problems by closing their accounts.

Figures 2 and 3 show that the betting behaviors evidenced by the group of distinct ACs might be composed of sub-groups; if so, it should be possible to discriminate these sub-groups from each other, thereby improving the utility of behavioral markers. Future research will expand this study, investigate betting behavior on other types of games, and examine the potential commonality across game types to develop additional markers of risky Internet gambling behavior that are universal across game types.

LIMITATIONS

The participants in this research formally applied to close their accounts and identified themselves as having gambling-related problems. Both actions rarely occurred and the self-selected sample is relatively unique. There is no additional information, such as a pathological gambling assay, to determine whether these players would meet diagnostic criteria for a clinical disorder. A large number of PGACs shared the pattern revealed in this analysis. There might be other, less prevalent, disordered patterns discernable in a larger sample. The distinct sub-group identified in this study evidenced a discernable set of behavioral markers. However, more research is necessary to extend the identification of behavioral markers among sports gamblers beyond this initial formulation. Consequently, we have implemented changes in the ongoing research collaboration procedures to provide additional information that will support of our quest for behavioral markers.

The pattern of behavioral markers identified in this study is distinct within the context of typical *sports* betting behavior. For most participants, sports betting is a rather slow-moving activity: many sporting events take place weekly. More rapid cycling games, such as casino games might require different measures and different formulations to identify behavioral markers of disordered gambling across game types.

Despite these limitations, one strength of this study is that it provides the opportunity to use an information base of actual individual betting transactions. However, these records are limited to those bets placed with our collaborating research partner, *bwin* Interactive Entertainment, AG. Some ACs might have placed bets at other venues and any disordered behavior associated with these venues might not be evident from the *bwin* information.

CONCLUDING THOUGHTS

This study supports the proposition that monitoring actual betting behavior is an appropriate initiative with the potential to promote responsible gambling and avoid disordered gambling. This study shows that we can recognize a sports betting pattern evidenced by players who later declare that they are having gambling-related problems. The elements of this pattern are markers associated with account closing. Continuing research will need to identify markers early in the process, perhaps at the cost of some precision, so that these markers will trigger interventions early in the sequence of events that can interrupt behavior and reduce associated penalties. It might be that the pattern described here is an identifiable phase within the development of responsible gambling. There is evidence that this cohort shows a general tendency to exhibit a period of initial enthusiastic betting followed by an adaptation to behavior that is more moderate (LaPlante, Schumann, LaBrie, & Shaffer, 2008). Scientists and clinicians need to determine how to integrate the information about distinct patterns of betting behavior into a system of markers and interventions. However, until a system is in place, the ability to detect, and perhaps even anticipate, disordered behavior demonstrated by this research has immediate application to promoting healthier behaviors.

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REFERENCES

Baumeister, R.F., Vohs, K.D., & Funder, D.C. (2007). Psychology as the science of self-reports and finger movements: Whatever happened to actual behavior? *Perspectives on Psychological Science, 2*, 396–403.

Broda, A., LaPlante, D.A., Nelson, S.E., LaBrie, R.A., Bosworth, L.B., & Shaffer, H.J. (2008). Virtual harm reduction efforts for Internet gambling: Effects of deposit limits on actual Internet sports gambling behavior. *Harm Reduction Journal, 5*, 1–9.

Christiansen Capital Advisors. (2006). Global Internet gambling revenue estimates and projections (2001–2010, $M, US). Retrieved from http://www.cca-i.com/Primary%20Navigation/Online%20Data%20Store/internet_gambling_data.htm

Fiedler, I.C., & Rock, J. (2009). Quantifying skill in games – Theory and empirical evidence for poker. *Gaming Law Review, 13*, 50–57.

Griffiths, M.D. (2003). Internet gambling: Issues, concerns, and recommendations. *CyberPsychology and Behavior, 6*, 557–568.

Griffiths, M., Wardle, H., Orford, J., Sproston, K., & Erens, B. (2009). Sociodemographic correlates of Internet gambling: Findings from the 2007 British Gambling Prevalence Survey. *CyberPsychology and Behavior, 12*, 199–202.

Kerber, C.S. (2005). Problem and pathological gambling among college athletes. *Annals of Clinical Psychiatry, 17*, 243–247.

LaBrie, R.A., LaPlante, D.A., Nelson, S.E., Schumann, A., & Shaffer, H.J. (2007). Assessing the playing field: A prospective longitudinal study of Internet sports gambling behavior. *Journal of Gambling Studies, 23*, 347–362.

LaBrie, R.A., Nelson, S.E., LaPlante, D.A., Peller, A.J., Caro, G., & Shaffer, H.J. (2007). Missouri casino self-excluders: Distributions across time and space. *Journal of Gambling Studies, 23*, 231–243.

Ladd, G.T., & Petry, N.M. (2002). Disordered gambling among university-based medical and dental patients: A focus on Internet gambling. *Psychology of Addictive Behaviors, 16*, 76–79.

Ladouceur, R., Jacques, C., Giroux, I., Ferland, F., & Leblond, J. (2000). Analysis of a casino's self-exclusion program. *Journal of Gambling Studies, 16*, 453–460.

LaPlante, D.A., Schumann, A., LaBrie, R.A., & Shaffer, H.J. (2008). Population trends in Internet sports gambling. *Computers in Human Behavior, 24*, 2399–2414.

Nelson, S.E., LaPlante, D.A., Peller, A.J., Schumann, A., LaBrie, R.A., & Shaffer, H.J. (2008). Real limits in the virtual world: Self-limiting behavior of Internet gamblers. *Journal of Gambling Studies, 24*, 463–477.

Nisbett, R.E., & Wilson, T.D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*, 231–259.

No More Gambling. (2004–2005). The dangers of online gambling. Retrieved from http://www.nomoregambling.com/online-gambling.html

Petry, N.M., Ammerman, Y., Bohl, J., Doersch, A., Gay, H., Kadden, R., . . ., Steinberg, K. (2006). Cognitive-behavior therapy for pathological gamblers. *Journal of Consulting and Clinical Psychology, 74*, 555–567.

Petry, N.M., & Mallya, S. (2004). Gambling participation and problems among employees at a university health center. *Journal of Gambling Studies, 20*, 155–170.

Petry, N.M., & Weinstock, J. (2007). Internet gambling is common in college students and associated with poor mental health. *The American Journal on Addictions, 16*, 325–330.

Richtel, M. (2004, March 26). Trade group says U.S. ban on Net gambling violates global law. *New York Times*.

Shaffer, H.J., LaPlante, D.A., LaBrie, R.A., Kidman, R.C., Donato, A.N., & Stanton, M.V. (2004). Toward a syndrome model of addiction: Multiple expressions, common etiology. *Harvard Review of Psychiatry, 12*, 367–374.

Shaffer, H.J., Peller, A.J., LaPlante, D.A., Nelson, S.E., & LaBrie, R.A. (2010). Toward a paradigm shift in Internet gambling research: From opinion and self-report to actual behavior. *Addiction Research and Theory, 18*, 270–283.

Smeaton, M., & Griffiths, M.D. (2004). Internet gambling and social responsibility: An exploratory study. *CyberPsychology and Behavior, 7*, 49–57.

SPSS Inc. (2008). SPSS (Version 17.0) [Computer software]. Chicago, IL: SPSS.

Welte, J.W., Barnes, G.M., Tidwell, M.O., & Hoffman, J.H. (2009). The association of form of gambling with problem gambling among American youth. *Psychology of Addictive Behaviors, 23*, 105–112.

Welte, J.W., Barnes, G.M., Wieczorek, W.F., & Tidwell, M.-C. (2004). Gambling participation and pathology in the United States – A sociodemographic analysis using classification trees. *Addictive Behaviors, 29*, 983–989.

Williams, R.J., & Wood, R.T. (2004). The proportion of gaming revenue derived from problem gamblers: Examining the issues in a Canadian context. *Analyses of Social Issues and Public Policy, 4*, 33–45.

Wood, R.T., Griffiths, M.D., & Parke, J. (2007). Acquisition, development, and maintenance of online poker playing in a student sample. *CyberPsychology and Behavior, 10*, 354–361.

Wood, R.T., & Williams, R.J. (2007). Problem gambling on the internet: Implications for internet gambling policy in North America. *New Media and Society, 9*, 520–542.

Wood, R.T., Williams, R.J., & Lawton, P.K. (2007). Why do Internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. *Journal of Gambling Issues, 20*, 235–252.

Woodruff, C., & Gregory, S. (2005). Profile of Internet gamblers: Betting on the future. *UNLV Gaming Research and Review Journal, 9(1)*, 1–14.

Woolley, R. (2003). Mapping Internet gambling: Emerging modes of online participation in wagering and sports betting. *International Gambling Studies, 3*, 3–21.

Xuan, Z., & Shaffer, H.J. (2009). How do gamblers end gambling: Longitudinal analysis of Internet gambling behaviors prior to account closure due to gambling related problems. *Journal of Gambling Studies, 25*, 239–252.

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Toward a paradigm shift in Internet gambling research: From opinion and self-report to actual behavior

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Abstract

Internet gambling is one of the fastest growing gambling-related industries (Christian Capital Advisers 2006). As the Internet gambling industry expands, many stakeholders have created, or are in the process of creating, gambling-related policy. Policy makers promulgating these regulations rely on professional opinions and/or conventional wisdoms related to Internet gambling to guide them because of the lack of sufficient scientific research. There is an ongoing need for quality empirical research to guide the development of public policies that surround Internet gambling. This article summarizes the current state of scientific research about Internet gambling by identifying, describing, and critiquing the available peer-reviewed literature. To identify the peer-reviewed literature related to Internet gambling published between January 1, 1967 and March 7, 2008, we used the search term "Internet [AND] gambling" in the PubMed and PsychINFO search engines. Of the 111 articles identified by our systematic search, only 30 included Internet gambling as a focus. The study methods presented in the abstracts of these 30 articles indicate that none included actual gambling behavior: 10 provided self-reports of gambling behavior using samples not representative of the general population, and 20 of the 30 articles were commentaries. In response to the clarion call to improve the state of psychological research (Baumeister et al. 2007), we have conducted research utilizing actual Internet gambling behavior. In contrast to prior self-report and case study research, our investigations using actual Internet gambling behavior suggest an overall pattern of moderate Internet gambling behavior (LaBrie et al. 2007).

Keywords: *Internet gambling, gambling, safe gaming, assessment, behavior, research methods, paradigm*

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Introduction

Internet gambling is one of the fastest growing gambling-related industries (Christian Capital Advisers 2006). Although some contend its worldwide growth is less than land-based gambling (Miller 2006), the industry is thriving and expected to continue to grow (Christian Capital Advisers 2006). As the Internet gambling industry expands, many stakeholders have created, or are in the process of creating, gambling-related policy despite the absence of empirical evidence. Many of the policy development efforts rely on professional opinions and/or conventional wisdoms related to gambling, generally, and Internet gambling, specifically. For example, most recently, the United States (US) Congress passed the Unlawful Internet Gambling Act of 2006 (UIGA), which has prevented legitimate Internet gambling businesses from providing gambling opportunities to a vast segment of potential customers (i.e., US citizens). Some negative repercussions of this Act have started to emerge (e.g., hundreds of millions of Euros in capitalization lost (Ruiz 2006), fines on the US by the World Trade Organization to be paid to Aruba (James 2007)); however, both positive and negative consequences are possible. For instance, the UIGA might meet its goal of minimizing online gambling among US citizens and, in turn, minimize unsafe gambling-related activity among US citizens. Alternatively, US citizens might gamble online as much as they would have if it were legal, but use unscrupulous vendors to do so and lose the protections afforded by regulated, legitimate commerce. Because scientific research is not guiding the development of public policies that surround Internet gambling, there is an ongoing need for new empirical research about Internet gambling that can inform public policy. The findings from this research hold the potential to encourage the use of new technology to conduct research that can advance our understanding of Internet gambling, clarify the need for public policy efforts, and define best business practices for the Internet gambling industry.

A shifting horizon: Advancing the assessment of actual behavior

Reliance on self-reports about behavior, as opposed to actual observations of behavior, has become commonplace for researchers. It is likely that this reliance is due in part to the perception by scientists that measurement instruments have become more reliable and improved; in addition, investigators reduce study costs by substituting participant recall for repeated observations over time. Researchers, however, have started to criticize the measurement precision costs that derive from problems associated with self-report and recall methods. Baumeister and co-workers for example, recently noted that, "psychology calls itself the science of behavior... Yet some psychological subdisciplines have never directly studied behavior, and studies on behavior are dwindling rapidly in other subdisciplines" (Baumeister et al. 2007, p.396). The major concern related to the exclusive use of self-reports is that actual behavior and self-reports of behavior are often inconsistent (Baumeister et al. 2007). As with any other pattern of human behavior, it follows that an accurate epidemiology of Internet gambling behavior requires the examination of actual Internet gambling behavior. Studies of actual Internet gambling behaviors might reveal patterns that are inconsistent with self-reported patterns of Internet gambling; the inconsistencies can result from self-reports that underestimate or overestimate the actual behavior. The ability for scientists to shift from self-report to actual behavior represents a methodological paradigm change for the field of gambling studies.

Present study

Currently, there is very little published empirical research about Internet gambling. Consequently, it seems that, with some exceptions, theoretical propositions and opinion papers represent most of the scholarly discussion surrounding Internet gambling. However, a careful and systematic review of the extant literature is necessary to determine the actual pattern of these papers. Therefore, the goal of this study is to identify systematically the extant available scientific literature focusing on the play patterns associated with Internet gambling; in addition, we will illustrate differences between the conclusions generated by distinctive methods (i.e., self-report *vs.* actual behavior) that have assessed the nature of Internet gambling. By providing a systematic approach to the identification of this literature, we also offer a strategy that scientists can replicate in future studies to identify investigative trends associated with Internet gambling research.

Methods and procedures

Our approach to this study was simple, yet systematic. To identify the peer-reviewed literature related to Internet gambling, we used the search terms "Internet [AND] gambling" in the PubMed and PsychINFO search engines; we limited this search to peer reviewed studies published from January 1, 1967 to March 7, 2008. This search strategy reviewed these terms in the titles, abstracts, keywords, and text of published articles from a literature of over 28 million references in PsychINFO and over 17 million references in PubMED. We excluded our own existing Internet gambling publications from this sample for reasons that will be self-evident when we discuss the results of this strategy.

This search strategy identified 111 articles that met the search criteria. We excluded eight book reviews from this total. Our inspection of abstracts from the remaining 103 articles revealed that 56 did not address the conceptual junction of Internet and gambling; most of these discussed Internet addiction, addiction to nongambling game play or gambling problems not related to the Internet. This left 47 articles that addressed Internet gambling. A review of these 47 articles revealed that only 30 of them included Internet gambling as a focus; in the other 17 papers, it was only a tangential interest. We reviewed the study methods of these 30 articles and classified them according to the methodological approach. We classified studies that did not present any original quantitative empirical data about Internet gambling behavior as commentaries; these commentaries included studies that used so few case reports (i.e., < 5) that these publications were not representative of the population of cases from which these were drawn. We classified studies with original quantitative empirical data about Internet gambling behavior according to the study methods and procedures: Self-report surveys or studies of actual Internet gambling behavior.

Results

As Table I shows, we can classify two-thirds of the 30 articles identified by our systematic search as commentaries and the remaining third as self-report surveys. Of the 20 commentaries, 16 were comments or reviews without data, two were case reports that included less than five patients, and two were descriptions of Internet site characteristics. Of the 10 self-report surveys, none included representative samples from the general population. All of these self-report surveys employed convenience samples: four sampled

Table I. Studies identified by systematic search of internet gambling research (Excludes published and under review studies about actual Internet gambling behavior from the authors).

Study	Classification	Sample
(Griffiths 1996)	Commentary	Not applicable
(Griffiths 1999)	Commentary	Not applicable
(Griffiths 2003a)	Commentary	Not applicable
(Griffiths et al. 2006)	Commentary	Not applicable
(Griffiths and Wood 2000)	Commentary	Not applicable
(Griffiths and Parke 2002)	Commentary	Not applicable
(Hayer and Meyer 2003)	Commentary	Not applicable
(Kerber 2005)	Self-report	Convenience sample of college athletes at three sites ($N = 636$)
(King 1999)	Commentary	Not applicable
(King and Barak 1999)	Commentary	Not applicable
(Ladd and Petry 2002)	Self-report	Convenience sample of uninsured, underprivileged medical and dental patients ($N = 369$)
(Laffey 2005)	Commentary	Not applicable
(Larner 2006)	Commentary	Case study ($N = 1$)
(Messerlian et al. 2004)	Commentary	Not applicable
(Miller 2006)	Commentary	Not applicable
(Mitka 2001)	Commentary	Not applicable
(Nower 2003)	Commentary	Not applicable
(Petry 2006)	Self-report	Convenience sample of uninsured, underprivileged medical and dental patients ($N = 1000$)
(Petry and Mallya 2004)	Self-report	Convenience sample of university health center employees ($N = 906$)
(Petry and Weinstock 2007)	Self-report	Convenience sample of college students ($N = 904$)
(Sevigny et al. 2005)	Commentary	Description of Internet casino sites
(Shaffer 1996)	Commentary	Not applicable
(Smeaton and Griffiths 2004)	Commentary	Descriptions of UK Internet gambling sites
(Watson et al. 2004)	Commentary	Not applicable
(Wong et al. 2007)	Commentary	Case studies ($N = 4$)
(Wood et al. 2007a)	Self-report	Convenience sample of student Internet poker players ($N = 422$)
(Wood and Williams 2007)	Self-report	Convenience sample of Internet gamblers ($N = 1920$)
(Wood et al. 2007b)	Self-report	Convenience sample of Internet gamblers ($N = 1920$)
(Woodruff and Gregory 2005)	Self-report	Convenience sample of Detroit casino players ($N = 200$)
(Woolley 2003)	Self-report	Convenience samples of Australian consumers ($N = 2948$)

Internet gamblers, two sampled free care medical and dental patients, one sampled college students, one sampled college athletes, one sampled casino patrons, and one sampled employees of a university health center. None of the articles identified by our systematic search (other than our own) were studies of actual Internet gambling behavior. In the discussion that follows, the studies reporting actual Internet gambling behavior originate from our collaborative research program with ***bwin*** Interactive Entertainment, A.G.

Commentaries about Internet gambling behavior

Existing commentaries debate and speculate about the impact and influence that Internet gambling has on the public health. For example, in an attempt to clarify nomenclature,

Shaffer (1996) and Shaffer et al. (2000) argue that the Internet, like other inanimate objects, does not have inherent addictive properties; the Internet is virtual space between computers. Addiction is the result of a relationship between people and objects or activities of interest. Computers, or the information that computers deliver, can represent these objects, but the Internet cannot. However, some commentaries speculate that Internet gambling is a public health hazard that, by its ability to increase access to consumers, has led to an increase in the prevalence of problem gamblers (Griffiths 1996, 1999, 2003a, 2003b; King 1999; King and Barak 1999; Griffiths and Parke 2002; Griffiths et al. 2006). In particular, commentaries speculate that Internet-based gambling's structural characteristics (e.g., rapid event frequency, high pay out ratio) encourage excessive betting. However, many of the cited Internet risk factors also exist among nonInternet-based gambling features (e.g., slot machines, video poker machines, Keno) and do not necessarily represent added risk. Commentaries also speculate that the potential social isolation of Internet gambling consumers limits the use of safeguards that might be able to reduce gambling-related problems; this difficulty, in turn, might lead to increased access by youth, unlimited access to cash flow, and gambling in inappropriate places (e.g., gambling in the workplace (Griffiths 1999; King 1999; King and Barak 1999; Griffiths and Wood 2000; Mitka 2001; Nower 2003; Messerlian et al. 2004; Griffiths et al. 2006)). Several commentaries recognize the need for empirical studies to substantiate these speculations (Griffiths and Parke 2002; Hayer and Meyer 2003). The two anecdotal case studies about Internet gambling among Parkinson's patients do not serve to increase the evidence base (Lamer 2006; Wong et al. 2007): these anecdotal studies confound variables that provide alternative explanations for the apparent association between gambling-related problems and dopamine agonist pharmacotherapy. Two other commentaries suggest that few sites provide safeguards for Internet gambling consumers. Some sites even use unscrupulous practices (e.g., inflated payout rates during the demo period) to lure customers (Smeaton and Griffiths 2004; Sevigny et al. 2005). Numerous problems that result from unregulated Internet gambling suggest it is necessary to improve regulatory systems for Internet gambling websites (Watson et al. 2004; Laffey 2005; Miller 2006). However, empirical data is necessary to understand the existing patterns of Internet gambling behavior. In short, speculations and commentaries about Internet gambling behavior can stimulate the development of hypotheses and models, however, these publications are of limited utility to help develop and test parameters for safer Internet gambling.

Self-reported Internet gambling behavior

Self-report data provide potentially useful descriptive information about the attitudes of Internet gamblers. For example, one study indicates that land-based casino patrons who gamble on the Internet tend to be younger, more educated, and use the Internet more regularly for other nongambling purposes compared to land-based casino gamblers who do not use the Internet for gambling (Woodruff and Gregory 2005). In addition, Internet gamblers report preferring the convenience of Internet gambling to land-based casinos (e.g., Wood et al. 2007a, 2007b). One study found that wagering on racing and sports betting were the most commonly reported Internet gambling activities (Woolley 2003).

Self-report studies provide a very wide range of Internet gambling prevalence estimates across a variety of special population segments. For example, Petry and Mallya's (2004)

self-report survey of 906 university health center employees estimated a 1.2% prevalence rate of Internet gambling. Studies of patients seeking free or reduced cost medical or dental care surveyed show self-reported rates of ever having gambled using the Internet as 8.1% among 369 patients (Petry et al. 2004) and, in another study, 6.9% of 1000 patients (Petry 2006). Self-report studies of students provide higher prevalence rates of Internet gambling. For example, prevalence of Internet gambling lifetime rates were 23% among undergraduates in one study (Petry and Weinstock 2007), and 10% among college athletes in another study (Kerber 2005); one study found that among college students the prevalence of online poker playing at least twice a week was 33% (Wood et al. 2007a). It is possible that students' self reports suffer from recall bias because factors other than the internal processes associated with their actual behavior influence their perceptions of personal behavior (Nisbett and Wilson 1977; Baumeister et al. 2007).

Authors of several self-report studies (Kerber 2005; Petry and Weinstock 2007; Wood et al. 2007a; Wood and Williams 2007) claim that their study findings demonstrate higher rates of gambling-related problems among Internet gamblers than nonInternet gamblers. While Internet gambling might be associated with higher rates of gambling problems, to date, these studies do not demonstrate a causal relationship between Internet gambling and gambling-related problems. These cross-sectional surveys are point-in-time estimates that cannot reliably predict cause-effect relationships. And, as stated previously, reliance on participant self-report hinders the ability to assess Internet gambling behavior accurately.

In addition to the limitations of self-report, self-selected participation and low response rates (e.g., 54% for Kerber (2005) 33% for Petry and Mallaya (2004)) limit the representativeness of Internet gambling survey findings. Our systematic review failed to identify two prevalence studies (Welte et al. 2002; LaBrie et al. 2003) that included Internet gambling information. Our search failed to identify these studies because they did not have the key search terms required for inclusion in this research. Nonetheless, these studies used systematic sampling procedures rather than relying on convenience samples, increasing the likelihood that the sample under study is representative of the population from which it was drawn. One of these two studies (LaBrie et al. 2003), utilizing information from 10,765 students selected from the 119 scientifically identified schools comprising the 2001 Harvard School of Public Health College Alcohol Study, found that 1.9% of responding students participated in Internet gambling a few times a year and 0.3% participated in Internet gambling once or more a week. These prevalence estimates suggest that studies of college students using convenience samples (Kerber 2005; Petry and Weinstock 2007; Wood et al. 2007a) have overestimated Internet gambling among this population segment. In the only existing prevalence study of the US adult general population (Welte et al. 2002) that included data about Internet gambling, a telephone survey of 2340 nationally representative US adults yielded a 0.1% prevalence rate of Internet gambling during the past year. However, though these studies were more representative of the populations in question, they still suffer from the previously mentioned limitations that are associated with self-report studies.

The wide variation among all of the prevalence estimates suggests that the current rate of Internet gambling might not be reflecting the same target behavior, or that these estimates simply are unreliable as a result of measurement or recall bias. Consequently, future research will need to employ improved assessment and sampling procedures.

The assessment of actual Internet gambling behavior

To address the dearth of scientific information about Internet gambling, researchers need to employ investigative strategies that can improve the prevailing methods used to assess Internet gambling behavior. Internet gambling websites provide a unique research opportunity because of their ability to track site visitors as they are gambling. Research taking advantage of these comprehensive data resources, therefore, has the potential to provide an evidence-based foundation for the study of the nexus between the Internet and gambling. Data derived from Internet sources (1) can monitor precisely both individual-level and population-level characteristics of online gamblers and (2) has the capability of installing and testing empirically derived intervention efforts.

Recognizing the opportunity to use Internet gambling technology for research, ***bwin*** Interactive Entertainment AG (***bwin***), one of Europe's largest gambling sites, and the Division on Addictions (DOA) entered into a seminal research collaboration relying substantially on a database of ***bwin*** subscribers' gaming activity. By centering a research agenda on ***bwin*** data, the DOA could study the emergence of Internet-related addiction and take advantage of the potential for new technology to alleviate or prevent addiction. Despite these potential advantages, using industry associated data, and industry-academic collaborations can be associated with a variety of potential problems. These issues must be addressed from the outset of scientific collaboration. Before discussing the value of Internet-based data tracking for gambling studies, we will take a brief discursion to describe the nature of the ***bwin***-Division on Addictions association.

bwin officials initiated the relationship with the Division on Addictions. The founder and co-director of the company approached the Division with the proposal that it might be possible to identify high risk gamblers early in their involvement with Internet gambling because all of their activities can be monitored and tracked. This idea was compelling and we recognized that this kind of monitoring opportunity had never before been available to gambling researchers. This led to the development of a contract between ***bwin*** and Harvard Medical School to conduct research focusing on Internet gambling. As is customary with all Harvard Medical School industry related projects, the contract had to satisfy university related policy for such collaborations. Harvard is unwavering in its requirements for academic freedom. Therefore, ***bwin*** had to agree to yield all control over publications, project review, and the scientific conduct of the research. Effectively, there was no negotiation between the industry and Harvard Medical School; ***bwin*** simply had to meet Harvard Medical School's demands. Once the research design satisfied institutional review board requirements to protect the confidentiality of the data and the data transfer and storage requirements, ***bwin*** provided the cohort of subscriber data without any strings attached. Practically, this meant that the Division was free to investigate as necessary and publish without industry review, regardless of the nature of the findings. As with all Division research, academic freedom is central and industry partners have no say about the conclusions drawn. We believe these working conditions are essential for a transparent and productive relationship between industry and science.

Before describing the findings of the studies from this collaboration that assess actual Internet gambling behavior in detail, it is important to underscore the unprecedented contribution that data tracking actual Internet gambling behavior brings to the state of Internet gambling research. ***bwin*** records every keystroke of every person that subscribes to the ***bwin*** website. At the beginning of this project, we defined and began tracking a longitudinal cohort of more than 40,000 subscribers from more than 80 countries. At this writing, we have created multiple datasets, and the original cohort has been followed for

more than 3 years. The published findings that derived from our analysis of the original longitudinal cohort generally are based on the first 2 years of data. During that time, 47,134 participants made 38 million bets on sporting propositions totaling €28.6 million; these bets did not include poker, casino-like game play and other regularly changing ***bwin*** propositions. The computer resources integral to the Internet permit a new research paradigm that can revolutionize data collecting: These resources allow us to collect the exact betting behavior of tens of thousands of subscribers from many locations around the world. This data includes details about the different types of sports bets, fixed odds bets (i.e., bets made on the outcomes of sporting events or games in which the amount paid for a winning bet is set by the betting service) and live-action bets (i.e., bets made on propositions about outcomes within a sporting event such as which side will have the next corner kick or whether the next tennis game in a match will be won at love by the server).

Research using data reflecting actual Internet gambling behavior has several methodological advantages compared to prior research about Internet gambling behavior. Research utilizing actual online behavior provides objective, detailed information about betting behavior, and the conditions under which gamblers place wagers. This strategy avoids the potential biases (e.g., memory-errors, self-presentation strategies, simple miscomprehension, and the phrasing of survey questions) that often emerge when research relies on participant self-report of past betting behavior (LaPlante et al. 2007). In addition, by utilizing a longitudinal study design, research from this collaborative is able to examine prospectively gambling behavior patterns that precede the development of excessive or maladaptive gambling behavior among ***bwin*** subscribers. This evidence-based approach permits us to identify effective prevention, diagnostic, and treatment strategies. Longitudinal studies often have provided landmark research findings that serve to improve public health interventions. For example, the Framingham Heart Study, a prospective, longitudinal study of more than 5000 healthy participants, helped to identify major cardiovascular disease risk factors and has led to vast improvements in public health strategies for cardiovascular disease prevention (Dawber and Stokes 1956). Similarly, analyses of this longitudinal cohort of ***bwin*** subscribers will allow researchers to gain a greater understanding of Internet gambling behavior and the factors that might influence the development and maintenance of gambling-related problems. The availability of this data source has provided new research opportunities to study the epidemiology of Internet gambling and responsible gambling practices with increased statistical confidence. Thus, this methodology represents a paradigm shift in the way scientists study Internet gambling.

Toward an accurate assessment of the epidemiology of Internet gambling behavior

Our research utilizing data about actual Internet gambling behavior has produced seven peer-reviewed publications (LaBrie et al. 2007, 2008; Broda et al. 2008; LaPlante et al. 2008, in press; Nelson et al. 2008; Peller et al. 2008), and other articles that are at various stages in the publication pipeline (e.g., Xuan and Shaffer, in press). We conducted seven empirical research studies about actual gambling behavior (LaBrie et al. 2007; Broda et al. 2008; LaBrie et al. 2008; LaPlante et al. 2008; Nelson et al. 2008; LaPlante et al. in press; Xuan and Shaffer in press) by assembling a prospective, longitudinal cohort of ***bwin*** subscribers' actual betting behavior in real time. The studies utilizing data about actual Internet gambling behavior provide a clear lens to examine Internet gambling behavior that is not clouded by the recall or sampling biases often evident in prior research.

Overall, findings from these studies of actual Internet gambling behavior (Broda et al. 2008; LaBrie et al. 2007, 2008; LaPlante et al. 2008, in press; Nelson et al. 2008; Xuan and Shaffer in press) contradict the speculation that most online gamblers exhibit excessive gambling behavior. The evidence shows instead that the vast majority of ***bwin*** subscribers engage in moderate sports betting behavior (e.g., for the median level players, 2.5 fixed odd sports bets of €4 each bet, every fourth day, or approximately US $5.30). A comparison of betting behavior among the different types of games available on the ***bwin*** site shows varying patterns of wagering. For example, subscribers lost more money on sports gambling than casino gambling. The typical aggregate expense (losses) for casino players is higher than for sports bettors. This is not because casino has greater losses. In fact, the house odds for casino play are less than half the house cut on sports betting. The greater aggregate is because casino betting is more rapid cycling and people place more bets. This finding is consistent with previous literature showing that people involved in casino gambling exhibit riskier behaviors and more frequently present for treatment than sports bettors (Shaffer et al. 2004; LaPlante et al. 2006). Patterns of sports betting varied for fixed-odds (i.e., bets made on the outcomes of sporting events or games in which the amount paid for a winning bet is set by the betting service) and live-action bets (i.e., bets made on propositions about outcomes within a sporting event, such as which side will have the next corner kick or whether the next tennis game in a match will be won at love by the server). Advocates and policymakers have speculated that live-action betting leads to more excessive gambling behavior (Griffiths 1999; Kong et al. 2008). Although empirical evidence from this analysis shows that subscribers placed fewer bets and lost less money when placing live-action bets (i.e., median of 2.8 wagers of €4 every fourth day during the median duration of 6 weeks at a loss of 18% of the amount wagered) than when placing fixed-odds bets (i.e., 2.5 bets of €4 every fourth day during the median 4 months from first to last bet at a loss of 29% of the amount wagered). Although the ***bwin*** cohort of subscribers was predominantly male, we conducted some analyses to examine gender differences in betting behavior. On average, results show that women's betting behavior was very similar to men's, but that women bet on more days and over a shorter period of time (LaBrie et al. 2007). It is worth noting that because ***bwin*** markets itself primarily as a sports betting website, the ***bwin*** subscriber population might be more likely to engage in sports betting. Thus, findings from these studies might not be generalizable to all Internet gamblers.

LaPlante et al. (2008) and Xuan and Shaffer (in press) completed studies of ***bwin*** subscribers that also used longitudinal methods with actual betting behavior. LaPlante et al.'s (2008) study of 46,339 ***bwin*** sports bettors illustrates an overall healthy exposure and adaptation pattern of betting behavior for the entire sample during a period of 18 months (i.e., short term increases in activity followed by quickly developing declines in population participation, number of bets, and size of stakes). Separate analyses of the most involved bettors (i.e., top 1–5% of the sample) show that trends of more excessive gambling behavior are evident for a very small minority of subscribers (LaBrie et al. 2007, 2008). The most involved bettors had increasing stakes and bets for live-action betting over time (LaBrie et al. 2007).

Xuan and Shaffer's (in press) paper examines the multiple trajectories of gambling behavior among the cohort of ***bwin*** live-action bettors from February 1, 2005 to June 30, 2006 who reported closing their accounts because of gambling-related problems ($N = 226$). These bettors who self identified as problem gamblers exhibited more signs of excessive gambling behavior (i.e., increasing monetary involvement and increasing loss) and more risk averse betting behavior than bettors who did not self identify as problem gamblers. The authors hypothesize that this behavior represents the self-identified problem gambler's

attempted by to regulate excessive gambling behavior. To gain a greater understanding of longitudinal trends for different types of Internet gambling behavior, we need more research examining the stability of these trends among different samples of bettors (e.g., groups with various risk and resilience gradients).

The assessment of actual Internet gambling using data from Internet websites provides new opportunities to improve this evidence base. In particular, studies evaluating the use of limit setting techniques (i.e., Nelson et al. 2008; Broda et al. 2008) provide researchers the opportunity to evaluate the efficacy of various harm reduction techniques.

Discussion

Although the field of Internet gambling is still in its infancy, we now have the technological ability to study real time gambling and all of its attendant details. This new technology represents a paradigm shift for both (1) the conceptual frameworks that organize how we think about information and each other (Kipnis 1991) and (2) research methods. This new technology provides researchers with the opportunity to conceptualize new and different research from the studies that have been available. This new research can focus on actual human behavior in addition to self-report, offering the opportunity to implement rigorous behavioral methodologies. Taken together, this technology and the opportunity to study actual behavior instead of only self-reported behavior represents a fundamental methodological shift in gambling studies that was not available in laboratory or land-based gambling settings. This scientific revolution already has yielded findings about Internet gambling that are distinct from earlier speculations or self-report based-research. For example, our findings derived from actual Internet gambling raise important questions about the utility and validity of self-report-based gambling research. Furthermore, this new body of research advances our understanding about the constructs and nomenclature now associated with excessive Internet gambling behavior. To illustrate, the current clinical definition of pathological gambling (American Psychiatric Association 1994), with respect to "persistent and recurrent" behavior, derives from the self-report of self-identified problem gamblers. The emerging body of literature using actual Internet gambling behavior suggests that these patterns might be different from those reported by treatment seekers, encouraging us to test these constructs empirically. In addition, studies of actual Internet gambling behavior assist with clinical case identification by providing behavioral evidence that will help clinical investigators minimize classification errors. Ultimately, it will be necessary to integrate evidence from studies of actual gambling behavior with self-report data that reflects the experience of gambling (e.g., perceptions and symptoms) to allow us to develop a more complete picture of Internet gambling behavior. Increased ability to understand the complexity and trajectory of gambling patterns also has important practical implications for developing strategies to regulate Internet gambling. For example, research identifying specific mediators and moderators of excessive Internet gambling provides policymakers and public health practitioners with an improved body of literature on which to base decision-making. This improved evidence base will guide the development of policies and public health interventions that will promote safer Internet gambling. Thus, continued research about Internet gambling utilizing the study of actual behavior has broad public health implications.

Limitations

This assessment of the peer-reviewed literature that focuses on Internet gambling has some important limitations. Although we conducted a systematic review of the literature, use of different keywords or search engines might have resulted in a different selection of articles. We present a critical discussion of study methodology (e.g., assessment techniques, sampling procedures) that we considered pertinent to the state of Internet gambling research; however, other researchers might have interpreted these studies differently.

The studies discussed in our systematic review evidenced important limitations. Commentaries do not provide any empirical evidence about Internet gambling. The self-report studies contain empirical data about Internet gambling behavior; however, the validity of these self-reported behaviors is potentially biased (e.g., recall bias). Researchers used convenience samples for many of these self-report surveys, and this strategy compromises the reliability of prevalence estimates and our ability to generalize the findings. Studies that utilize actual gambling behavior also have limitations. For example, these data still rely on subscriber self-reported demographic characteristics. Several people might use an account or a single user might be making bets for others. Subscribers might be engaging in Internet gambling on multiple sites, including ***bwin***. Therefore, the research based on actual gambling might not capture fully all of the features associated with subscriber betting behavior. Although ***bwin*** subscriber betting behavior is likely representative of betting behavior, these studies do not describe the players' clinical characteristics, perceptions, or the social consequences associated with their betting behavior. There are several other potentially important limitations associated with Internet-based gambling research. First, as we have noted elsewhere (LaBrie et al. 2007; Xuan and Shaffer in press), we currently have no means test, that is, no data about subscriber income. Consequently, it is difficult to know which subscribers might be betting beyond their means. Second, due to the absence of a means test and other psychosocial information about the meaning and consequences of gambling (e.g., debt, family/social problems, legal problems, etc.), we have little information to base any clinical judgments about the impact of Internet gambling on the lives of individual subscribers. Finally, it is reasonable to expect that Internet gamblers might also gamble both online and at casinos or other gambling venues. Therefore, we cannot estimate the potential synergistic effects of Internet and nonInternet gambling. Consequently, estimates of how much Internet subscribers gamble might not be accurate.

Next steps: Research to increase understanding of Internet gambling behavior

Despite advances in the methodology used to assess Internet gambling behavior (e.g., use of actual gambling behavior, longitudinal studies), current gaps in knowledge about Internet gambling behavior demand further empirical research. By introducing the Internet Gambling Study Act of 2007, US policymakers have acknowledged the need for empirical research to guide policymaking decisions. There are several areas related to Internet gambling that require further inquiry. For example, research examining the psychological characteristics of subscribers in more detail (e.g., functionality measures, mood) is an important next step towards understanding how to create parameters for safer Internet gambling. Further research also can improve the efficacy of product safety parameters for Internet gambling, by studying the factors that mediate and moderate safe play. For example, because research has not addressed comprehensively all of the components of the Epidemiologic Triangle, it is important to develop more research to address the social

settings with which people gamble (Peller et al. 2008). In addition, Internet gambling research will need to pinpoint factors that moderate exposure and adaptation effects across time and space to gain a better understanding of ways to create environment parameters for safer gambling behavior (LaPlante et al. 2007; Peller et al. 2008). Use of standardized assessment tools (e.g., Regional Impact of Gambling Exposure (Shaffer et al. 2004)) can facilitate quantified measurement of gambling exposure effects. Furthermore, the development of research that recognizes the dynamic relationship between host, agent, and environment holds the potential to generate new approaches for product safety. For example, research shows that time spent gambling on the Internet can be as debilitating to subscribers' daily functioning as the amount of money they spend gambling (Nelson et al. 2008). Therefore, interventions designed to limit Internet gambling involvement might help some people with gambling-related problems. However, future research will need to integrate observations of behaviors with self-reports of symptoms to optimally target interventions.

Advances in research about Internet gambling behavior will require collaborative partnerships between researchers, operators, and policymakers (Peller et al. 2008). For example, allowing researchers full access to data about subscribers' actual betting behavior and characteristics requires Internet gambling operators to participate in responsible gambling collaboratives that bring key stakeholders together. This empirical data can, in turn, help policymakers to enforce regulations that promote safer gambling behavior for all Internet gambling subscribers.

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References

American Psychiatric Association. 1994. DSM-IV: Diagnostic and statistical manual of mental disorders. 4th ed. Washington, DC: American Psychiatric Association.

Baumeister RHF, Vohs KHD, Funder DC. 2007. Psychology as the science of self-reports and finger movements. Perspectives on Psychological Science 2(4):396–403.

Broda A, LaPlante DA, Nelson SE, LaBrie RA, Bosworth L, Shaffer HJ. 2008. Virtual harm reduction efforts of Internet gambling: Effects of deposit limits on actual Internet sports gambling behavior. Harm Reduction Journal 5(1):27.

Christian Capital Advisers I. 2006. Global Internet Gambling Revenue Estimates and Projections (2001–2010, $M, US). Retrieved May 16, 2008, Available from: http://www.cca-i.com/Primary%20Navigation/Online%20Data%20Store/internet_gambling_data.htm

Dawber TR, Stokes J III. 1956. Rheumatic heart disease in the Framingham study. New England Journal of Medicine 255(26):1228–1233.
Griffiths M. 1996. Gambling on the Internet: A brief note. Journal of Gambling Studies 12(4):471–473.
Griffiths M. 1999. Gambling technologies: Prospects for problem gambling. Journal of Gambling Studies 15(3):265–283.
Griffiths M. 2003a. Internet abuse in the workplace: Issues and concerns for employers and employment counselors. Journal of Employment Counseling 40(2):87–96.
Griffiths M. 2003b. Internet gambling: Issues, concerns, and recommendations. CyberPsychology & Behavior 6(6):557–568.
Griffiths M, Parke A, Wood RT, Parke J. 2006. Internet gambling: An overview of psychosocial impacts. UNLV Gaming Research & Review Journal 10(1):27–39.
Griffiths M, Parke J. 2002. The social impact of internet gambling. Social Science Computer Review 20(3):312–320.
Griffiths M, Wood RT. 2000. Risk factors in adolescence: The case of gambling, videogame playing, and the Internet. Journal of Gambling Studies 16(2):199–225.
Hayer T, Meyer G. 2003. Das Suchtpotenzial von Sportwetten. Sucht: Zeitschrift fur Wissenschaft und Praxis 49(4):212–220.
James C. 2007. US faces $100 billion fine for web gaming ban. itnews. Available from: http://www.itnews.com.au/News/62937,us-faces-us100-billion-fine-for-web-gaming-ban.aspx
Kerber CS. 2005. Problem and pathological gambling among college athletes. Annals of Clinical Psychiatry 17(4):243–247.
King SA. 1999. Internet gambling and pornography: Illustrative examples of the psychological consequences of communication anarchy. CyberPsychology & Behavior 2(3):175–193.
King SA, Barak A. 1999. Compulsive Internet gambling: A new form of an old clinical pathology. CyberPsychology & Behavior 2(5):441–456.
Kipnis D. 1991. The technological perspective. Psychological Science 2(2):62–69.
Kong L, Ngan L, Leung J. 2008. Regulations and policies on online gambling. Available from: http://newmedia.cityu.edu.hk/cyberlaw/gp25/intro.html
LaBrie RA, Kaplan S, LaPlante DA, Nelson SE, Shaffer HJ. 2008. Inside the virtual casino: A prospective longitudinal study of actual Internet casino gambling. European Journal of Public Health, 18(4), 410–416.
LaBrie RA, LaPlante DA, Nelson SE, Schumann A, Shaffer HJ. 2007. Assessing the playing field: A prospective longitudinal study of internet sports gambling behavior. Journal of Gambling Studies 23(3):347–363.
LaBrie RA, Shaffer HJ, LaPlante DA, Wechsler H. 2003. Correlates of college student gambling in the United States. Journal of American College Health 52(2):53–62.
Ladd GT, Petry NM. 2002. Disordered gambling among university-based medical and dental patients: A focus on Internet gambling. Psychology of Addictive Behaviors 16(1):76–79.
Laffey D. 2005. Entrepreneurship and innovation in the UK betting industry: The rise of person-to person betting. European Management Journal 23(3):351–359.
LaPlante DA, Kleschinsky JH, LaBrie RA, Nelson SE, Shaffer HJ. 2008. Sitting at the virtual poker table: A prospective epidemiological study of actual Internet poker gambling behavior. Computers in Human Behavior.
LaPlante DA, LaBrie RA, Nelson SE, Schumann A, Shaffer HJ. 2007. Understanding the influence of gambling opportunities: expanding exposure models to include adaptation. The American Journal of Orthopsychiatry 77(4):616–623.
LaPlante DA, Nelson SE, LaBrie RA, Shaffer HJ. 2006. Men and women playing games: Gender and the gambling preferences of Iowa Gambling Treatment Program participants. Journal of Gambling Studies 22(1):65–80.
LaPlante DA, Schumann A, LaBrie RA, Nelson SE, Shaffer HJ. 2008. Population trends in Internet sports gambling. Computers in Human Behavior 24:2399–2414.
Larner AJ. 2006. Medical hazards of the internet: Gambling in Parkinson's disease. Movement Disorders 21(10):1789.
Messerlian C, Byrne AM, Derevensky JL. 2004. Gambling, youth and the Internet: Should we be concerned? Canadian Child and Adolescent Psychiatry Review 13(1):3–6.
Miller R. 2006. The need for self regulations and alternative dispute resolution to moderate consumer perceptions of perceived risk with Internet gambling. UNLV Gaming Research & Review Journal 10(1):51–58.
Mitka M. 2001. Win or lose, Internet gambling stakes are high. Journal of the American Medical Association 285(8):1005.
Nelson SE, LaPlante DA, Peller AJ, Schumann A, LaBrie RA, Shaffer HJ. 2008. Real limits in the virtual world: Self-limiting behavior of Internet gamblers. Journal of Gambling Studies 24(4):463–477.

Nisbett RE, Wilson TD. 1977. Telling more than we can know: Verbal reports on mental processes. Psychological Review 84(3):231–259.

Nower L. 2003. Pathological gamblers in the workplace: A primer for employers. Journal of Workplace Behavioral Health 18(4):55–72.

Peller AJ, LaPlante DA, Shaffer HJ. 2008. Parameters for Safer gambling behavior: examining the empirical research. Journal of Gambling Studies 24(4), 519–534.

Petry NM. 2006. Internet gambling: An emerging concern in family practice medicine? Family Practice 23(4):421–426.

Petry NM, Mallya S. 2004. Gambling participation and problems among employees at a university health center. Journal of Gambling Studies 20(2):155–170.

Petry NM, Weinstock J. 2007. Internet gambling is common in college students and associated with poor mental health. The American Journal on Addictions 16(5):325–330.

Ruiz M. 2006. European Companies Regroup to Offset the Effects of US Law Against Online Gambling. Available from: http://www.ibls.com/internet_law_news_portal_view.aspx?s=latestnews&id=1588

Sevigny S, Cloutier M, Pelletier M-F, Ladouceur R. 2005. Internet gambling: Misleading payout rates during the 'demo' period. Computers in Human Behavior 21(1):153–158.

Shaffer HJ. 1996. Understanding the means and objects of addiction: Technology, the Internet and gambling. Journal of Gambling Studies 12(4):461–469.

Shaffer HJ, Hall MN, Vander Bilt J. 2000. 'Computer addiction': A critical consideration. American Journal of Orthopsychiatry 70(2):162–168.

Shaffer HJ, LaBrie RA, LaPlante DA. 2004. Laying the foundation for quantifying regional exposure to social phenomena: Considering the case of legalized gambling as a public health toxin. Psychology of Addictive Behaviors 18(1):40–48.

Shaffer HJ, LaBrie RA, LaPlante DA, Kidman RC, Donato A. 2004. The Iowa Gambling Treatment Program: Treatment outcomes for a follow-up sample. Journal of Gambling Studies 21(1):59–71.

Smeaton M, Griffiths M. 2004. Internet gambling and social responsibility: An exploratory study. CyberPsychology & Behavior 7(1):49–57.

Watson S, Liddell Jr P, Moore RS, Eshee Jr WD. 2004. The legalization of internet gambling: A consumer protection perspective. Journal of Public Policy & Marketing 23(2):209–213.

Welte JW, Barnes GM, Wieczorek WF, Tidwell M-C, Parker J. 2002. Gambling participation in the US–results from a national survey. Journal of Gambling Studies 18(4):313–337.

Wong SH, Cowen Z, Allen EA, Newman PK. 2007. Internet gambling and other pathological gambling in Parkinson's disease: A case series. Movement Disorders 22(4):591–593.

Wood RT, Griffiths M, Parke J. 2007a. Acquisition, development, and maintenance of online poker playing in a student sample. Cyberpsychology & Behavior 10(3):354–361.

Wood RT, Williams RJ. 2007. Problem gambling on the internet: Implications for internet gambling policy in North America. New Media & Society 9(3):520–542.

Wood RT, Williams RJ, Lawton PK. 2007b. Why do Internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. Journal of Gambling Issues 20:235–252.

Woodruff C, Gregory S. 2005. Profile of Internet gamblers: Betting on the future. UNLV Gaming Research & Review Journal 9(1):1–14.

Woolley R. 2003. Mapping internet gambling: Emerging modes of online participation in wagering and sports betting. International Gambling Studies 3(1):3–21.

Xuan Z, Shaffer HJ. (in press). How do gamblers end gambling: longitudinal analysis of Internet gambling behaviors prior to account closure due to gambling related problems. Journal of Gambling Studies.

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Disordered gambling, type of gambling and gambling involvement in the British Gambling Prevalence Survey 2007

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Background: The purpose of this study was to examine the relationships between types of gambling and disordered gambling, with and without controlling for gambling involvement (i.e. the number of types of games with which respondents were involved during the past 12 months). **Methods:** We completed a secondary data analysis of the 2007 British Gambling Prevalence Survey (BGPS), which collected data in England, Scotland and Wales between September 2006 and March 2007. The sample included 9003 residents, aged 16 or older, recruited from 10 144 randomly selected addresses. 5832 households contributed at least one participant. Post-facto weighting to produce a nationally representative sample yielded 8968 observations. The BGPS included four primary types of measures: participation in gambling (during the past 12 months and during the past 7 days), disordered gambling assessments, attitudes toward gambling and descriptive information. **Results:** Statistically controlling for gambling involvement substantially reduced or eliminated all statistically significant relationships between types of gambling and disordered gambling. **Conclusions:** Gambling involvement is an important predictor of disordered gambling status. Our analysis indicates that greater gambling involvement better characterizes disordered gambling than does any specific type of gambling.

Keywords: gambling, internet, internet gambling, games, PG.

Introduction

Pathological gambling (PG) is a public health problem that is associated with a number of mental and physical health, interpersonal and financial problems.[1–3] For example, among those with co-occurring mental illness, 75% of PGs in the USA have mental illness that preceded their PG, about 23% have mental illness that followed, and about 2% had these problems emerge concurrently.[1] Research also suggests that PG is associated with domestic violence, suicide and suicidal ideation, financial troubles, criminal behavior and other problems.[3,4] These public health issues warrant continued empirical attention to gambling and gambling-related problems.

The aetiology of PG is uncertain; however, research has shown a tendency to focus on types of games as a potential primary cause. For example, a recent examination of correlates of British Internet gambling reported higher rates of disordered gambling among internet gamblers than among non-internet gamblers.[5] Consequently, Griffiths *et al.* concluded that Internet gambling probably is more likely to contribute to gambling problems than non-internet gambling activities, explaining that this might be the case because internet gambling is less protective (e.g. year-round 24/7 access from home) of vulnerable gamblers than other types of games. Similarly, researchers and others often point to fruit/slot machines as being particularly dangerous to individuals because of their potential to promote rapid gambling (for a review, see reference 6).

Although internet gambling and fruit/slot machine gambling contribute to the overall costs associated with excessive gambling, the scientific approach to whether specific games are the primary cause of PG has been uneven; as a result of this situation, so has the evidence. As Welte *et al.*[7] emphasized, research that tests how well different games predict gambling problems or discriminate individuals with gambling problems from those without provides more reliable information about the relationship between games and gambling problems than research that simplistically reports the prevalence of gambling problems among individuals who participate in, or prefer, a specific type of gambling. The latter type of research is problematic because it yields findings that researchers and others cannot generalize to the general population or even to the general population of gamblers. Further, the patterns of results (i.e. risk pattern by game) generated by the two types of studies differ noticeably (see reference 7 for more information).

Recent research suggests that relying exclusively on game types as an explanatory factor for disordered gambling might mask other important contributing factors, such as the range of gambling involvement (involvement). Specifically, using a nationally representative sample of US youth, Welte *et al.*[7] recently reported that, although a number of different types of gambling could discriminate individuals with and without gambling-related problems, the pattern of risk was not consistent with popular theories of risk (e.g. rapid-cycling technology-based forms of gambling being the most risky) often identified by less sophisticated analyses. Furthermore, Welte *et al.* demonstrated that controlling for involvement minimized or eliminated the discriminative relationships between types of games and measures of gambling disorder. The authors concluded that, contrary to conventional wisdom, the most rapid play games might not be the most problematic for US youth, and further, that overall involvement might be a more potent predictor of gambling-related problems than any specific game type.

The Welte *et al.*[7] research is limited by its use of a US youth-only sample, who have few legal gambling options in the USA. The current study extended these findings by utilizing an adult, non-US sample. Specifically, we examined data from the British Gambling Prevalence Survey 2007 (BGPS) to determine the relative ability of games to predict gambling-related disorder, with and without controlling for

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involvement. We expected that involvement would attenuate or eliminate the associations of games with gambling-related disorder.

Methods

This research utilized data from the BGPS 2007, produced by the National Centre for Social Research, sponsored by the Gambling Commission, and supplied by the UK Data Archive.[8] The data are Crown copyright. The following is a brief overview of the BGPS methodology, as described more fully in multiple sources.[5,9,10]

Participants

The BGPS is a publicly available dataset of interviews from a sample of 9003 residents of England, Scotland and Wales. For the current study, we used weighted data of 8968 observations characteristic of the general population. The weighted sample comprised 52% women and 48% men. With respect to age, 14% of the sample was aged 16–24, 35% was 25–44, 31% was 45–64 and 19% was aged 65 and over.

Procedures

The BGPS recruited 32 households from each of 317 geographic primary sampling units selected with a probability that was proportional to the number of addresses within them. All residents of selected households aged 16 and older were eligible to participate in the survey, indicating that their household had been selected as eligible for participation in the study and that researchers would soon visit their home.

Researchers visited dwellings a minimum of five times to recruit eligible residents to participate. During a successful contact visit, researchers completed a brief household survey and distributed hard copies (i.e. paper–pencil based) of the study survey. Participants could complete the study survey immediately, at a later point at which time researchers would collect the survey, or online. About 7% of the sample completed the surveys online. Researchers made a minimum of two reminder phone calls to residents who had promised to complete the survey, but had not done so. The overall response rate for the study was 52%.[9]

Measures

The BGPS included four primary types of measures. First, the survey included the assessment of participation in gambling types during the past year and the past 7 days, including: national lottery tickets, scratch cards, other lotteries, football pools, bingo, fruit/slot machines, virtual gaming machines (e.g. virtual roulette, keno, bingo, etc.) at a bookmaker's location, casino table games, online gambling, online betting with bookmaker, betting exchange, horse race, dog race, betting on any other event or sport in a bookmaker's, by phone or at the venue, spread betting, private betting and 'other' types of betting. Second, the survey contained two assessments of disordered gambling, the Diagnostic and Statistical Manual-IV (DSM; 11) and the Canadian Problem Gambling Severity Index (PGSI; 12). For the DSM assessment within the BGPS 2007 study, investigators report that they adapted the DSM-IV criteria into question format (e.g. when you gamble, how often do you go back another day to win back money you lost?).[9] Response options were very often, fairly often, occasionally and never. Positive responses included answering fairly often or very often to criteria 1–7 (i.e. chasing losses, ruminating about gambling, tolerance, withdrawal, gambling to escape, lying to others about gambling and inability to cut back) and answering occasionally, fairly often or very often to criteria 8–10 (i.e. committing a crime to finance gambling, risking relationships/jobs and asking others for money to gamble). Third, the survey included a series of variables representing gambling-related attitudes (e.g. agree or disagree that people should have the right to gamble). Fourth, non-gambling information included a variety of demographic (e.g. gender, age, socio-economics) and health-related information (e.g. do you have a long-standing health illness).

For the current study, we focused on game type, gambling problems and demographic information. For game type, we used the above-defined categories with one exception. We combined online gambling, online betting with a bookmaker and use of a betting exchange into an 'Internet gambling' category. This data reduction replicated that employed by Griffiths *et al.*[5] on this dataset. This is a conservative measure because the combination of three categories of activities creates a variable that by definition represents greater involvement. This notation also applies to other gambling activity categories that can represent multiple gambling opportunities (e.g. casino table games). For gambling problems, we used the past year DSM-IV assessment and considered aspects of the endorsement of symptoms (i.e. % endorsing any symptoms, % endorsing 3+ symptoms, mean number of symptoms endorsed). We used the cutoff 3+ symptoms to create a categorical variable called disordered gambling status (i.e. reporting 3+ DSM gambling symptoms during the past 12 months or not). We operationally defined gambling involvement as the number of types of gambling for which an individual reported being involved during the past 12 months.

Analysis plan

The Cambridge Health Alliance Institutional Review Board reviewed and approved this secondary data analysis.

We used weighted data for all analyses. Specifically, the BGPS created a weighting variable correcting for dwelling and household selection probabilities, age, gender and individual non-response within participating households.[13] The application of the weighting variable yields findings that can be generalized to the general population surveyed.

We conducted three primary sets of analyses. First, we calculated for the full sample, and by gender, participation rates for each game type. We used chi-square analyses to determine whether those rates varied by gender. Second, for each type of game, we calculated for the sample of individuals who had played the game during the past 12 months and, by gender, the proportion reporting any gambling symptoms during the past 12 months, the proportion reporting 3+ gambling symptoms during the past 12 months, the mean number of gambling symptoms reported during the past 12 months and the mean number of gambling types played during the past 12 months. Third, we conducted a series of logistic regressions, which used participation in each gambling type to predict disordered gambling status among past 12 month gamblers. We conducted these logistic regressions first without controlling for involvement and then added involvement as a control.

Results

Gambling participation and problems

Table 1 shows the participation in all types of gambling by gender and for the full sample. The top five gambling types with respect to participation were: the national lottery, scratch cards, betting on horses, fruit/slot machines and 'other' lottery. Also popular were private betting, bingo and other sports

betting (other than online betting or betting on horses or dogs).

We observed a number of gender differences for gambling participation. Only the rate of playing scratch cards ($\chi^2(1) = 1.32$) and other lottery ($\chi^2(1) = 0.00$) was the same among women as it was among men. A greater number of men than women participated in national lottery ($\chi^2(1) = 11.21$), football pools ($\chi^2(1) = 92.67$), fruit/slot machines ($\chi^2(1) = 159.80$), virtual gaming machines ($\chi^2(1) = 58.24$), casino table games ($\chi^2(1) = 104.64$), Internet gambling ($\chi^2(1) = 148.92$), betting on horses ($\chi^2(1) = 125.27$), betting on dogs ($\chi^2(1) = 69.58$), other sports betting ($\chi^2(1) = 193.78$), spread betting ($\chi^2(1) = 36.55$), private betting ($\chi^2(1) = 161.64$) and other types of betting ($\chi^2(1) = 4.16$). A greater number of women than men participated in bingo ($\chi^2(1) = 104.88$).

Table 1 Participation in all types of gambling by gender (weighted $N = 8968$)

	Percent played last year		
Type of gambling	Female	Male	Overall
National lottery**	55.5	59.0	57.2
Scratch cards	20.2	19.2	19.7
Other lottery	11.7	11.7	11.7
Football pools***	1.6	5.2	3.3
Bingo***	9.9	4.3	7.2
Fruit/slot machines***	9.9	19.3	14.5
Virtual gaming machines***	1.4	3.9	2.6
Casino table games***	1.9	6.0	3.9
Internet gambling***	2.9	8.9	5.8
Betting on horses***	12.8	21.7	17.1
Betting on dogs***	3.1	7.0	5.0
Other sports betting ***	2.7	9.8	6.2
Spread betting***	0.2	1.3	0.7
Private betting***	6.4	14.7	10.4
Other type of betting*	0.3	0.6	0.5
Any gambling	65.2	70.7	67.9

***Significant difference between males and females, $p < 0.001$

**Significant difference between males and females, $p < 0.01$

*Significant difference between males and females, $p < 0.05$

About 0.6% ($N = 51$) of the full sample reported 3+ DSM gambling symptoms during the past year and about 0.3% ($N = 27$) reported 5+ DSM gambling symptoms during the past year. Table 2 shows gender stratified prevalence rates for gambling-related problems reported by individuals who participated in various types of gambling. Individuals who participated in spread betting and used virtual gaming machines had the highest likelihoods of reporting any DSM gambling symptoms during the past 12 months, as well as reporting 3+ DSM gambling symptoms during the past 12 months. These types of games also were associated with the highest mean numbers of DSM gambling symptoms and mean number of types of gambling during the past year (i.e. involvement).

The top five prevalence rates of any DSM gambling symptoms by types of game were: virtual gaming machines, spread betting, casino table games, other sports betting and betting on dogs. The top five prevalence rates of 3+ DSM gambling symptoms by the type of game were: spread betting, virtual gaming machines, other types of betting, casino table games and betting on dogs. The top five types of games for the mean number of DSM gambling symptoms were: spread betting, virtual gaming machines, casino table games, Internet gambling and betting on dogs. The top five types of games for the mean number of types of gambling during the past year (i.e. involvement) were: spread betting, virtual gaming machines, casino table games, internet gambling and other sport betting.

Predicting gambling-related problems

In this section, we use 'predict' in a technical sense to indicate a relationship between the logistic regressions 'predictor' variables and outcome (see reference 14, pp. 623–4), and not to suggest these predictor variables cause gambling problems. Among the full sample, participants engaged in an average of 1.67 types of gambling (SD = 1.93) in the past 12 months. About 62% reported gambling in the past year. Among gamblers (i.e. those participants who engaged in at least one type of gambling in the past 12 months), that average increased to 2.47 (SD = 1.88).

Table 3 shows a series of logistic regressions illustrating how well each type of gambling contributes to the prediction of

Table 2 Prevalence of any gambling symptoms, prevalence of disordered gambling, mean gambling symptoms and involvement for gamblers who played each type of gambling (weighted $N = 8968$)

	N (weighted)			Percentage of weight/any gambling symptoms			Percentage of weight/ 3+ gambling symptoms (disordered gamblers)			Mean no. of gambling symptoms			Mean no. of types of gambling (involvement)		
Type of gambling	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total
National lottery	2398	2400	4798	5.9	10.3	8.1	0.4	1.6	1.0	0.08	0.18	0.13	2.31	2.91	2.61
Scratch cards	866	771	1637	7.4	13.9	10.4	0.9	3.0	1.9	0.12	0.28	0.19	3.38	4.48	3.90
Other lottery	495	467	962	7.5	10.7	9.0	1.4	2.8	2.1	0.13	0.24	0.19	3.34	4.34	3.82
Football pools	66	207	273	12.1	15.9	15.0	1.5	4.3	3.7	0.18	0.37	0.32	4.23	5.30	5.05
Bingo	431	178	609	8.3	17.4	11.0	1.6	6.7	3.1	0.14	0.50	0.25	3.63	5.02	4.04
Fruit/slot machines	427	767	1194	8.2	13.8	11.8	1.6	3.3	2.7	0.15	0.30	0.25	4.14	4.75	4.53
Virtual gaming machines	56	157	213	16.1	30.8	26.9	5.4	13.4	11.3	0.48	1.04	0.89	6.37	7.30	7.05
Casino table games	81	245	326	11.1	19.0	17.1	1.2	6.5	5.2	0.15	0.51	0.42	5.28	6.23	6.00
Internet gambling	127	354	481	11.0	16.9	15.4	2.4	5.9	5.0	0.22	0.50	0.42	5.20	5.79	5.63
Betting on horses	565	891	1456	6.4	12.6	10.2	0.7	2.5	1.8	0.10	0.26	0.20	3.70	4.43	4.15
Betting on dogs	137	286	423	8.0	19.9	16.1	1.5	7.0	5.2	0.12	0.57	0.42	4.74	5.64	5.35
Other sports betting	126	405	531	12.7	18.1	16.8	1.6	4.7	4.0	0.20	0.44	0.38	5.24	5.71	5.60
Spread betting	9	49	58	11.1	29.2	26.3	11.1	16.3	15.5	0.53	1.14	1.05	10.54	8.60	8.89
Private betting	275	580	855	9.5	14.5	12.9	1.5	2.8	2.3	0.15	0.31	0.26	4.18	4.97	4.72
Other type of betting	15	23	38	0.0	13.0	7.9	0.0	8.7	5.3	0.00	0.51	0.31	3.14	4.73	4.10
Any gambling	2726	2801	5527	5.8	10.2	7.9	0.4	1.5	0.9	0.07	0.17	0.12	2.23	2.82	2.53

F = female; M = male; 541 participants did not answer DSM questions and thus were not included in this table

Table 3 Logistic regression analyses predicting disordered gambling status from type of game, with and without controlling for involvement

Type of game	Odds ratio (95% CI), no control	Odds ratio (95% CI), controlled for involvement	Change in odds ratios	Involvement odds ratio (95% CI)
Spread betting	21.84 (9.91, 48.10)***	0.70 (0.21, 2.28) NS	−21.14	1.58 (1.44, 1.74)***
Virtual gaming machines	24.01 (13.62, 42.32)***	4.26 (1.85, 9.84)**	−19.75	1.38 (1.24, 1.53)***
Internet	9.58 (5.50, 16.71)***	1.53 (0.69, 3.38) NS	−8.05	1.50 (1.36, 1.66)***
Betting on dogs	9.39 (5.36, 16.47)***	1.95 (0.95, 3.97) NS	−7.44	1.49 (1.36, 1.62)***
Casino table games	8.15 (4.50, 14.74)***	0.79 (0.33, 0.91) NS	−7.36	1.58 (1.43, 1.75)***
Other sports betting	6.60 (3.75, 11.60)***	0.77 (0.34, 1.74) NS	−5.83	1.59 (1.44, 1.75)***
Fruit/slot machines	5.75 (3.27, 10.10)***	1.19 (0.58, 2.47) NS	−4.56	1.53 (1.40, 1.68)***
Other betting	7.24 (1.90, 27.58)**	2.93 (0.60, 14.43) NS	−4.31	1.55 (1.43, 1.67)***
Football pools	4.56 (2.24, 9.29)***	0.44 (0.16, 1.21) NS	−4.12	1.62 (1.48, 1.78)***
Bingo	4.92 (2.78, 8.72)***	1.76 (0.90, 3.42) NS	−3.13	1.52 (1.40, 1.65)***
Private betting	3.36 (1.90, 5.90)***	0.36 (0.16, 0.84)*	−3.00	1.69 (1.52, 1.86)***
Scratch cards	3.91 (2.22, 6.88)***	1.09 (0.56, 2.13) NS	−2.82	1.54 (1.42, 1.68)***
Betting on horses	2.77 (1.60, 4.80)***	0.46 (0.22, 0.97)*	−2.31	1.64 (1.50, 1.80)***
Other lottery	3.00 (1.70, 5.28)***	0.85 (0.43, 1.71) NS	−2.15	1.57 (1.44, 1.70)***
National lottery	1.85 (0.68, 5.19) NS	1.04 (0.36, 3.00) NS	−0.81	1.55 (1.44, 1.67)***

*$P<0.05$; **$P<0.01$; ***$P<0.001$; NS = not significant

gambling-related problems (i.e. 3+ DSM-IV criteria). Bivariate analyses showed that all types of gambling, except for the National Lottery, contributed significantly to the prediction of gambling-related problems and all increased risk for gambling-related problems. The top five odds ratios were for: virtual gaming machines, spread betting, Internet gambling, betting on dogs, and casino table games.

Subsequent regressions that added involvement (i.e. number of types of games played in the past 12 months) showed that involvement contributed significantly to the prediction of gambling-related problems in all models. The addition of involvement greatly reduced the contribution of games to the prediction of gambling-related problems in each model. For almost all games, the addition of the involvement variable rendered the significant positive association between gambling type and gambling-related problems non-significant. The exception was virtual gaming machines, which maintained a significant positive relationship to disordered gambling status after adjusting for involvement. Two games, private betting and betting on horses, had a reversal of association. After controlling for involvement, individuals who engaged in private betting or betting on horses were significantly *less* likely to have gambling-related problems than people who did not.

Discussion

In this study, we provide a comprehensive analysis of participation with different games among British residents aged 16 and older. We placed a special emphasis on the nature and strength of the associations between types of games and gambling-related problems. The types of games that had the strongest associations with gambling-related problems did not include all of the games that the conventional wisdom might expect. For example, fruit/slot machines were not included among the top five game types for gambling-related problems. Virtual gaming machines had the strongest association with gambling-related problems, but few people (i.e. 2.6%) endorsed that they had played these games during the past 12 months. These findings suggest that popular perceptions of risk associated with specific types of gambling for the development of gambling-related problems might misrepresent actual risk.

Regardless of the type of game, past 12-month participation was associated with disordered gambling; however, for the most part, such associations disappear, or at least become weakened, when statistical analyses control for the range of gambling involvement. Our findings with a primarily adult British sample are consistent with Welte *et al.*'s (2009) results for US youth. Taken together, these two sets of findings suggest that researchers and others use caution when interpreting results showing that people who play specific types of games have a higher rate of gambling-related problems than others. In fact, these studies reveal that some games might be indicators of unhealthy involvement, rather than critical factors for gambling-related problems themselves.

One interesting, and perhaps unanticipated, finding was that the nature of the relationships between private betting and betting on horses and gambling problems changed when we considered the influence of involvement: engaging in these types of gambling, but not other types, seemed to protect players against developing gambling problems. This finding suggests that the apparent risk between gambling activities and developing gambling-related problems resides, perhaps primarily or even entirely, among individuals who have high rates of involvement. For others who do not have high rates of involvement, playing these types of games might reflect social setting characteristics (e.g. norms) that encourage control and preclude excessive gambling.

These findings hold some disparate possibilities for theories of gambling exposure. On one hand, these findings might imply that more opportunities to gamble create more opportunities for involvement and, therefore, might yield more gambling-related problems. On the other hand, these findings might suggest that more opportunities to gamble will have little to no impact on the prevalence and incidence of gambling-related problems because individuals are more or less prone to involvement. Increases in gambling opportunities will not influence individuals who are less prone to involvement, but only those likely to become, or who already are, involved. There is some evidence to support the latter view because the rate of gambling disorders has changed little during the past 35 years despite the extraordinary growth of gambling opportunities and access around the world.[15]

Strengths and weaknesses of the study

Notable strengths of this study include the analysis of multiple game types simultaneously and the incorporation of a measure of involvement into analyses that examine the association between type of game and gambling-related problems. Controlling for involvement allows a more sophisticated

understanding of the risk unique to some types of games and provides a level of analytic sophistication more advanced than the majority of available research.[7] By controlling for involvement, this research shows that involvement is a potent predictor of gambling-related problems that exceeds the potency of types of games. In fact, controlling for involvement drastically reduces the ability of games to discriminate statistically individuals who have gambling-related problems from those who do not. Another strength of this study is that it advances this more sophisticated methodology and line of inquiry from a US adolescent sample to a British primarily adult sample. This broader study sample helps to avoid problems related to legal access to different types of gambling observed among the US sample and concerns about different gaming interests by age cohorts.

Nevertheless, this study is not without limitations. First, the analyses rely on self-report data and not actual gambling activity. Self-report is vulnerable to weaknesses, including faulty memory, factual errors and self-presentation biases. Second, we only included one measure of involvement (i.e. number of types of games played during the past 12 months). Other measures of involvement (e.g. intensity of play, involvement in clusters of games, etc.) might provide weaker or stronger attenuation of the association between types of games and gambling-related problems. Third, this study relied on retrospective reports of behavior and therefore cannot establish any causal patterns. Fourth, many of the game-type variables represent multiple types of games by definition (e.g. casino table games, internet gambling, etc.). This approach is conservative and only presents as a limitation because of the inability to distinguish the effects of subtypes of games. Fifth, a small number of people played some types of games; consequently, increases in the sample size might alter the findings for games played by small numbers of people.

Future research should include the longitudinal assessment of real-time gambling data and multiple measures of involvement to yield a better determination of whether involvement is a moderator, mediator or both, of disordered gambling. Other important directions include examinations of game clustering, to determine whether subtypes of involvement are possible, the determination of whether there might be a critical level of involvement (e.g. 5 types, 10 types) that has optimal sensitivity and specificity for determining disordered gambling status and, finally, a consideration of age-related effects.

Concluding thoughts

The range of gambling involvement frequently is a better predictor of disordered gambling status than type of gambling. This finding is important because it represents a deviation from the tendency to focus on specific games, such as fruit/slot machines as central to gambling-related problems. This research does not suggest that differentiating between types of games is completely unimportant; clearly, there are differences in the popularity of games. These and similar results[7] suggest the need to reconsider the conventional assumptions related to the influence of game types and direct more attention toward global behavioral characteristics, such as the range of involvement.

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Conflict of interest: During the past 5 years, the authors of this paper have received honoraria and fees for a variety of activities, including gambling-related symposia, speaking events, education events, research, and consulting. HJS has served as an expert witness for gambling and other addiction-related legal cases. The authors have no other personal or employment-related competing interests. The sponsor had no role in this research. We conducted this research independently from the sponsor.

Key points

- The aetiology of PG is uncertain, but research has attempted to determine whether specific game types (e.g. slot machines, internet gambling) are associated with increased risk for developing disordered gambling.
- Recent research suggests that past findings linking game types to risk for disordered gambling failed to consider the range of gambling involvement among people who play specific games and when the extent of involvement is considered, game type influences diminish. Nevertheless, this recent research is limited by its reliance on a US youth sample.
- The current study extends recent research by testing the associations between specific games, range of involvement and disordered gambling among a nationally representative British adult sample.

References

1 Kessler RC, Hwang I, LaBrie RA, et al. DSM-IV pathological gambling in the National Comorbidity Survey Replication. *Psychol Med* 2008;38:1351–60.

2 Petry NM, Stinson FS, Grant BF. Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: results from the National Epidemiologic survey on alcohol and related conditions. *J Clin Psychiatry* 2005;66:564–74.

3 Shaffer HJ, Korn DA. Gambling and related mental disorders: a public health analysis. *Ann Rev Public Health* 2002;23:171–212.

4 Shaffer HJ, LaPlante DA, LaBrie RA, et al. Toward a syndrome model of addiction: multiple expressions, common etiology. *Harv Rev Psychiatry* 2004;12:367–74.

5 Griffiths M, Wardle H, Orford J, et al. Sociodemographic correlates of internet gambling: findings from the 2007 British gambling prevalence survey. *CyberPsychol Behav* 2009;12:199–202.

6 Dowling N, Thomas T. Electronic gaming machines: are they the 'crack-cocaine' of gambling? *Addiction* 2005;100:33–45.

7 Welte JW, Barnes GM, Tidwell M-CO, Hoffman JH. The association of form of gambling with problem gambling among American youth. *Psychol Addict Behav* 2009;23:105–12.

8 National Centre for Social Research. British gambling prevalence survey 2007. Colchester, Essex: UK Data Archive, 2008.

9 Wardle H, Sproston K, Orford J, et al. British gambling prevalence survey 2007: National Centre for Social Research, September 2007.

10 Griffiths M, Wardle H, Orford J, et al. Internet gambling: a secondary analysis of findings from the 2007 British Gambling Prevalence Survey: Nottingham Trent University, 2008.

11 American Psychiatric Association. DSM-IV: diagnostic and statistical manual of mental disorders. 4th edn. Washington, D.C.: American Psychiatric Association, 1994.

12 Ferris J, Wynne H. The Canadian Problem Gambling Index: Final Report. Ottawa, ON, Canada: Canadian Centre on Substance Abuse, 2001.

13 National Centre for Social Research. British Gambling Prevalence Survey 2007 User Guide. Colchester, Essex: UK Data Archive, 2008.

14 Tabachnick BG, Fidell LS. Using multivariate statistics. New York, NY: Harper Collins, 1996.

15 LaPlante DA, Shaffer HJ. Understanding the influence of gambling opportunities: Expanding exposure models to include adaptation. *Am J Orthopsychiatry* 2007;77:616–23.

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ORIGINAL PAPER

How Do Gamblers End Gambling: Longitudinal Analysis of Internet Gambling Behaviors Prior to Account Closure Due to Gambling Related Problems

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Abstract *Objective*: To examine behavioral patterns of actual Internet gamblers who experienced gambling-related problems and voluntarily closed their accounts. *Design*: A nested case–control design was used to compare gamblers who closed their accounts because of gambling problems to those who maintained open accounts. *Setting*: Actual play patterns of in vivo Internet gamblers who subscribed to an Internet gambling site. *Participants*: 226 gamblers who closed accounts due to gambling problems were selected from a cohort of 47,603 Internet gamblers who subscribed to an Internet gambling site during February 2005; 226 matched-case controls were selected from the group of gamblers who did not close their accounts. Daily aggregates of behavioral data were collected during an 18-month study period. *Main outcome measures*: Main outcomes of interest were daily aggregates of stake, odds, and net loss, which were standardized by the daily aggregate number of bets. We also examined the number of bets to measure trajectory of gambling frequency. *Results*: Account closers due to gambling problems experienced increasing monetary loss as the time to closure approached; they also increased their stake per bet. Yet they did not chase longer odds; their choices of wagers were more probabilistically conservative (i.e., short odds) compared with the controls. The changes of monetary involvement and risk preference occurred concurrently during the last few days prior to voluntary closing. *Conclusions*: Our finding of an involvement-seeking yet risk-averse tendency among self-identified problem gamblers challenges the notion that problem gamblers seek "long odds" during "chasing."

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Introduction

The study of gambling consequences is a central topic that has stimulated interest among researchers, clinicians, and public policy makers (Griffiths 2004; National Research Council 1999; Petry 2005; Shaffer and Korn 2002). Although long-run mathematical expectations for gambling (e.g., "Gambler's ruin" (Ross 2002)) have been documented, considerable complexity arises for those who try to predict actual gambling behaviors. Theoretical attempts to predict gambling behaviors are sometimes inconsistent with what ordinary people actually do. For example, The Saint Petersburg Paradox was published in 1738 from Daniel Bernoulli's presentation of the problem. An individual is required to pay a fixed fee to enter a coin toss game. A fair coin will be tossed in sequence until a "tail" appears and ends the game. The payoff starts at 1 dollar and is doubled after each "head" appears. The individual wins the final payoff when the game ends with the first "tail". The question is how much an individual should pay to enter the game. In theory, the expected value of the game is positive infinity; yet in reality, most people are willing to pay only a small amount of money to play the game. The Saint Petersburg Paradox highlights a classical example where in vivo people behave differently from what a naïve decision theorist recommends. A naïve decision theorist would suggest that people pay an infinite amount because the expected value of gambling is positive infinity; however, ordinary people usually follow heuristics rather than pure mathematical reasoning.

Theoretical constructs regarding the development and maintenance of gambling disorders often are not empirically developed and tend to remain untested against actual gambling behavior. One example is the construct of "chasing." Researchers have defined chasing in several ways. Lesieur (1979) describes the "chase" as an individual episode or series of gambling events where gamblers increase their losses because they continue gambling compulsively to recoup previous losses. Lesieur (1984) asserts that the intensity of the "chase" escalates as the money loss increases. Similarly, the American Psychiatric Association defines pathological gambling as a persistent and recurrent pattern of maladaptive gambling that is characterized behaviorally as "needs to gamble with increasing amounts of money" and "after losing money...returns...to get even" or "chasing one's losses" (American Psychiatric Association 1997). Pathological gambling also entails elevated monetary risk (Breen and Zuckerman 1999). Clinicians have considered "chasing losses" as a central attribute of pathological gamblers. Finally, Dickerson describes chasing losses as "to bet more...by a sequence of losing bets resulting in further betting with increased stakes and/or longer odds" (Dickerson 1984, p. 133).

The suggestion that a gambler's choice for more risky bets, and a desire for a bigger win to "get even" more quickly, is inconsistent with the extant decision-making literature that shows "loss aversion" (Kahneman and Tversky 1979) motivates people more than "winning." To advance the scientific literature on this topic, it is necessary to empirically investigate whether the behavior of in vivo gamblers corresponds to a conventional depiction of "chasing." In this study, we primarily examine Dickerson's two-part definition of chasing: increasing stakes and/or betting on propositions with

longer odds to recoup losses. Further, we study the trajectory of gambling frequency as measured by the number of bets when loss occurs and continues. Conceptually, chasing is a construct that represents behavioral patterns of betting that evolve over time. Consequently, this study is the first longitudinal investigation of actual gambling behaviors that focuses on the nature of chasing.

The extant empirical foundation for the constructs used to identify gambling disorders is limited. For example, despite the popularity of inferring "loss of control" (Blaszczynski and Nower 2002) as a construct to explain "compulsive" or "pathological" gambling, this association remains uncertain and not immune to caveats; the reason for this uncertainty is that the empirical base for this explanation rests primarily on self-report. The notion of gambling as an irrational impulse control disorder derives primarily from gamblers who have sought help for the disorder and not from gamblers in the community. Clinicians typically diagnosis the presence of pathological gambling by interviewing help-seeking patients and then applying criteria and cutoff values (e.g., DSM-IV) (American Psychiatric Association 1997) to their self-reported gambling patterns. Self-report measures of gambling wins and losses can be unreliable. Both selection bias and recall bias compromise the reliability of clinical assessment. These biases also limit the validity of inferring how problem gamblers differ from other gamblers in their behavioral trajectories. Similarly, experiments (Potenza et al. 2003; Reuter et al. 2005) that shed light on the association between pathological gambling status and reduced efficacy of the mesolimbic reward system often rely on self-report interview questions. Further, the value of physiological evidence derived from gamblers experiencing artificial gambling tasks is uncertain: using gambling experiments as a substitute for in vivo gambling raises important validity concerns about whether proxy gambling can stimulate responses that are sufficiently similar to actual gambling to yield useful results (Anderson and Brown 1984).

In addition to the limitations of self-reported behavior, if we are trying to understand behavioral trajectories, cross-sectional research can be misleading. Longitudinal analysis is instrumental to understand the maintenance or escalation of gambling behavior (Slutske 2007). The longitudinal analytic approach in our study is a type of random-effects model that represents a common and unifying approach to fitting growth trajectories and repeated-measures data (Laird and Ware 1982). To the best of our knowledge, there are no studies that employ longitudinal analyses to investigate the patterns of *actual* gambling behaviors that reflect chasing-related monetary involvement, risk preference, and frequency.

Recently, researchers began to learn from the study of actual Internet gamblers (LaBrie et al. 2007, 2008; LaPlante 2008a, b). The present study extends this growing body of in vivo research by examining the natural course of gambling patterns evidenced by a group of Internet gamblers who reported gambling-related problems and, consequently, voluntarily ended their gambling accounts because of these problems. We will use a prospective cohort recently detailed in an epidemiological description of Internet gamblers (LaBrie et al. 2007). The advent of Internet gambling provides an ideal context to study gamblers who might experience gambling problems because this technology permits us to examine prospectively every bet, with its stake and odds. This study will focus on the behavioral trajectories of in vivo gambling that precede account closure. In addition, this study will allow us to test the prevailing wisdom that gambling problems increasingly are associated with higher levels of risk-seeking (i.e., increasing stakes and/or engaging in longer odds bets when experiencing increasing monetary loss).

Methods

Sample

The research cohort consisted of 47,603 individuals who sequentially subscribed to an Internet sports-betting service provider during February 2005. This service implemented a web-based account closure system that allowed gamblers to close their accounts voluntarily. To close an account, players were required to report one of three listed reasons for the account closing: (a) I am unsatisfied with the company; (b) I have no more interest in betting; (c) Gaming causes me financial, social or personal problems; therefore, I would like to close my account in context with the prevention of gaming addiction.

To be included in this study as a case, players must have wagered on live action events for 3 or more betting days and reported closing their accounts because of gambling problems (i.e., reason (c) above). Live gambling allows gamblers to follow the progress of a particular sports event and bet on various imminent outcomes. For example, as a tennis match progresses, a gambler can bet on "How many set points will the winner of the first set need to win the set?", "Who will serve the first ace in the second set?", "Who will be the 1st to win 10 points in the third set?" and so on. To examine how cases differ from other gamblers, we employed a nested case–control study design (Rothman and Greenland 1998). To approximate the risk set, we selected those who had open accounts on the day an individual's account was closed due to gambling problems, but who did not close their accounts. We randomly sampled controls without replacement from the risk set. We employed a 1:1 ratio of case–control matching on age and sex variables. As a result, both cases and controls had the same distributions of the age and sex. We do not have other demographic variables such as income level or education for this cohort. The cases and controls were not matched for the number of betting days because this variable is fundamental to the imbalanced data structure for our longitudinal analysis.

We only included gamblers with a history of live action gambling activities for three reasons. First, live action gambling requires quick evaluation and rapid decision for a sequence of outcomes while sporting events are taking place. This type of quick evaluation and rapid decision is common among various types of casino and poker games and research suggests that this type of rapid evaluation and decision-making can be made quickly, with autonomic arousal (Sharpe et al. 1995), and without conscious contemplation (Bechara et al. 1997). Second, using only live action gambling data prevents bias from sports fan preference about event outcomes that support their favorite teams, a common phenomenon in conventional fixed-odd sports gambling, that might preclude observation of chasing-like behavior. Third, unlike other fixed-odds gambling data where betting and event outcome can be separated by days, live action gambling data can be aggregated easily on a daily basis, an efficient way to construct a dataset suitable for longitudinal analysis.

During the period between Feb 1st 2005 and June 30th 2006 (study period), 264 gamblers who had a history of live action gambling closed their accounts because they reported gambling problems. To predict both group-average trajectories in a statistically meaningful way, we excluded gamblers who had less than three live action betting days. As a result, the number of cases in our study was a sub-sample of 226 gamblers.

Design

We employed a nested case–control design in our study. The outcome variables included net loss, stake, odds, and number of bets. We standardized the daily aggregates of stake,

odds, and net winning by the daily aggregates of bets because the respective aggregates of stake, odds and winning were influenced by the number of the bets. We used log transformation to normalize the right skewness of stake per bet, odds per bet and the number of bets. The net loss per bet is, on average, positive (i.e., gamblers lose); this inevitable outcome is due, in part, to the "rake" collected by the gambling provider.

To operationally define the "time" variable for the longitudinal analysis of gambling behaviors prior to account closure, we used the following two schemes: (a) active betting days; and (b) calendar days. We counted backward in both schemes. In the first scheme, the last betting day was coded as 1, and the previous betting day was coded as 2 and so on, regardless of the calendar days. In the second scheme, we used the last day of our observation period (June 30, 2006) as day 1 and counted backward to Feb 1, 2005, yielding a total of 525 calendar days. We applied both schemes of coding "time" variable to the cases and controls.

Analyses

To determine the length of the time that would be included in the following analyses, we examined descriptive statistics. Prior to account closure, the number of active gambling days ranged from 3 to 299 days (Table 1) among the sub-sample of 226 gamblers. 50% had at least 23 gambling days and the mean gambling days was 45 days. We computed regression coefficients of the time effect using 23 days prior to account closure as the maximum analytic period because this time frame covered a majority of the cases. Therefore, day 1 represents the last betting day. A case might or might not have closed account on that day. We plotted the group average by the betting days prior to closing. We stratified these means by case–control status. We employed lowess smoother (smoother span = 1/3) on the plotted means to illustrate the trends.

Since the number of active betting days varied by individuals in our sample, we applied a two-stage random-effects model (Laird and Ware 1982; Ware 1985) to handle the imbalanced longitudinal data structure. We used the NLME package (Pinheiro et al. 2008)

Table 1 Descriptive statistics for the live gambling account closers who identified themselves as having gambling related problems

	Sub-sample (at least 3 days)	Full sample
Total subjects	226	264
Total observations (daily aggregates)	10,143	10,199
Demographics		
Age (s.d.)	29.3 (8.0)	30 (8.5)
% male	93	93
Gambling behaviors		
Range of gambling days	3–299	1–299
Mean gambling days	45	39
Median gambling days	23	16
Median # of bets per gambling day	5	5
Median stake per bet	€7.67	€7.64
Median Odds per bet	2.49	2.49
Median actual net loss per bet	€0.67	€0.68

in R 3.1 to conduct the regression analysis. We used the Restricted Maximum Likelihood method to compute parameter estimates. For simplicity purpose, we assumed no within-subject serial correlations. Our *basic model* can be formulated as:

$Y_{ij} = \beta_0 + \beta_1 Time_{ij} + \beta_{i0} + \beta_{i1} Time_{ij} + e_{ij}$ where $Time_{ij}$ denotes the time of the j measurement occasion on gambler i, and β_1 denotes the coefficient of the time effect. In other words, the corresponding change of Y associated with one unit change of Time (i.e., day). We assumed standard Gaussian distributions for β_{i0}, β_{i1}, and e_{ij}. We estimated the time effect with and without adjusting for age and gender as covariates; this provides an opportunity to further determine the potential influence of these covariates. We used Q–Q plot to examine and confirm the Gaussian distribution assumptions for the random effects. We used the Bayesian Information Criterion (BIC) to examine model fit and confirm the assumption of no within-subject serial correlation. To investigate whether cases had different behavioral trajectories compared to the controls, we revised our basic model by adding a main effect of case status and examined the interaction term between case status and time in the *interaction model*.

When we estimated the time effect, we restricted the range of data points to the cumulative gambling days prior to account closing. Specifically, for the duration of the 23-day analytic period, we computed a total of 21 coefficients (from 1st–3rd day to 1st–23rd day) for the time effect. For example, since each of the 226 gamblers had at least three observations of daily aggregates, we computed the coefficient of the time effect for the last three gambling days prior to closing using a total of 678 observations of daily aggregates, 3 days from each of these 226 gamblers. Further, we computed the coefficient for the last four gambling days prior to closing by restricting the data to the last four daily aggregates; gamblers with only three observations contribute all 3 days to form their respective trajectories. Because we computed the trajectory for each individual cumulatively using the algorithm just described, we computed and interpreted the group average trajectories as cumulative time effects prior to closing. To illustrate the patterns of the time effect coefficients near account closure, we plotted the coefficients of the time effect against the days prior to closing. We reversed the signs of the effects in the plot so that the coefficients correspond to the time effects approaching account closure. Similar to the means, we stratified these coefficients by case–control status.

Results

Monetary Loss

Figure 1 illustrates that both cases and controls experienced loss, but the cases evidence increasing loss per bet for the last several betting days. For example, the average losses per bet on the last 3 betting day were €3.3, €4.7, and €7.5 (day 1) per bet for the cases. The average losses per bet on the equivalent last 3 betting day among the controls were €3.5, €3.7, and €3.7 per bet. Figure 1 indicated that gamblers who closed their account due to gambling problems experienced an increase of monetary loss—on average €2 per bet—each day during the last 3 betting days prior to account closing. When we examined the last 6 betting days among the cases, we observed a statistically significant rate of change ($\beta = 1.02$, p-value = 0.03, 95% CI [0.08, 1.97]). This rate of change with respect to loss per bet increased from €1 per bet during the last 6 betting days to €2 per bet during the last 3 betting days. Based on the stratified analysis, the magnitude of the rate of change appears to be greater among the cases as they near their account closing time. This observation

reveals the increasing tendency toward monetary loss among those who eventually closed their accounts due to gambling problems. The rate of change regarding loss per bet among the controls remained constant during this time in Fig. 1.

Monetary Involvement: Stake Per Bet

Figure 2 shows an increasing average log-scaled stake per bet among the cases as they near their account closure dates. For example, the average log-scaled stake per bet for the last 3 betting days among the cases were 1.71, 1.75, and 1.91; the average stake per bet for the same period were €17.4, €18.8, and €23.3. Among the controls, the average log-scaled stake per bet for similar period were 1.40, 1.32, and 1.32; the average stake per bet were €15.1, €12.8, and €15.7. T-tests on the log-scaled stake per bet suggested significantly greater monetary involvement among the cases as compared to the controls (i.e., $t = 2.2$, 3.1, and 4.0; p-value <0.05, <0.01, and <0.001, respectively). Lowess smoothers in Fig. 2 suggest that a declining monetary involvement among the controls for the 23-day analytic period. The decline was much less salient among the cases; on the contrary, the beginning of an uptrend was evident near 5th day prior to closure. Figure 2 compares the rates of change of stake per bet (log scale) in the days preceding the closure for the cases and controls. For example, for the last 5 betting days prior to closure, the coefficient of the time effect is around 0.05 (p-value = 0.02) with 95% CI [0.01, 0.09]. That is, 1 betting day nearer to the closure is significantly associated with an increase of stake per bet by about

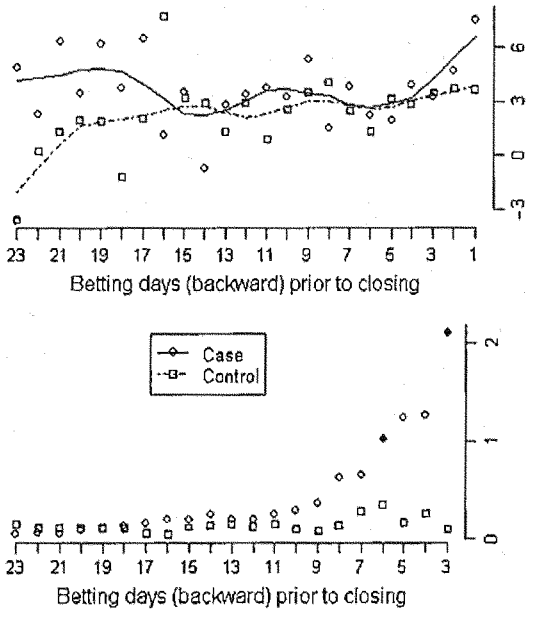

Fig. 1 (*Above*) Average loss per bet counting backward prior to account closing. (*Below*) Regression coefficients of cumulative time effect on loss per bet in live action gambling. A solid marker indicates that the coefficient significantly differs from 0 at an alpha level of 0.05

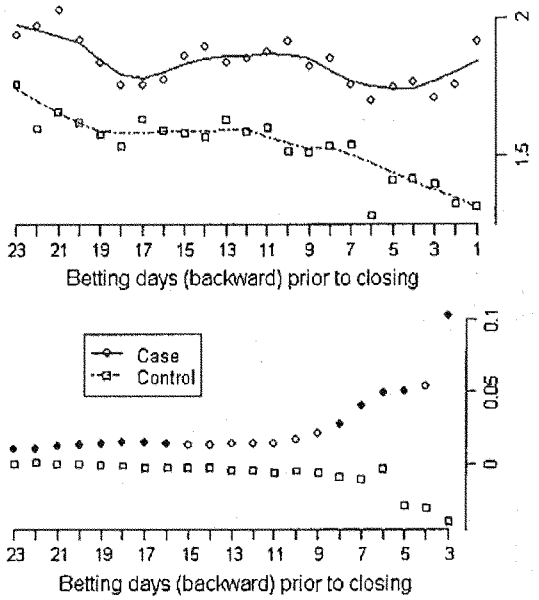

Fig. 2 (*Above*) Average log-scaled stake per bet counting backward prior to account closing. (*Below*) Regression coefficients of cumulative time effect on log-scaled stake per bet in live action gambling. A solid marker indicates that the coefficient significantly differs from 0 at an alpha level of 0.05

5%. Similarly, the rate of increase of stake per bet among the last 3 betting days shows a 10% increase per day as the gamblers approaches their account closure dates. In contrast, the rates of change for the controls appear to be constant near zero. This means that, among the controls, there is no statistically significant stake per bet changes during parallel analytic periods, even for the equivalent period prior to account closure. The rates of change for the interaction terms in the interaction models corroborated the results of the stratified analyses: the coefficients for the interaction terms increased from 0.04 (p-value = 0.04) with 95% CI [0.002, 0.07] for the last 9 days to 0.14 (p-value = 0.02) with 95% CI [0.02, 0.26] for the last 3 days. Coding "time" according to calendar days yields similar trend results: the nearer cases get to their account closure dates, the percentage increase of their stake per bet advances at a more rapid rate.

Risk Preference: Odds Per Bet

From the lowess smoother in Fig. 3, there appears to be a small downtrend of risk preference among the cases several days preceding closure. The average log-scaled odds per bet among the cases for the last 3 days were 1.01, 1.07, and 0.96; the average log-scaled odds per bet among the controls for the last 3 days were 1.10, 1.08, and 1.12. The log-scaled odds per bet among the cases for the last 3 days was significantly lower than the controls ($t = 1.97$, p-value < 0.05). The downtrend appears to begin around the 5th day preceding closure. Figure 3 shows that the rate of change in log-scaled odds per bet among the cases is decreasing prior to closure; however, this rate of change is not statistically

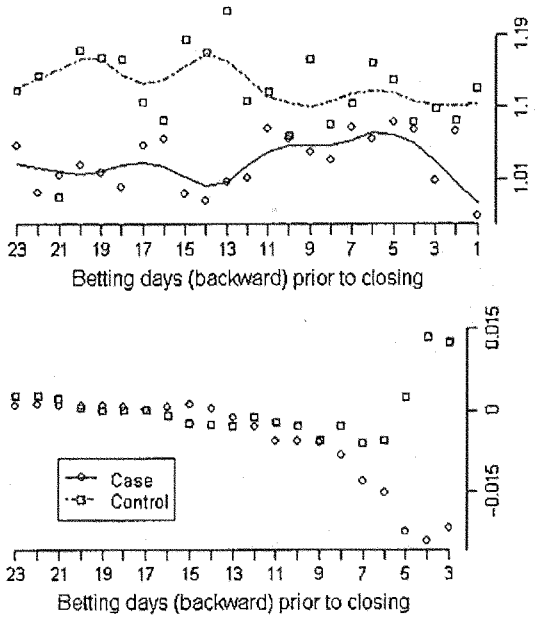

Fig. 3 (*Above*) Average log-scaled odds per bet counting backward prior to account closing; (*Below*) Regression coefficients of cumulative time effect on log-scaled odds per bet in live action gambling. A solid marker indicates that the coefficient significantly differs from 0 at an alpha level of 0.05

significant. Based on the data from the last 5 betting days, 1 day closer to the account closure is associated with a 2% decrease of odds per bet for cases' risk preference. A decrease of odds (or shorter odds) per bet suggests involvement with less risky bets (i.e., bets with more certainty). Among the controls, the log-scaled odds per bet remain constant in Fig. 3. Using calendar day as the "time" variable, we also observed a conservative risk preference (i.e., less risky) as indicated from the downtrend of negative coefficients, where some coefficients near the closure time were significantly less than zero (i.e., $\beta = -0.0005$ for the last five day period, p-value = 0.02, 95% CI [−0.001, −0.0001]; $\beta = -0.00045$ for the last six day period, p-value <0.05, 95% CI [−0.001, −0.00001]).

Risk Preference: Number of Bets

Figure 4 illustrates downtrends of the average log-scaled number of bets for both the cases approaching their account closing and for the controls. Figure 4 also shows a consistent downtrend of the significant rates of change with respect to number of bets per day. This downtrend indicates that the percentage of decrease in the number of bets per betting day increased for all gamblers. In other words, gamblers with problems and the controls appear to make fewer and fewer bets over time. In addition, none of the 21 coefficients of the interaction terms in the interaction models were statistically significant, suggesting that the tendency to make fewer bets is common among both cases and controls.

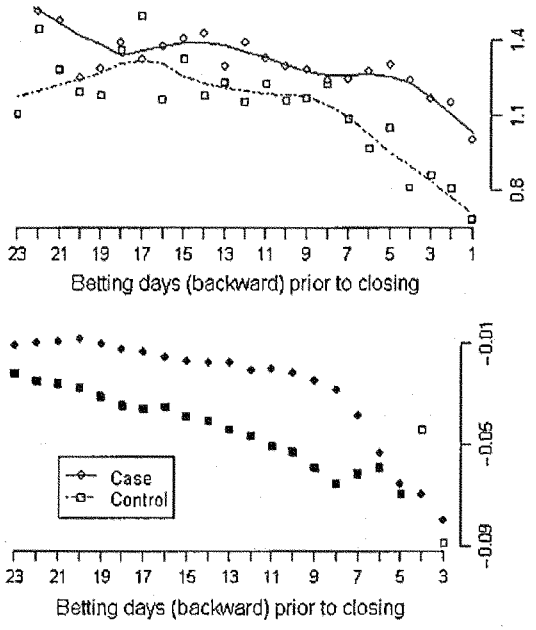

Fig. 4 (*Above*) Average log-scaled number of bets counting backward prior to account closing; (*Below*) Regression coefficients of cumulative time effect on log-scaled number of bets in live action gambling. A solid marker indicates that the coefficient significantly differs from 0 at an alpha level of 0.05

Discussion

Using evidence from a group of Internet gamblers who identified themselves as having gambling problems, we examined the patterns of actual gambling behavior that led these gamblers to voluntarily close their online gambling accounts. We observed that while they experienced increasing loss preceding account closure, these gamblers appeared to try recouping their losses by increasing their stake per bet on events that were probabilistically less risky. We also observed decreasing gambling frequency as measured by number of bets during the analytic period.

Our findings of in vivo Internet gamblers extend the risk preference literature. Among a group of gamblers who identified themselves as having gambling problems, we unexpectedly observed evidence of a risk-averse gambling pattern. The construct of "chasing," episodic interview records among Gamblers Anonymous members (Lesieur 1979, 1984), and structured questionnaires that assess pathological gambling (American Psychiatric Association 1997) suggest an increasing risk-seeking tendency among those with gambling-related problems. However, the results of this study reveal the downtrends of average log-scaled odds per bet and negative coefficients (Fig. 3) as well as some significant departure from zero using calendar day as the coding scheme for the "time" variable. These findings may reflect the tendency of problem gamblers to increasingly become probabilistically risk-averse. Instead of making more risky bets by increasing their stake on probabilistically longer odds, as Dickerson (8) had suggested, this group of gamblers tried

to recoup losses by increasing their stake on events with higher probabilities of winning (i.e., they become more risk averse and, therefore, bet more conservatively).

Previously, some research seemed to suggest the opposite: using a simulated gambling task to study rapid processing of monetary gains and loss, Gehring and Willoughby found that betting choices after losses were riskier (Gehring and Willoughby 2002). Instead, we observed a risk-averse pattern of live action gambling during a period when gamblers experienced loss and increasing loss. The difference in our research focus might explain the contrast in the findings. Our longitudinal data was constructed using daily aggregates; we aimed at estimating in vivo behavioral tendencies, rather than experimental event-based responses. Thus, "instant utility" (Kahneman 1999), a mental state resulting from sequential event-based evaluations, had little influence on this data. Further, the short-term mood or emotional states that can impact event-based gambling sequences had little impact on our findings. We employed a longitudinal data structure (i.e., daily aggregates) that operationally represents and is consistent with the premise that (a) "the long-term chase is the distinguishing feature of compulsive gambling" (Lesieur 1984; O'Connor and Dickerson 2003) and (b) the DSM-IV behavioral cross-session criterion that a disordered gambler "often returns another day to get even." With actual behavioral data, our findings advanced the knowledge base focusing on the human tendency toward "loss aversion" during a period when problem gamblers experienced increasing monetary losses, an aspect not previously studied in the above-mentioned event-based experiment.

It is intriguing to consider the concurrency between the monetary involvement and risk preference behavioral changes that emerge for cases prior to closing their accounts. Although the plots of slopes by days prior to closing suggest that the stake per bet and odds per bet rate changes appear to begin near the 5th day preceding account closing, it is not sufficient from this study to proclaim the exact location of this dynamic change. However, this finding can suggest that contemplating a decision to self-exclude is perhaps a relatively brief temporal process, during which gamblers increase their stake and reduce their probabilistic risk to recover loss. If loss continued to escalate, however, it did not take long before players made a decision to close their account. This phenomenon of gambling larger stakes prior to voluntary closure resonates with the clinical observation of substance abusers who stop using psychoactive drugs after taking a "last fling." That gamblers bet a larger stake while simultaneously becoming more conservative in their risk preference provides support for the notion that losing encourages people to become more "loss averse" than "gain motivated" under conditions of uncertainty. Future research should focus on identifying possible break points where gamblers' change their behaviors with long series of data points.

In general, the comparisons between the cases and controls based on the stratified analysis and the interaction models appear to be consistent. The gamblers who closed their accounts due to gambling problems evidenced heavier stake per bet than the controls, although both groups appear to experience loss and engage in fewer bets. This finding also was consistent when we employed other 1: n matching ratios ($n > 1$) with more precise standard errors (these results are available from the authors upon request).

The estimates of the cumulative time effect were consistent when we used adjusted models (i.e., for age and sex) instead of the unadjusted models reported in this paper (these results are available from the authors upon request). We expected this correspondence because, by matching on age and sex, these two covariates were uncorrelated with caseness; therefore, the estimates of the cumulative time effect in the unadjusted model should not be biased without controlling for age and sex. Moreover, although we observed that the two coding schemes for the "time" variable (e.g., whether calendar days or betting days

were used) influenced the magnitude of the coefficient, the direction of the time effects on the outcomes was consistent regardless of coding scheme. Finally, the random effects employed in our models appeared to fit the Gaussian assumption. According to BIC, the assumption of no within-subject serial correlation fit the data well when the cumulative time spans were near the account closure.

This study has several limitations. First, we did not have information about individuals' wealth, other gambling activities (i.e., Internet or land-based venues), personality (Blaszczynski et al. 1986), and cognitive determinants; some of these attributes can be linked to the development and maintenance of gambling disorders (Breen and Zuckerman 1999; Shaffer and Korn 2002). Because wealth can affect both monetary involvement and gambling frequency, controlling for wealth should yield a more accurate estimate of the cumulative time effect. In the absence of wealth information, our choice of a nested case–control design should limit possible confounding, but not entirely. Further, monetary loss has been presumed as the main reason why gamblers closed accounts. Despite the absence of wealth information, our findings about greater tendency of gambling loss among the account closers near the closure time confirmed the existence and nature of salient behavioral changes. Second, seasonality can impact gambling behaviors associated with sporting events, which is not accounted for in our longitudinal models. However, seasonality might not be an influential factor in our analyses because the gamblers' dates of voluntary termination varied during the observation period. Because our analyses focused on live action gambling, a type of gambling similar to casino games and poker games that requires rapid decisions and quick evaluation, seasonality likely has limited impact on our findings. Third, the current cohort represents Internet sports gamblers. Therefore, their gambling behaviors might not readily generalize to other types of gambling. Nevertheless, it is worth noting that live action gambling shares some similar cognitive characteristics as Poker and some Casino games where rapid evaluation and decisions are cognitively engaged. Finally, the last daily aggregate (day 1) in Fig. 4 should not be interpreted as a full-day aggregate because the time of the day when a gambler closes account might vary. Therefore, the last observation (day 1) in Fig. 4 among the cases must be read with caution: the average log-scaled number of bets for day 1 should be greater than the reading in Fig. 4. Nevertheless, the gambling frequency is trending downward among both the cases and controls. The measurements for stake, odds, and net loss were valid as well because we standardized these indices by the number of bets.

This study has several important theoretical implications. The dictum that "losses loom larger than gains" (Kahneman and Tversky 1979) might have played an important role in how gamblers chase their losses. This study suggests that people, even those who self-identify as having gambling problems, are more "loss averse" than "gain motivated" under conditions of uncertainty; they choose more conservative wagers to prevent further loss—despite their willingness to bet with greater stake size. It is possible that when players employed a more conservative gambling strategy, the momentum of losing might have triggered a decision to voluntarily terminate their account. If so, this new model of chasing raises important questions about the capacity for self-control during periods of excessive gambling. Because most Internet gamblers also are land based gamblers, it is possible that similar behavioral patterns exist within land based gambling settings. However, due to the lack of in vivo data derived from players in those settings, our current understanding of "chasing" remains limited because of the recall bias associated with participants in land-based gambling research. Our findings suggest that it is possible for some gamblers to self-control (e.g., self-exclude) some aspects of their gambling behavior even under adverse circumstances. More research will be necessary to better identify (1)

the heuristics that guide Internet players' decisions to close their accounts, (2) the temporal sequencing of the associated behavioral changes, (3) the mediators of these processes (i.e., co-occurring disorders, cognitive processes), and (4) the unique attributes of these gamblers compared with other types of gamblers.

Statistically, the expected value of any bet is negative because of the service provider's "rake." Therefore, from a behavioral economics perspective, engaging in gambling voluntarily without contemplating the negative expected value is paradoxical and irrational (Wagenaar and Albert 1988). We can view the self-initiated voluntary account closing by a problem gambler as a measure of self-control; this control represents a transitional state from irrational to rational. By providing actual gambling behavior as an evidence base, this study advances our understanding of the choice of risk before problem gamblers decide to close.

In sum, regarding the construct of "chasing losses," we observed evidence that supports the construct with respect to increasing stake during increasing monetary loss. However, we also observed that, among this group of gamblers who experienced gambling problems, betting long odds is a path "less traveled by." We observed reduced gambling frequency among these problem gamblers. This apparent paradox reflects an intriguing example of how studies focusing on actual behavior can contradict a prior theoretical proclamation.

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References

American Psychiatric Association. (1997). *Diagnostic and statistical manual of mental disorders*. Washington, DC: American Psychiatric Association.

Anderson, G., & Brown, R. I. (1984). Real and laboratory gambling, sensation seeking and arousal. *The British Journal of Psychology, 75*, 401–410.

Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1997). Deciding advantageously before knowing the advantageous strategy. *Science, 275*, 1293–1295. doi:10.1126/science.275.5304.1293.

Blaszczynski, A., & Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction (Abingdon, England), 97*, 487–499. doi:10.1046/j.1360-0443.2002.00015.x.

Blaszczynski, A., Wilson, A. C., & McConaghy, N. (1986). Sensation seeking and pathological gambling. *British Journal of Addiction, 81*, 113–117. doi:10.1111/j.1360-0443.1986.tb00301.x.

Breen, R. B., & Zuckerman, M. (1999). 'Chasing' in gambling behavior: Personality and cognitive determinants. *Personality and Individual Differences, 27*, 1097–1111. doi:10.1016/S0191-8869(99)00052-5.

Dickerson, M. (1984). *Compulsive gamblers*. London: Longman.

Gehring, W. J., & Willoughby, A. R. (2002). The medial frontal cortex and the rapid processing of monetary gains and losses. *Science, 295*, 2279–2281. doi:10.1126/science.1066893.

Griffiths, M. (2004). Betting your life on it. *BMJ (Clinical Research Ed.), 329*, 1055–1056. doi:10.1136/bmj.329.7474.1055.

Kahneman, D. (1999). Objective happiness. In D. Kahneman, Ed. Diener, & N. Schwarz (Eds.), *Well-being: Foundations of hedonic psychology* (pp. 3–25). New York: Russell Sage Foundation.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*, 263–292. doi:10.2307/1914185.

LaBrie, R. A., Kaplan, S. A., LaPlante, D. A., Nelson, S. E., & Shaffer, H. J. (2008). Inside the virtual casino: A prospective longitudinal study of actual internet casino gambling. *European Journal of Public Health, 18*, 410–416. doi:10.1093/eurpub/ckn021.

LaBrie, R. A., LaPlante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007). Assessing the playing field: A prospective longitudinal study of internet sports gambling behavior. *Journal of Gambling Studies, 23*, 347–362. doi:10.1007/s10899-007-9067-3.

Laird, N. M., & Ware, J. H. (1982). Random-effects models for longitudinal data. *Biometrics, 38*, 963–974. doi:10.2307/2529876.

LaPlante, D. A., Nelson, S. E., LaBrie, R. A., & Shaffer, H. J. (2008a). Stability and progression of disordered gambling: lessons from longitudinal studies. *Canadian Journal of Psychiatry, 53*, 52–60.

LaPlante, D. A., Schumann, A., Labrie, R. A., & Shaffer, H. J. (2008b). Population trends in internet sports gambling. *Computers in Human Behavior, 24*, 2399–2414. doi:10.1016/j.chb.2008.02.015.

Lesieur, H. (1979). The compulsive gambler's spiral of options and involvement. *Psychiatry, 42*, 79–87.

Lesieur, H. (1984). *The chase: Career of the compulsive gambler*. Cambridge, MA: Schenkman Publishing Co.

National Research Council. (1999). *Pathological gambling: A critical review*. Washington, DC: National Academy Press.

O'Connor, J., & Dickerson, M. (2003). Definition and measurement of chasing in off-course betting and gaming machine play. *Journal of Gambling Studies, 19*, 359–386. doi:10.1023/A:1026375809186.

Petry, N. M. (2005). *Pathological gambling: Etiology, comorbidity, and treatment*. Washington, DC: American Psychological Association.

Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., & the R Core team. (2008). nlme: Linear and nonlinear mixed effects model. R package version 3.1-89.

Potenza, M. N., Leung, H.-C., Blumberg, H. P., Peterson, B. S., Fulbright, R. K., Lacadie, C. M., et al. (2003). An fMRI stroop task study of ventromedial prefrontal cortical function in pathological gamblers. *The American Journal of Psychiatry, 160*, 1990–1994. doi:10.1176/appi.ajp.160.11.1990.

Reuter, J., Raedler, T., Rose, M., Hand, I., Gläscher, J., & Büchel, C. (2005). Pathological gambling is linked to reduced activation of the mesolimbic reward system. *Nature Neuroscience, 8*, 147–148. doi:10.1038/nn1378.

Ross, S. (2002). *A first course in probability*. Upper Saddle River, NJ: Prentice-Hall.

Rothman, K. J., & Greenland, S. (1998). Types of epidemiologic study. In K. J. Rothman & S. Greenland (Eds.), *Modern epidemiology* (pp. 67–78). Philadelphia, PA: Lippincott Williams & Wilkins.

Shaffer, H. J., & Korn, D. A. (2002). Gambling and related mental disorders: A public health analysis. *Annual Review of Public Health, 23*, 171–212. doi:10.1146/annurev.publhealth.23.100901.140532.

Sharpe, L., Tarrier, N., Schotte, D., & Spence, S. H. (1995). The role of autonomic arousal in problem gambling. *Addiction (Abingdon, England), 90*, 1529–1540. doi:10.1111/j.1360-0443.1995.tb02815.x.

Slutske, W. S. (2007). Longitudinal studies of gambling behavior. In G. Smith, D. C. Hodgins, & R. J. Williams (Eds.), *Research and measurement issues in gambling studies* (pp. 127–151). Oxford: Elsevier, Academic Press Publications.

Wagenaar, W. A. (1988). *Paradoxes of gambling behaviour*. Hove: Lawrence Erlbaum Associates Ltd., Publishers.

Ware, J. H. (1985). Linear models for the analysis of longitudinal studies. *The American Statistician, 39*, 95–101. doi:10.2307/2682803.

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Sitting at the virtual poker table: A prospective epidemiological study of actual Internet poker gambling behavior

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ABSTRACT

Internet gambling is a potential object of addictive behavior and consequently an important concern for public health. Epidemiological analyses of Internet gambling are necessary to determine the extent of public health threat. This paper reports the results of the first prospective epidemiological study of actual Internet poker gambling behavior. Participants were 3445 Internet gambling service subscribers who enrolled during February 2005. Data include two years of recorded poker outcomes (i.e., chips bought and sold) for each poker session played. Among our sample, we identified two subgroups of poker players. Approximately 95% of the sample bought a median of €12 worth of chips at each of two poker sessions per week during a median duration from first to last bet of six months. A smaller subgroup (i.e., 5%) of most involved poker players bought a median of €89 worth of chip at each of 10 sessions per week during a median duration from first to last bet of 18 months. In addition to level differences, we report the differences in patterns of behavior observed between these two subgroups. The analyses presented in this paper suggest that the majority of Internet poker players moderated their behavior based on their wins and losses. A minority of most involved players did not show such moderation. These results have important implications for both gambling-and addiction-related research.

1. Introduction

Most people who gamble never experience serious gambling-related problems (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004); however, some experience poor financial and health outcomes (Petry, 2006). These gambling-related problems are similar to the sequelae associated with other expressions of addiction (Shaffer, LaPlante et al., 2004) and consequently, gambling is associated with many of the same concerns as other objects of addiction. For example, the availability of common objects of addiction (e.g., alcohol, tobacco, gambling) tends uniformly to create concerns about the emergence of addictive behavior and its sequelae among the general population (Shaffer, LaBrie, & LaPlante, 2004; Weitzman, Folkman, Folkman, & Wechsler, 2003). With respect to gambling, new forms of gambling often raise concerns that easy access to and social approval of gambling will expose more people to the risks of gambling, increase the number of people in the general population with gambling-related problems, and exacerbate the difficulties of those already affected by gambling (DeFuentes-Merillas, Koeter, Schippers, & van den Brink, 2004; LaPlante & Shaffer, 2007).

Politicians, advocates and researchers alike have expressed concerns about the potential public health impact of Internet gambling (Blitz & Yeager, 2006; Griffiths, 2001, 2003; LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007; Lemke, 2006; Savage, 2007). Unfortunately, the validity of such concerns is unclear. Although gambling in general is now widely recognized as a potential object of addiction (Shaffer, LaPlante et al., 2004), researchers know little about the ways that different types of gambling might influence the development of addiction. Internet gambling, for example, can take many forms (e.g., casino-type games, lotteries, and poker), but we do not know whether different forms pose differential risk to health. Internet poker is of particular interest because of the current popularity of poker ("How to counter online bets", 2006; McManus, 2006; Mihoces, 2007; Wise, 2007). A first step toward understanding the relative influence of different types of gambling on addictive behavior is to determine the epidemiology of particular gambling activities. This paper provides the first ever epidemiological analysis of the actual gambling behavior evidenced by a large cohort of Internet poker gamblers.

1.1. Current information about Internet gambling and Internet poker

Policy makers and some in the general public have expressed concerns about Internet gambling (Business Week, 2007; Ford, 2006; Murray & Grimaldi, 2006; Savage, 2007). Examples of these

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concerns include: Unlimited access to gambling venues at home or work; easier access for underage gambling; gambling to escape problems; playing multiple games at one time; anonymity allowing users to engage in gambling without fear of stigma; harmful marketing practices; and gambling while intoxicated (Griffiths, 2001, 2003). Many such concerns about Internet gambling derive exclusively from speculation because of a dearth of empirical research related to these issues.

The bulk of the available literature related to Internet gambling focuses on rates of participation and related problems, and rates vary widely from study to study. For instance, several cross-sectional studies utilizing self-report surveys estimate the prevalence of Internet gambling in the general population to range from 1.2% to 8.1% (e.g., Responsible Gambling Program of British Columbia, 2003; Griffiths, 2001; Ialomiteanu & Adlaf, 2002; Volberg, 2002; Wardle et al., 2007). Similarly, studies involving special populations, such as clinical samples (Ladd & Petry, 2002; Petry, 2006; Petry & Mallya, 2004), are also variable.

To date, only one study has examined Internet poker play (Wood, Griffiths, & Parke, 2007). Researchers asked 422 college students from the midlands region of the United Kingdom to self-report retrospectively their poker play. Wood et al. found that approximately 29% ($n = 123$) of the study sample participated in online poker play multiple days each week. Eighteen percent of these participants endorsed at least four DSM-IV criteria for pathological gambling. The extant studies are limited. Most used samples of convenience (i.e., non-probability samples), limiting the generalizability of the studies and obtained self-reports of behavior which are subject to inadequacies of recall and potential bias toward more socially acceptable answers.

1.2. Longitudinal research on actual gambling behavior

Until recently, there have been a limited but growing number of available longitudinal gambling studies (e.g., Abbott, Williams, & Volberg, 2004; Barnes, Welte, Hoffman, & Dintcheff, 2005; DeFuentes-Merillas et al., 2004; Hodgins & el-Guebaly, 2004; Jacques, Ladouceur, & Ferland, 2000; Shaffer & Hall, 2002; Slutske, Caspi, Moffitt, & Poulton, 2005; Slutske, Jackson, & Sher, 2003; Vachon, Vitaro, Wanner, & Tremblay, 2004; Vander Bilt, Dodge, Pandav, Shaffer, & Ganguli, 2004; Wiebe, Single, & Falkowski-Ham, 2003; Winters, Stinchfield, Botzet, & Anderson, 2002; Winters, Stinchfield, Botzet, & Slutske, 2005). These studies were self-report surveys of gambling behaviors repeated over time, and none examined Internet gambling specifically.

We are not aware of any research studies before our research program that examined actual gambling behavior. To date, we have published three studies about Internet gambling using a longitudinal design and actual gambling behavior. One study (LaBrie et al., 2007) examined the actual daily Internet gambling behavior of more than 40,000 Internet *sports* gamblers during an 8-month study period. A second study (LaPlante, Schumann, LaBrie, and Shaffer (2008) observed a general exposure and adaptation experience consisting of an eight-day period of increasing gambling after initial exposure to both fixed-odds and live-action betting followed by a gambling decrease during the next 3 months. This adaptation pattern was not observed for the 1% most involved bettors (MIB), identified by the number of bets made and total monies wagered. During the length of the study, MIB bettors often maintained or increased their betting activity. The third study (LaBrie, Kaplan, LaPlante, Nelson, & Shaffer, 2008), measured the gambling behavior of 4222 Internet *casino* gamblers during a two-year period. LaBrie et al. identified two distinct groups of gamblers similar to sports bettors: moderate gamblers and an empirically determined group of most involved bettors whose gambling behavior exceeded that of 95% of the sample.

1.3. Present study

To advance and expand the extant literature related to actual Internet gambling behavior, the present study examined the *poker* play of participants in an epidemiological study who used an Internet gambling service provider's poker site. We analyzed the daily records of poker sessions into the total amount of chips purchased, amount of chips cashed, and sessions conducted. We present three types of results: (1) an epidemiological description of the characteristics of 3445 sequentially subscribed Internet poker players; (2) an epidemiological description of the gambling behavior of these Internet poker players; and (3) an epidemiological description of the gambling behavior of an empirically determined subgroup of most involved poker players.

1.4. Hypotheses

Our previous research (LaBrie et al., 2007, 2008; LaPlante et al., 2008) identified primarily moderate Internet gambling behavior among subscribers to this Internet gambling service, compared to the excesses suggested by some stakeholders (Ford, 2006; Griffiths, 2003; Kyl, 2003; Wood et al., 2007). In those studies, we also observed that a small (i.e., 1% or 5%) portion of the population displayed more extreme gambling behaviors than the majority of the population. Because both sports gambling and poker playing are chance games that attempt to incorporate a measure of skill (e.g., anticipating spread and implementing strategy, respectively), we hypothesize the presence of a similar pattern of gambling behavior among poker players. More specifically, we anticipate observing what many might consider to be moderate gambling behavior for the majority of the poker sample, but also a lack of continuity in our sample's betting behavior. A small fraction of the population will display discontinuously extreme betting behavior across measures.

2. Methods

2.1. Sample

The full epidemiological research cohort included 48,114 people who opened an account with the Internet betting service provider, *bwin* Interactive Entertainment, AG (*bwin*), during February 2005 (i.e., 100% of new subscribers). The Internet site, *bwin*, known best for its sports gambling service, offers several types of gambling services including poker. This investigation includes a cohort of 4459 subscribers who elected to play poker online. We excluded from the current study 951 participants who played less than four poker sessions during the study period and 63 poker players who did not begin poker play until the last month of the study period (i.e., after January 31, 2007). The resulting sample includes the 3445 people with more than a passing interest in playing poker and a sufficient observation period.

2.2. Measures

The available demographic characteristics of the research sample included age, gender, country of residence, and preferred language. At enrollment, participants elected to interact with the wagering system in one of 22 languages.

The study participants' actual transaction records with the poker platform provide the gambling behavior measures. A gambling session consists of the recorded value of chips purchased at entry to the poker platform and the value of chips at exit, if any. We aggregated the daily records of poker sessions into the total amount of chips purchased, amount of chips cashed, and sessions conducted.

The gambling behavior measures are based on daily aggregates of betting activity records. We summarized the daily aggregations into composite measures of gambling behavior. We measured the duration of gambling involvement (i.e., Duration) as the number of calendar days from the first eligible session to the last. We obtained the total number of sessions (i.e., Total Sessions) and total monies wagered (i.e., Total Wagered) by summing the daily aggregations. To obtain a measure of intensity, we calculated the Sessions per Day by dividing Total Sessions by Duration. We obtained the average buy-in (value of chips purchased) per session (i.e., Euros per Session) by dividing Total Wagered by the Total Sessions. The net result of gambling (i.e., Net Loss) is the difference between Total Wagered and total winnings. The dominant outcome is a net loss and, by subtracting total winnings from Total Wagered, positive values indicate net losses, the cost of gambling. We converted Net Loss to a percent of total wagers (i.e., Percent Lost) to create an index of losses that is independent of Total Wagered.

2.3. Procedures

We conducted a secondary data analysis of the subscriber database obtained from *bwin*. We received approval from our Institutional Review Board to conduct secondary data analyses of the available information.

2.4. Data analysis

We summarized the participants' demographics and gambling behavior using descriptive statistics. Tests for differences between group means included testing the assumption of equal variances and, if necessary, adjusting for unequal variances. We organized the analyses into three sections: (1) cohort characteristics; (2) cohort gambling behavior; and (3) the behavior of most involved players. For cohort characteristics, we report gender and country distributions, as well as gambling behavior differences by gender. For cohort gambling behavior, we report gambling involvement by time (i.e., Duration), betting intensity (i.e., Total Sessions, Sessions per Day, Euros per Session), and money at risk (i.e., Total Wagered, Net Loss, and Percent Lost). We also examined the correlations between measures. The distribution of characteristics violates the assumptions of normality necessary for the interpretation of product moment correlation coefficients. Consequently, to avoid the undue influence of extreme observations on the relationship between characteristics we used a non-parametric procedure (i.e., Spearman's rank-order correlation) to measure the degrees of association. For this same reason, we provide medians when describing cohort gambling behavior.

The measures of betting intensity were all skewed towards extreme values. We considered that extreme amounts of Total Wagered was the best measure of involvement because it carried with it the highest risk for financial problems associated with disordered gambling. Similar to a scree plot, Fig. 1 presents the centiles of the distribution of Total Wagered and reveals a discontinuous distribution beginning at the 95th centile. Guided by this evidence, we operationally defined the most involved players as those among the 5% of the cohort with the largest Total Wagered. We report gambling behavior for the entire cohort, the most involved 5%, and the remaining majority of bettors.

The large sample size greatly reduces the likelihood that observed differences result by chance, limiting the usefulness of tests of statistical significance. Consequently, it is important to consider both the statistical significance and the size of any effects to determine the practical significance of any differences.

3. Results

3.1. Cohort characteristics

The average age of the cohort was 27.9 years ($SD = 8.4$) and most (94.5%) were male. The players were from 46 countries. The majority (24.8%) were from Denmark. There were 17.3% from Germany, 9.6% from France, 6.9% from Austria, and 6% from Spain. Turkey, Italy, Greece, Poland, and Norway each accounted for approximately 5% of the sample. Switzerland, Sweden, and Portugal accounted for 3.1%, 2.4%, and 1.3% of the sample, respectively, while the remaining 33 countries accounted for the remaining 4.2% of the cohort.

The relatively few women (5.5%) in the sample differed from the men on only two characteristics. The women in this study were older than their male counterparts ($M_{women} = 31.7$ years of age, $SD = 11$ versus $M_{men} = 27.7$ years of age, $SD = 8.2$, $t(199.1) = 4.97$, $p < .001$ adjusting for unequal variance. On average, women bet for a shorter duration of time than men did ($M_{women} = 208$ days, $SD = 223$ versus $M_{men} = 267$ days, $SD = 232$, $t(3443) = -3.37$, $p < .001$). Given the relatively small number of women in the cohort and a single difference in gambling behavior between men and women, we chose not to conduct analyses separately by gender.

3.2. Cohort gambling behavior

The first set of columns in Table 1 present the total sample's descriptive statistics for the measures of poker behavior. The differences between the medians and means and the standard deviations, as well as the Kolmogorov–Smirnov test for normality reveal that most distributions are not normal and are skewed by extreme values. To create the most representative characterization, we utilize the median as the description of central tendency.

The typical poker player in our sample was an active poker player for a median Duration of six and a half months and participated in a median of one poker sessinn every three days (i.e., Duration/Total Sessions). The median Euros per Session gambled was €13 and the median Net Loss across all sessions was €106. A calculation that divides median Net Loss by median Total Sessions reveals the median cost of playing poker was €1.8 per session.

3.3. Relationships between gambling behaviors

As Table 1 shows, the gambling behaviors were not normally distributed. Consequently, we calculated non-parametric rank-order correlations (rho) between behaviors. Table 2 presents the correlations for the entire study sample. Of note, people who played poker for a longer period of time (Duration) tended to play fewer sessions during that period (Sessions per day, rho = .62). Risking more money (Total Wagered) was related to playing more often (Total Sessions, rho = .85) and to wagering higher stakes per session (Euros per Session, rho = .57) However, hettors who wagered more (Total Wagered) also lost a smaller portion of the monies bet (Percent Lost, rho = −.36). It is notable that individuals who lost larger portions of their monies bet (Percent Lost) were involved for shorter periods (Duration, rho = −.23) and played fewer poker sessions when they were involved (Total sessions, rho = −.41).

3.4. Most involved players

Fig. 1 shows the disproportionate distribution of Total Wagered that begins at the 95th percentile. The final columns of Table 1 describe the behavior of the 5% most involved poker players. According to median measures of behavior, these players were active for a duration of 18.5 months and participated in a session and a half per

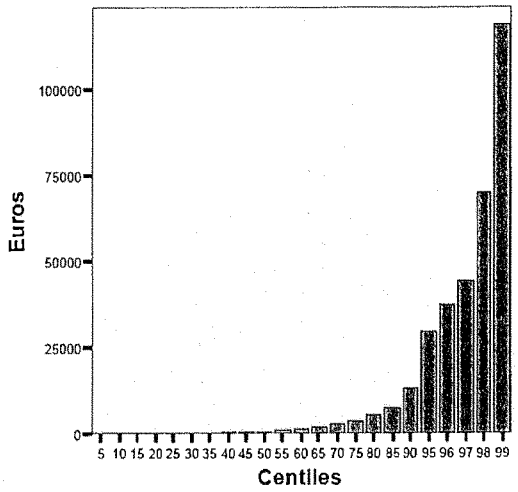

Fig. 1. Distribution of total monies wagered.

Table 1
Gambling behavior of Internet poker players and most involved poker players.

Measure	Total sample (n = 3445)				Majority (95%) (n = 3272)			Most involved 5% (n = 173)					
	Mean (*SD*)	Median	K–S	*df*	*p*	Mean (*SD*)	Median	Mean (*SD*)	Median	*t*	*df*	*p* (2-tailed)	Cohen's d
Duration	263 (232)	196	0.13	3445	<.001	249 (225)	181	530 (190)	565	−18.8	198.5	<.000	−1.349
Total Sessions	197 (376)	80	0.30	3445	<.001	152 (256)	52	1060 (891)	818	−13.4	173.5	<.000	−1.385
Sessions/Day	1.1 (1.6)	0.6	0.24	3445	<.001	1.1 (1.5)	0.5	2.2 (1.9)	1.6	−7.8	185.9	<.000	−0.626
Euros/Session	35 (187)	13	0.43	3445	<.001	25 (46)	12	231 (786)	89	−3.4	172.1	<.01	−0.370
Total Wagered	8684 (85,583)	807	0.46	3445	<.001	2737 (4784)	704	121167 (355037)	55012	−4.4	172.0	<.000	−0.472
Net Loss	587 (3019)	106	0.35	3445	<.001	465 (1210)	106	2888 (12206)	1941	−2.6	172.2	<.05	−0.279
% Lost	24 (29)	20	0.11	3445	<.001	25 (30)	21	7 (13)	3	16.4	287.0	<.001	−0.779

Note. Duration, interval in days between first and last poker session; Net Loss, total wagers minus total winnings;% Lost, Net Loss divided by Total Wagered.

Table 2
Correlations among gambling behavior measures for Internet poker play for the total sample (n = 3445).

	Duration	Total Sessions	Sessions/Day	Euro/Session	Total Wagered	Net Loss	Percent Lost
Duration	–						
Total Sessions	0.62**	–					
Sessions/day	−0.38**	0.37**	–				
Euros/Session	0.13**	0.09**	−0.29**	–			
Total Wagered	0.56**	0.85**	0.30**	0.57**	–		
Net Loss	0.31**	0.44**	0.10**	0.47**	0.59**	–	
Percent Lost	−0.23**	−0.41**	−0.18**	−0.07**	−0.36**	0.36**	–

Note. Nonparametric Spearman correlations.
* Correlation significant at $p < .05$.
** Correlation significant at $p < .01$.

day. They staked €89 at each session and lost nearly two thousand Euros (€1941). They wagered at least 75 times more than the majority of the sample. However, the most involved players had a smaller Percent Lost than the sample majority. Ultimately, their Cost (i.e., Net Loss/Total Sessions) of playing poker per session, €2.4, was slightly higher than for the entire sample. As Table 1 shows, when comparing the differences on each of these gambling measures between the majority of the sample and the 5% most involved poker players, Cohen's d indicates that Duration and Total Sessions had large effects and Sessions per day and% lost with the same high degree of significance exhibited medium effects.

Table 3 presents the correlations among behaviors observed for the 5% most involved poker players. Among these most involved players, the variables measuring financial intensity (Total Wa-

Table 3
Correlations among gambling behavior measures for Internet poker play for 5% most involved ($n = 173$).

	Duration	Total Sessions	Sessions/Day	Euro/Session	Total Wagered	Net Loss	Percent Lost
Duration	–	0.34**	−0.29**	−0.21**	0.09	−0.01	−0.03
Total Sessions		–	0.76**	−0.74**	0.07	−0.01	0.01
Sessions/Day			–	−0.50**	−0.01	0.03	0.08
Euros/Session				–	0.55**	−0.13	−0.18*
Total Wagered					–	−0.17*	−0.28**
Net Loss						–	0.95**
Percent Lost							–

Note. Nonparametric Spearman correlations.
* Correlation significant at $p < .05$.
** Correlation significant at $p < .01$.

gered, Net Loss, and Percent Loss) did not relate to intensity as measured by Duration, Total Sessions, and Sessions per Day. In this group, the players who bought in for more money (Euro/Session) played less as indicated by the negative correlations between Euro/Session and Duration, Total Sessions, and Sessions/Day.

4. Discussion

This study presents the first epidemiological description of actual Internet poker playing behavior. During recent years, concerns about gambling-related addiction and other morbidity have sparked a worldwide debate. Some countries have regulated Internet gambling, others prohibited it, and others have not yet ruled on its legal status. In the absence of evidence, speculation about Internet gambling abounds in the popular press and in professional journals (Bray, 2006; General Accounting Office, 2002; Griffiths, 1999; Griffiths & Parke, 2002; Ladd & Petry, 2002; McBride, 2006; Mitka, 2001).

The findings from our research provide a description of the epidemiology of Internet poker behavior evidenced by a large cohort of gamblers observed for two years. The description includes the central tendencies of this cohort and it distinguishes the behavior of a group of intensely involved players. The discontinuous nature of gambling behavior within our population stimulated us to analyze this extreme group to better illustrate the limits possible for this gambling medium. The variety of findings we present here has important implications for gambling-related public health research and policy.

4.1. Cohort characteristics

The majority of this sample of Internet poker players is males of European descent, in their mid to late 20s. Women comprise only 5.5% of our research cohort of poker players. Our research focusing on people seeking treatment for gambling problems (LaPlante, Nelson, LaBrie, & Shaffer, 2006) revealed that gender was only one of many predictors of game choice and more research is necessary to determine whether this finding also applies to Internet poker play. It is interesting to note that the patterns of Internet poker play evidenced by women in our sample were very similar to that of the men. The only significant difference was that women played for a shorter duration of time between their first and last poker sessions.

4.2. Cohort gambling behavior

It is important to establish an epidemiological baseline for any area of addiction-related research, especially potentially new objects of addiction (LaBrie et al., 2008). In this research, we provide evidence that supports the findings in our previous research (LaBrie et al., 2007, 2008; LaPlante et al., 2008) that most subscribers who gamble on the Internet do so moderately. In fact, correlation analyses indicated that as Percent Lost increased, Duration, Total Sessions, and Total Wagered all decreased, suggesting that the majority of individuals moderated their behavior based on their wins and losses – exhibiting "rational" betting behavior. This suggests that, at the population level, losing discourages ongoing play and winning encourages continuing play.

One other important aspect of our population-level findings is the discontinuous nature of its gambling behavior. Most of the gambling behavior variables in this study indicated a large skew. This suggests that the vast majority of the sample look similar when examining their gambling behavior, but differently from the most involved poker players at the high end of the distribution. This is not surprising because there is evidence from the epidemiology of other patterns of behavior associated with various expressions of addiction (e.g., drinking, drugging, shopping, etc.) that the vast majority of the population can engage in these activities moderately and without meaningful health risks (Grant et al., 2004; Kessler, Chiu, Demler, & Walters, 2005; Lejoyeux, Ades, Tassain, & Solomon, 1996; Regier & Robins, 1991). The next section provides an in-depth analysis of this extreme group.

4.3. Most involved poker players

The subset of most involved poker players devoted much more time and money to this activity than did the rest of the cohort. We might have expected that more intense involvement would limit duration: Perhaps the expenditures would become a burden and/or the time spent would interfere with other activities. This was not the case; the duration of play for the more intense players was three times longer than the majority of the sample.

Between groups comparisons indicated differences in poker play between the majority of the sample and the 5% most involved. However, it is important not only to examine level differences, but also the relationship between the various gambling variables. We examined the correlations between the gambling variables and found some interesting differences. Unlike the majority of the research sample, there was no correlation between Percent Lost and either Duration, Total Sessions, or Sessions per Day. However, with respect to monies spent, the most involved, like the rest of the sample, reduced Euros per session and reduced Total Wagered as Percent Loss increased. This finding suggests differential decision-making for temporal and financial costs: Financial cost patterns potentially representing more rationale behavior than temporal cost patterns. The study of actual Internet gambling, therefore, might hold meaningful potential to advance our understanding of the important risk factors that influence how addiction emerges and is sustained.

4.4. Clinical significance

Although this study reports the first ever analysis of actual Internet poker gambling activity among a large cohort followed

during two years of observation, it is important to note that this study does not include information about rates of clinical or subclinical gambling pathology. However, spending large amounts of money on gambling is consistent with some DSM-IV-R pathological gambling criteria (American Psychiatric Association, 2000) (e.g., needing to gamble with increasing amounts of money to achieve the desired excitement; and "chasing" one's losses). Extensive involvement with gambling also can cause problems not reflected in money spent but, instead, in the amount and appropriateness of time spent gambling (e.g., choosing to gamble rather than meet other obligations). Future research is necessary to understand the clinical significance of our findings. Research that indicates a disproportionate influence of time-related factors on disordered gambling could direct DSM-V revisions of the definition of pathological gambling.

4.5. Limitations

This study is not without limitations. The observed Internet poker behavior of this sample might not represent a participant's total online gambling behavior. Unlike land-based gambling venues, bettors can access Internet sites easily, play at several venues, and move among them readily. Subscribers to *bwin* also might have been betting on sports at the site. It is possible that multiple individuals might have bet using the same account. We reported gambling behavior observed during a two-year study period. It is possible that the course of activities leading to problem gambling might require longer exposure to Internet gambling. Additional research is necessary to clarify these issues and we continue to collect information about this cohort.

4.6. Concluding thoughts

This study takes the first steps necessary toward informing the wide range of gambling stakeholders about the behavioral epidemiology of Internet poker gambling. Understanding the distribution of a phenomenon is central to building a scientific foundation of explanation. The next step is to clarify the distribution of Internet poker playing and other online gambling among vulnerable population segments. Once the distribution of this activity is clear, it will then become possible to identify the determinants of these patterns, with emphasis on the moderators and mediators of gambling disorders. For now, research must move to replicate these findings using a variety of other Internet sites and a variety of other types of Internet gambling. Research must begin to identify the population segments at greater or lesser risk for developing Internet gambling-related addiction problems. The determinants for increasing or decreasing the likelihood of developing Internet gambling problems can then serve as a guide for the development of gambling addiction prevention and treatment programs.

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References

Abbott, M. W., Williams, M. M., & Volberg, R. A. (2004). A prospective study of problem and regular nonproblem gamblers living in the community. *Substance Use and Misuse, 39*(6), 855–884.

American Psychiatric Association. (2000). *DSM IV-TR: Diagnostic and statistical manual of mental disorders–Text revision* (4th ed.). Washington, DC: American Psychiatric Association.

Barnes, G. M., Welte, J. W., Hoffman, J. H., & Dintcheff, B. A. (2005). Shared predictors of youthful gambling, substance use, and delinquency. *Psychology of Addictive Behaviors, 19*(2), 165–174.

Blitz, R., & Yeager, H. (2006). Bill to outlaw casino sites almost out of time [Electronic Version]. *Financial Times (London)* 21. Retrieved 10/4/07.

Bray, H. (2006). Could the future of Internet gambling in the US lie in Antigua? Retrieved March 30, 2006, from <www.boston.com>.

Business Week, T. (2007). Internet gambling deserves a new chance. The US should heed the wrath of the World Trade Organization by making betting games legal on the Web. Pro or con? [Electronic Version]. *The Debate Room*. Retrieved 10/3/2007 from http://blogs.businessweek.com/debateroom/archives/2007/09/internet_gambli.html.

DeFuentes-Merillas, L., Roeter, M. W., Schippers, G. M., & van den Brink, W. (2004). Temporal stability of pathological scratchcard gambling among adult scratchcard buyers two years later. *Addiction, 99*(1), 117–127.

Ford, R. (2006). Relaxed gaming laws 'will cause extensive damage within 20 years' [Electronic Version]. *The Times (London)*, 34. Retrieved 10/3/2007.

General Accounting Office. (2002). *Internet gambling: An overview of the issues* (No. GAO-03-89). Washington, DC: United States General Accounting Office.

Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Dufour, M. C., & Pickering, R. P. (2004). The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991–1992 and 2001–2002. *Drug and Alcohol Dependence, 74*(3), 223–234.

Griffiths, M. D. (1999). Gambling technologies: Prospects for problem gambling. *Journal of Gambling Studies, 15*(3), 265–283.

Griffiths, M. D. (2001). Internet gambling: Preliminary results of the first UK prevalence study. *eGambling: The Electronic Journal of Gambling Issues*. Retrieved June 3, 2004, from http://www.camh.net/egambling/issue5/research/griffiths_article.html.

Griffiths, M. D. (2003). Internet gambling: Issues, concerns, and recommendations. *CyberPsychology & Behavior, 6*(6), 557–568.

Griffiths, M. D., & Parke, J. (2002). The social impact of Internet gambling. *Social Science Computer Review, 20*(3), 312–320.

Hodgins, D. C., & el-Guebaly, N. (2004). Retrospective and prospective reports of precipitants to relapse in pathological gambling. *Journal of Consulting and Clinical Psychology, 72*(1), 72–80.

How to counter online bets [Electronic Version]. (2006). *USA Today*, 11a. Retrieved 10/2/2007.

Ialomiteanu, A., & Adlaf, E. M. (2002). Internet gambling among Ontario adults. *eGambling: The Electronic Journal of Gambling Issues*. Retrieved June 3, 2004, from http://www.camh.net/egambling/issue5/research/ialomiteanu_adlaf_article.html.

Jacques, C., Ladouceur, R., & Ferland, F. (2000). Impact of availability on gambling: A longitudinal study. *Canadian Journal of Psychiatry, 45*(9), 810–815.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 617–627.

Kyl, J. (2003). Illegal Internet gambling: Problems and solutions. *Republican Policy Committee*. Retrieved February 2, 2007, from http://www.ncalg.org/library/internet/Kyl_Internet.pdf.

LaBrie, R. A., Kaplan, S. A., LaPlante, D. A., Nelson, S. E., & Shaffer, H. J. (2008). Inside the virtual casino: A prospective longitudinal study of Internet casino gambling. *European Journal of Public Health, 18*(4), 410–416.

LaBrie, R. A., LaPlante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007). Assessing the playing field: A prospective longitudinal study of internet sports gambling behavior. *Journal of Gambling Studies, 23*(3), 347–362.

Ladd, G. T., & Petry, N. M. (2002). Disordered gambling among university-based medical and dental patients: A focus on Internet gambling. *Psychology of Addictive Behaviors, 16*(1), 76–79.

LaPlante, D. A., Nelson, S. E., LaBrie, R. A., & Shaffer, H. J. (2006). Men and women playing games: Gender and the gambling preferences of Iowa Gambling Treatment Program participants. *Journal of Gambling Studies, 22*(1), 65–80.

LaPlante, D. A., Schumann, A., LaBrie, R. A., & Shaffer, H. J. (2008). Population trends in Internet sports gambling. *Computers in Human Behavior, 24*(5), 2399–2414.

LaPlante, D. A., & Shaffer, H. J. (2007). Understanding the influence of gambling opportunities: Expanding exposure models to include adaptation. *American Journal of Orthopsychiatry, 77*(4), 616–623.

Lejoyeux, M., Ades, J., Tassain, V., & Solomon, J. (1996). Phenomenology and psychopathology of uncontrolled buying. *American Journal of Psychiatry, 153*(12), 1524–1529.

Lemke, T. (2006). Odds favor Internet gambling; Lawmakers aim to rein in industry [Electronic Version]. *The Washington Times*, 1. Retrieved 10/4/07.

McBride, J. (2006). Internet gambling among youth: A preliminary examination. *Youth Gambling International, 6*(2), 1.
McManus, J. (2006). The poker world is flat, part 3 [Electronic Version]. *The New York Times*, D6(L). Retrieved 10/2/2007.
Mihoces, G. (2007). Second-largest crowd no sign of off year for game. [Electronic Version]. *USA Today*, 10c. Retrieved 10/2/07.
Mitka, M. (2001). Win or lose, Internet gambling stakes are high. *Journal of the American Medical Association, 285*(8), 1005.
Murray, S., & Grimaldi, J. V. (2006). House passes bill to restrict Internet poker [Electronic Version]. *The Washington Post*, A01. Retrieved 10/2/2007.
Petry, N. M. (2006). Internet gambling: An emerging concern in family practice medicine? *Family practice, 23*, 421–426.
Petry, N. M., & Mallya, S. (2004). Gambling participation and problems among employees at a university health center. *Journal of Gambling Studies, 20*(2), 155–170.
Regier, D. A., & Robins, L. N. (1991). Introduction. In D. A. Regier & L. N. Robins (Eds.), *Psychiatric disorders in America: The epidemiologic catchment area study* (pp. 1–10). New York: The Free Press.
Responsible Gambling Program of British Columbia. (2003). British Columbia Problem Gambling Prevalence Study: Final Report. Retrieved February 13, 2008, from <http://www.eia.gov.bc.ca/gaming/reports/docs/rpt-rg-prevalence-study-2003.pdf>.
Savage, M. (2007). Is gambling a problem that is spinning out of control in Britain? [Electronic Version]. *The Independent*, 44. Retrieved 10/3/2007.
Shaffer, H. J., & Hall, M. N. (2002). The natural history of gambling and drinking problems among casino employees. *Journal of Social Psychology, 142*(4), 405–424.
Shaffer, H. J., LaBrie, R. A., & LaPlante, D. A. (2004). Laying the foundation for quantifying regional exposure to social phenomena: Considering the case of legalized gambling as a public health toxin. *Psychology of Addictive Behaviors, 18*(1), 40–48.
Shaffer, H. J., LaBrie, R. A., LaPlante, D. A., Nelson, S. E., & Stanton, M. V. (2004). The road less traveled: Moving from distribution to determinants in the study of gambling epidemiology. *Canadian Journal of Psychiatry, 49*(8), 504–516.
Shaffer, H. J., LaPlante, D. A., LaBrie, R. A., Kidman, R. C., Donato, A. N., & Stanton, M. V. (2004). Toward a syndrome model of addiction: Multiple expressions, common etiology. *Harvard Review of Psychiatry, 12*, 367–374.
Slutske, W. S., Caspi, A., Moffitt, T. E., & Poulton, R. (2005). Personality and problem gambling: A prospective study of a birth cohort of young adults. *Archives of General Psychiatry, 62*, 769–775.
Slutske, W. S., Jackson, K. M., & Sher, K. J. (2003). The natural history of problem gambling from age 18 to 29. *Journal of Abnormal Psychology, 112*(2), 263–274.
Vachon, J., Vitaro, F., Wanner, B., & Tremblay, R. E. (2004). Adolescent gambling: Relationships with parent gambling and parenting practices. *Psychology of Addictive Behaviors, 18*(4), 398–401.
Vander Bilt, J., Dodge, H., Pandav, R., Shaffer, H. J., & Ganguli, M. (2004). Gambling participation and social support among older adults: a longitudinal community study. *Journal of Gambling Studies, 20*(4), 373–390.
Volberg, R. A. (2002). *Gambling and problem gambling among adolescents in Nevada*. Northampton, MA: Gemini Research Ltd.
Wardle, H., Sproston, K., Orford, J., Erens, R., Griffiths, M. D., Constantine, R., et al. (2007). *British Gambling Prevalence Survey 2007*: National Centre for Social Research.
Weitzman, E. R., Folkman, A., Folkman, M. P., & Wechsler, H. (2003). The relationship of alcohol outlet density to heavy and frequent drinking and drinking-related problems among college students at eight universities. *Health & Place, 9*(1), 1–6.
Wiebe, J., Single, E., & Falkowski-Ham, A. (2003). *Exploring the evolution of problem gambling: A one year follow-up study*. Ontario: The Responsible Gaming Council.
Winters, K. C., Stinchfield, R. D., Botzet, A., & Anderson, N. (2002). A prospective study of youth gambling behaviors. *Psychology of Addictive Behaviors, 16*(1), 3–9.
Winters, K. C., Stinchfield, R. D., Botzet, A., & Slutske, W. S. (2005). Pathways of youth gambling problem severity. *Psychology of Addictive Behaviors, 19*(1), 104–107.
Wise, G. (2007). Whither WCOOP. *ESPN Poker Club*. Retrieved 10/02, 2007, from http://sports.espn.go.com/espn/poker/columns/story?id=3045060.
Wood, R. T., Griffiths, M. D., & Parke, J. (2007). Acquisition, development, and maintenance of online poker playing in a student sample. *Cyberpsychology & Behavior, 10*(3), 354–361.

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Virtual harm reduction efforts for Internet gambling: effects of deposit limits on actual Internet sports gambling behavior

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Abstract

Background: In an attempt to reduce harm related to gambling problems, an Internet sports betting service provider, ***bwin*** Interactive Entertainment, AG (***bwin***), imposes limits on the amount of money that users can deposit into their online gambling accounts. We examined the effects of these limits on gambling behavior.

Methods: We compared (1) gambling behavior of those who exceeded deposit limits with those who did not, and (2) gambling behavior before and after exceeding deposit limits. We analyzed 2 years of the actual sports gambling behavior records of 47000 subscribers to ***bwin***.

Results: Only 160 (0.3%) exceeded deposit limits at least once. Gamblers who exceeded deposit limits evidenced higher average number of bets per active betting day and higher average size of bets than gamblers who did not exceed deposit limits. Comparing the gambling behavior before and after exceeding deposit limits revealed slightly more unfavorable gambling behavior after exceeding deposit limits.

Conclusions: Our findings indicate that Internet gamblers who exceed deposit limits constitute a group of bettors willing to take high risks; yet, surprisingly, they appear to do this rather successfully because their percentage of losses is lower than others in the sample. However, some of these gamblers exhibit some poor outcomes. Deposit limits might be necessary harm reduction measures to prevent the loss of extremely large amounts of money and cases of bankruptcy. We discuss how these limits might be modified based on our findings.

Background

The Internet is a relatively new medium available for wagering. Research indicating how many people participate in Internet gambling is scarce. Two empirical studies published prevalence estimates of Internet gambling among the US general population: these studies reported rates of 0.3% [1] and 4% [2]. Among 1294 adults from a representative sample in Ontario, 5.3% reported having gambled on the Internet during the past 12 months [3]. Using a representative national sample from the United States, researchers reported a lower rate of 2.5% for college students [4]. Although some observers note that Internet gambling growth is slow compared to other forms of gambling, e.g. casinos and lottery [5], Internet gambling is prolific and growing [6]. Therefore, examining the influence of Internet gambling on public health is important.

Research examining land-based gambling suggests that adverse gambling-related outcomes often include financial distress, emotional and physical deterioration, and damaged interpersonal relationships [7]. Some research suggests that disordered gambling relates to poor mental health, such as personality and psychiatric disorders [8, 9]. Researchers, public policy makers, and public health officials have argued that Internet gambling is associated with similar public health threats [10-13]. One study reported that Internet gambling was linked to pathological gambling and associated with poor physical and mental health [14]. Because this is the only study providing empirical data about health correlates of Internet gambling, and because this study provides results based on retrospective self-reports of a locally restricted sample of patients in clinic waiting areas, what we actually know about the health dangers of Internet gambling remains limited.

Speculations about potential hazards particular to Internet gambling include the apparent lack of fail-safes, such as the inability to protect individuals who are underage or

people known to have gambling-related problems and to prevent gambling while intoxicated or gambling at work [15]. However, the Internet also provides a unique opportunity for implementing special safeguards and harm reduction efforts. For example, tracking software can record all gambling online activity, which companies could potentially use to control the extent of gambling by specific users. Web-based technology could limit the time per gambling session or the amount of money participants can use to gamble. Recent recommendations for Internet gambling operators include accepting payments with credit cards only, providing options to self-limit gambling expenditure, and providing options that allow users to self-exclude from an Internet site [16].

In this study, we explore a harm reduction feature currently unique to Internet gambling. As part of their corporate social responsibility agenda, a large Internet sports betting service provider, ***bwin*** Interactive Entertainment, AG (***bwin***), imposes limits on the amount of money that users can deposit into their online gambling accounts within a given time period. When a user tries to deposit more than the allowed amount, ***bwin*** sends the user a notification message about the attempt to exceed deposit limits and rejects the attempted deposit. We expected that users who received a notification message constitute a group of extremely engaged gamblers, and we therefore hypothesized that exceeding deposit limits would be associated with unfavorable gambling behavior, such as excessively large betting, high losses or high frequency of playing (i.e., high financial and/or temporal engagement). Furthermore, we expected that receiving a notification message would act as a warning sign to users; consequently, we hypothesized that exceeding deposit limits would attenuate gambling behavior that followed exceeding the limit. To examine these possibilities, this study compares (1) the gambling behavior of those who exceeded deposit limits with those who did not, and (2) the gambling behavior of consumers before and after exceeding deposit limits.

Methods

Sample

The research cohort included 48114 people who registered with ***bwin*** between February 1 and February 28, 2005, and who deposited money in their accounts before February 28, 2007. ***bwin*** is primarily an Internet sports gambling service, offering two types of sports bets: fixed-odds bets and live-action bets. Fixed-odds bets are made on the outcomes of sporting events or games before the events begin. The amount paid for a winning bet is set (fixed) by the betting service at the time of the bet. Live-action bets are made while the event is in progress. In addition to bets on the outcome of the event, the betting service offers bets on selected outcomes within the sporting event (e.g., which side will have the next corner kick). Fixed-odds bets are relatively slow-cycling betting propositions. The outcomes of a bet are generally not known for hours or days later. In contrast, live-action bets provide relatively quick-paced betting propositions posed in real-time during the progress of a sporting event.

Some subscribers in the cohort did not engage in fixed-odds or live-action sports gambling (n = 1114, < 3%). Consequently, these subscribers were excluded from the study, leaving 47000 sports-betting subscribers for the current analysis. This cohort consisted of 43222 (92.0%) men and 3778 (8.0%) women. The mean age of subscribers was 30.3 years (SD = 9.9) and the cohort included people from 84 countries, with most people (n = 26955, 57.4%) from Germany, followed by Turkey (n = 2846, 6.1%), Poland (n = 2834, 6.0%), Spain (n = 2754, 5.9%), and Greece (n = 2586, 5.5%). The majority, 31544 (67.1%), placed both fixed-odds and live-action bets, 14723 (31.3%) played fixed-odds only, and 733 (1.6%) played live-action only.

Measures

bwin prepared a dataset of the actual Internet sports gambling behavior of this cohort for the 2+-year period, between February 1, 2005 and February 28, 2007. More specifically,

this dataset included the daily aggregates of betting activity (i.e., the aggregate number of bets, amount of money wagered, and amount of money won for fixed-odds and live-action sports betting per calendar day) for all participants in the cohort.

Exceeding Deposit Limits. ***bwin*** provides several ways of limiting the amount of money that users can deposit in their accounts. By default, ***bwin*** does not allow users to deposit more than 1000 Euros per 24 hours or 5000 Euros per 30 days (or currency equivalents). One exception to this default is a flexible limit system, which automatically increases allowable deposit limits by the subscribers' amount of winnings from gambling. A second exception occurs when subscribers can evidence exceptional financial means. In such cases, users may have higher deposit limits. At the other end of the spectrum, users can choose to set for themselves lower maximum deposit amounts per 30 days. Users repeatedly can adjust these self-limits to their needs.

Exceeding any deposit limit leads ***bwin*** to issue a notification message. Although we have information about if and when a user received such notification, we do not have information about the type of limit (i.e., self or company) that initiated the notification message. Thus, this study explores the combined effects of exceeding company- and self-imposed deposit limits.

Gambling Behavior. Based on the daily aggregates of betting activity, we computed four measures of gambling behavior for each user: percentage of days within the active period from first to last betting day on which the user placed bets (i.e., percent active betting days); the average number of bets per active betting day; the average size of bets in Euros; and a categorical measure of percent lost. These measures are more adequate than gross totals of number of bets or money wagered when comparing the gambling behavior of different users. Each measure was computed for fixed-odds and live-action betting separately, aggregated across the total 2-year observation period. Further, within the subset of people who received a notification message, each measure was computed for the period of time before as well as

after the first receipt of a notification message (note that the day of receipt of the notification message was defined as an 'after' day).

We defined the percentage of active betting days as the percent of days within the interval from the first to the last betting day that included a bet. We obtained the average number of bets per active betting day by dividing the total number of bets made by the total number of active betting days, and the average size of bets in Euro by dividing the total money wagered by the total number of bets. These two gambling behavior measures were highly positively skewed with many cases on the left and fewer cases (but still substantial numbers due to the large sample size) on the right side of the distribution. Log-transformations were performed to generate normal distributions for these measures.

We calculated the percentage of losses by subtracting the total amount of winnings from the total amount of wagers and dividing the difference by the total amount of wagers. This measure was highly negatively skewed and transformations did not help approximate a normal distribution. We therefore categorized this variable to capture (1) users who were overall winners (negative percentage of losses), (2) users with the lowest percentage of losses (operationally defined as losses of 0 to <20%), (3) users with an intermediate percentage of losses (i.e., 20 to <80%), and (4) users with the highest percentage of losses (i.e., 80 to 100%). We chose the cut-point of the lowest percentage of losses to approximately agree with the expected losses, which according to the target returns expected by the operator are approximately 13% for fixed-odds betting and 6% for live-action betting. The 20% cut-point reflects the nearest rounded percentage. For the cut-point of the highest percentage of losses, we applied the same 20% margin, and the remaining percentage of losses was categorized as intermediate.

Most Involved Bettors. We defined *most involved bettors* (MIB) subgroups as the top 1% of the sample regarding the total number of bets, total amount of wagers, and net loss (i.e., subtracting the total amount of winnings from the total amount of wagers) on fixed-odds or

live-action betting. We used a scree-type analysis of centile plots to empirically identify these 1%-subgroups [17]. This strategy allowed us to classify MIB into six non-exclusive groups: (1) total number of bets; (2) total amount of wagers; (3) net loss for fixed-odds players (each of these groups n = 462); (4) total number of bets; (5) total amount of wagers; and (6) net loss for live-action players (each of these group n = 322). A total of 984 users belonged to at least one of the fixed-odds MIB groups (2.13% of 46267 fixed-odds players), and a total of 613 users belonged to at least one of the live-action MIB groups (1.90% of 32277 live-action players).

Analyses

In addition to providing descriptive statistics, we conducted two primary comparative analyses. First, we examined differences in gambling behavior between users who did and did not exceed deposit limits using independent-samples tests. These tests employed the gambling behavior measures that were aggregated across 2 years. We also looked to see whether the proportion of most involved betters was greater among individuals who exceed limits compared to those who did not. Second, we analyzed individuals' differences in gambling behavior before and after exceeding deposit limits within users who exceeded limits using paired-samples tests. These tests compared the gambling behavior measures that were created for the period of time before and after receipt of the notification message.

The procedures of limiting deposits and sending notifications were only in effect starting late September 2005, about 8 months after the beginning of our study. Users of our cohort experienced no restrictions to the amount of money they could deposit during the first 8 months after they registered with ***bwin***. This could potentially bias our findings: On one side, only a subset of people who registered in February 2005 was still active in September 2005 (e.g., of the 47000 sports, 27726 or 59% had deposited money after September 2005) and thus could experience the new deposit limit policies. Short-term bettors might exhibit a low extent of gambling behavior, potentially resulting in overestimating the differences

between users who did and did not exceed limits. We therefore repeated the analyses within the subset of users who had deposited money after September 2005.

Alternatively, certain deposit activities could have been possible before September 2005, but might have conflicted with company-imposed or self-imposed deposit limits after September 2005. For example, people could deposit very large amounts during the first 8 months but not after September 2005. People might have chosen to self-limit their deposit amount but had no option to do so before September 2005. We had no means of identifying people who would have been subject to one of the limits before September 2005, and thus no means of excluding these people from the analyses. However, in our analyses these people are considered users who did not exceed limits, yielding conservative estimates for the comparisons of users who did and did not exceed limits.

Analyses involving the average number of bets per active betting day and the average size of bets in Euro used the log-transformed variables; however, we report means, standard deviations, and medians for the untransformed variables for descriptive purposes.

Results

Descriptive Statistics

Of the 47000 sports bettors, 160 (0.3%) had received at least one notification message about exceeding deposit limits. Five (3.1%) were women and 155 (96.9%) were men, and the mean age was 30.8 years (SD = 9.2). Most of the bettors who exceeded limits played both types of games: 159 (99.4%) were fixed-odds players and 149 (93.1%) were live-action players; 148 of the 149 who played live-action also played fixed-odds. Among users who placed both fixed-odds and live-action bets, 0.5% (n = 148) received a notification message, compared to 0.1% (n = 11) of users who played fixed-odds only and 0.1% (n = 1) of users who played live-action only ($\chi^2 = 46.95$, df = 2, $p < .001$).

These 160 notified users received between 1 and 267 notification messages, with a

mean of 14 messages (SD = 29, Median = 6). Of the 160 users, 5 (3.1%) stopped depositing money in their accounts after receiving the notification message. One user had tried to deposit more than the allowed amount with the very first deposit. The mean number of deposits before receiving the notification message was 57 (SD = 89, Median = 20) with a range of 1 to 796. The mean number of days between the date of the first deposit and the date of the first notification message was 372 (SD = 184, Median = 380) with a range of 0 to 741.

To describe the general distribution of deposits, we examined the maximum amount deposited per 24-hour and 30-day period among the 46840 sports bettors who never received a notification message. Table 1 reports the mean (SD) and centiles for this measure. The vast majority of users never came close to the limits of 1000 Euros/24 hours or 5000 Euros/30 days.

Comparing Gambling Behavior between Users who Did and Did Not Exceed Deposit Limits

Table 2 presents a comparison of gambling behavior aggregated across 2 years for users who did and did not exceed their established deposit limits. Results were similar for fixed-odds and live-action betting. The percentage of active betting days for these groups was not significantly different. The average number of bets per active betting day and the average size of bets were higher among users who exceeded deposit limits compared to users who did not exceed deposit limits. The distribution of the categorized percentage of losses was more favorable among users who exceeded deposit limits; that is, the likelihood of the lowest percentages of losses was significantly higher and the likelihood of the intermediate and the highest percentages of losses were significantly lower among users who exceeded deposit limits.

Despite losing a smaller proportion of what they wagered, users who exceeded limits still, on average, lost significantly more than users who did not exceed limits. That is, the mean net loss on fixed-odds of users who did exceed limits was 1,135 Euro (SD = 2,766,

Median = 213) compared to 185 Euro (SD = 1,028, Median = 50) for users who did not exceed limits ($t = 11.51$, $p < .001$) (live-action: 1,975 Euro, SD = 5,569, Median = 135, compared to 187 Euro, SD = 1,414, Median = 13, $t = 14.91$, $p < .001$).

Exceeding deposit limits was a significant predictor of being in the MIB subgroups. For example, 14.5% of users who received notification messages, belonged to at least one of the fixed-odds MIB groups, compared to 2.1% who did not; this association yielded an odds ratio of 7.95 (95% CI 5.08 – 12.42). Further, 14.8% of users who received notification messages compared to 1.8% of those who did not, belonged to at least one of the live-action MIB groups; this association yielded an odds ratio of 9.24 (95% CI 5.84 – 14.64). Table 3 presents the associations between individual MIB groups and exceeding limits.

Within the group of people who exceeded limits, we compared users who belonged to at least one of the fixed-odds or live-action MIB groups to users who did not belong to a MIB group on the gambling behavior measures. Users belonging to a MIB group had a higher percentage of active betting days and a higher average number of bets per active betting day on fixed-odds and live-action, and a higher average size of bet on live-action. The distribution of the categorized percentage of losses was not significantly different between users who did and did not belong to a MIB group.

Comparing Gambling Behavior Before and After Exceeding Deposit Limits

Table 4 shows the comparison of gambling behavior before and after exceeding deposit limits. Of the 159 fixed-odds players, 143 had activity both before and after exceeding deposit limits and are included in Table 4; likewise, of the 149 live-action players, 105 had activity both before and after and are included in the Table.

Again, similar patterns of results emerged for fixed-odds and live-action betting. The percentage of active betting days and the distribution of the categorized percentage of losses did not change. The average size of bet increased and the average number of bets per active

betting day decreased after exceeding deposit limits.

Analyses for Users Who Deposited Money after September 2005

To control for potential biases that might result from the notification messages being introduced only after September 2005, we repeated all the above analyses with the subset of 27726 users (59% of the total sample) who had still deposited money after September 2005. These analyses compare the 159 fixed-odds players who exceeded limits with 27442 users who did not exceed limits, and the 149 live-action players who exceeded limits with 21433 users who did not exceed limits. Overall these analyses yielded the same pattern of results, although the percentage of active betting days was significantly different between the limit-exceeding and non-limit-exceeding groups for fixed-odds betting and the distribution of the categorized percentage of losses was not significantly different between the two groups for either fixed-odds or live-action betting. The odds ratios for belonging to the MIB subgroups were slightly lower overall: between 4.06 and 6.53 for the fixed-odds MIB groups and between 4.37 and 9.78 for the live-action MIB groups. The analyses of gambling behavior before and after exceeding deposit limits necessarily are identical to the overall results.

Discussion

The company-imposed or self-imposed deposit limits affected only a minority of ***bwin*** Internet sports bettors. Very few people, only 0.3% of our sample, ever tried to exceed these deposit limits. Furthermore, the vast majority of the sample (i.e., 95%) never deposited more than 500 Euro per 24 hours, half the maximum allowed 1000 Euros, and never deposited more than 1050 Euro per 30 days, a fifth of the maximum allowed 5000 Euros. This means that ***bwin*** could reduce the deposit limits substantially (e.g., by half) and still most people would not exceed these limits.

One reason for the finding that the deposit limits were hardly exceeded might be that the sports bettors are highly responsible gamblers who bet for fun and spend relatively low

amounts on betting. Another reason might be that users are well aware of ***bwin's*** deposit limits policies and purposely avoid violating them. The deposit limits are presented as part of the general terms and conditions that every user needs to accept when opening an account with ***bwin***. Our findings seem to indicate that knowing about the deposit limits prevented some bettors from exceeding the deposit limits and subsequently from losing money. If this is correct, then the mere provision of deposit limits can serve as a harm reduction device.

We examined whether the deposit limits seemed to safeguard the gambling behavior of the minority that exceeded the deposit limits. People who exceed deposit limits constitute a group of bettors who are willing to place larger bets than people who do not exceed deposit limits; yet, they appear to do this in a manner that keeps their percentage of losses lower than others in the sample. Although the percentage of losses might be more favorable among people who exceed limits, compared to people who do not exceed limits, their net loss still is significantly higher. Because these bettors place very large bets they are at high risk for losing very large amounts of money.

We identified exceeding limits as a strong predictor for being in the MIB subgroups. People who exceed limits are about 6 to 14 times more likely to belong to the various MIB groups. Thus, exceeding the limits is associated with a high likelihood of being in the group of bettors that bet, wagered and/or lost the most; these activities are possible indicators of disordered gambling. Consistent with this notion, we found that among people who exceed limits, people who belong to MIB groups show more intensive gambling behavior than people who do not belong to MIB groups. That is, those who belong to MIB groups bet more often, place more bets, and place larger bets.

Our comparison of the gambling behavior before and after exceeding limits found that exceeding the limits did not have a diminishing effect on gambling behavior. The number of bets was the only measure of gambling behavior that evidenced a minor decrease after exceeding limits. This decrease was offset by a steep increase in the size of bets after

exceeding limits. The number of days of play and the percentage of losses did not change. Thus, we found no indication that receiving the limit notification message influences users to curtail their betting activity. Rather, the findings suggest that exceeding deposit limits encourages players to shift their strategy; they begin to make more calculated, informed risks with single large bets compared to before exceeding the deposit limit.

The finding that the feedback about a violation of a policy or regulation does not have the intended harm-reducing effect is a finding consistent with other evidence about regulating behavior. For example, people who were given feedback that their blood alcohol levels exceeded legal drink-drive limits have been nonetheless subsequently observed to drive [18-20]. Drivers who received speeding tickets have been shown to be at increased risk of receiving subsequent speeding tickets [21]. Likewise, smokers who were given biomedical feedback indicating negative effects of smoking did not initiate appreciable changes towards quitting smoking [22].

No differences emerged in the patterns of results for fixed-odds and live-action betting. Fixed-odds and live-action propositions might differ in the extent of skill required to place successful (i.e., winning) bets. Whereas placing a successful bet in fixed-odds might be determined more by skill (or knowledge) than by chance, placing a successful bet in live-action likely is determined more by chance than by skill. Thus, we could have expected our findings to mirror the differing outcomes of games of skill versus games of chance. Our findings instead show that, with regard to evaluating the risk of disordered gambling among people who exceed deposit limits, distinguishing fixed-odds from live-action betting does not provide additional information.

Limitations

Our study examines conceptually different deposit limits. Some limits are mandatory and imposed by ***bwin***: the default limits of 1000 Euros per 24 hours or 5000 Euros per 30

days, and the increase of the default limits by the amount of winnings. The users voluntarily impose other limits: restrictions to a lower amount than the default limits, or exemption from default limits for users with exceptional financial means. When exploring the effects of exceeding deposit limits, we combined the different deposit limits. Although different deposit limits are examined in this study, an essential similarity of all deposit limits is that they represent specific, predetermined maximum values that certain users are not willing to or are not able to comply with. To this extend, the current study investigates effects of exceeding pre-set deposit limits.

We can posit that different types of limits might be associated with different effects on gambling behavior. Therefore, an analysis differentiating the types of limits would have been desirable. Unfortunately, no information was available about the type of limit that led to issuing a notification message; thus this analysis was not an option for this paper.

It is important to note that the procedures of limiting deposits and sending notification messages were not in effect during the entire two-year study period. We performed some statistical controls in our analyses to account for this fact, and the overall results remained largely unchanged. Thus, we consider our findings to reflect generalizable effects of deposit limits on Internet sports gambling behavior.

Conclusion

The deposit limits examined in this study are part of the corporate social responsibility agenda of ***bwin***. This harm reduction practice is consistent with recommendations to integrate safety features for the prevention of disordered gambling into gambling websites [16].

This study indicates that current deposit limits affect only a very small minority of Internet sports bettors. The vast majority of Internet bettors seem to be able to regulate themselves and require little additional safeguards; however, some bettors can benefit from additional limits. Consequently, for Internet gambling operators reluctant to include harm reduction measures, an interesting message is that a company's financial loss due to imposing

such safeguards such as deposit limits will be rather small and balanced by the promoting effect of being regarded as a socially responsible company.

In this study, we saw that the mandatory limits exceed what most people are willing to spend on Internet gambling activities. However, the mandatory limits also exceed what most people could possibly spend without taking substantial financial risks. Thus, while the current mandatory limits might help prevent the loss of extremely large amounts of money and cases of bankruptcy, these limits still allow users to transfer substantial amounts of money each day and each month, which can lead to financial problems for gamblers without sufficient financial means. For these cases, instead of the company-imposed limits, the self-imposed limits might have value.

This study shows that people who try to exceed deposit limits have some poor outcomes: a high likelihood of placing an extremely large number of bets, wagering extremely large amounts, and/or loosing extremely large amounts of money. These people constitute a group of bettors who appear to be willing to take high risks; yet, surprisingly, they appear to do this rather successfully because their percentage of losses (but not their net loss) is lower than others in the sample.

Without deposit limits, the behavioral and financial consequences of gambling might be even more adverse. These unintended consequences of Internet gambling indicate that the ***bwin*** deposit limits could aid in the prevention of adverse gambling-related consequences. More research is necessary to determine the extent of this influence and to monitor and revise such notification systems so that the promise of limits can be optimized. For example, recent research suggests that gambling activity, or behavioral engagement in gambling, might be as important to consider as financial considerations [23]. Such findings suggest that corporations need not limit harm reduction techniques to financially-related factors. Rather, techniques that account for temporally-related factors (e.g., amount of time spent gambling) remain open to consideration and examination. Online gambling companies would benefit from testing the

harm reduction value of warning systems for amount of time spent gambling.

In this study, we examined deposit limits as a single harm reduction measure of a single Internet gambling provider. Unfortunately, users can sidestep such single safeguards easily; another Internet gambling provider is just a mouse-click away. To implement effective safeguards, concerted harm reduction efforts of companies, users, public health organs, and others are necessary. Ways of achieving this goal might include the development of policy requiring safety provisions as a prerequisite for licensing providers, or having companies cooperate to employ software programs and technology tools to regulate user gambling.

The findings of this study originate from actual gambling behavior and betting activity, without any direct contact with individual gamblers. A previous study analyzing Internet sports betting behavior in this manner indicated that, at the population level, gambling activity is moderate, as evidenced by analyses of time (e.g., people were active less than half the time possible, despite infinite access), activity (e.g., most placed less than 4 bet/day during such limited active periods), and expenditures (e.g., most placed bets less than 5 Euros) [4, 17]. Future research needs to investigate how these findings compare with subjective assessments of perceptions and behaviors by the individual. If additional research supports the findings of this study, technology-based screening tools for gambling-related problems could incorporate the attempt to deposit more than the allowed amount of money as an early indicator of a person's vulnerability to disordered gambling.

Declaration of competing interests

The authors declare that they have no competing interests.

Authors' contributions

AB performed the statistical analyses and drafted the manuscript. RAL and HJS conceptualized the study and were instrumental in its design and coordination. DAL and SEN participated in the statistical analyses and were involved in drafting the manuscript. LBB made substantial contributions to the analysis and interpretation of the data. All authors read and approved the final manuscript.

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References

[1] Welte JW, Barnes GM, Wieczorek WF, Tidwell M-C, Parker J. Gambling participation in the U.S. - results from a national survey. J Gambling Studies 2002; 18: 313-37.

[2] American Gaming Association, 2006 State of the States: The AGA Survey of Casino Entertainment. 2006, Washington, DC: American Gaming Association.

[3] Ialomiteanu A, Adlaf EM. Internet gambling among Ontario adults. From http://www.camh.net, retrieved 2007-06-28.

[4] LaBrie RA, Shaffer HJ, LaPlante DA, Wechsler H. Correlates of college student gambling in the United States. J Am Coll Health 2003; 52: 53-62.

[5] Miller R. The need for self regulations and alternative dispute resolution to moderate consumer perceptions of perceived risk with Internet gambling. UNLV Gam Res Rev J 2006; 10: 51-8.

[6] Christiansen Capital Advisors. Global internet gambling revenue estimates and projections. From http://www.cca-i.com, retrieved 2007-06-28.

[7] Shaffer HJ, Hall MN. The natural history of gambling and drinking problems among casino employees. J Soc Psychol 2002; 142: 405-24.

[8] Petry NM, Stinson FS, Grant BF. Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. J Clin Psychiatry 2005; 66: 564-74.

[9] Slutske WS, Caspi A, Moffitt TE, Poulton R. Personality and problem gambling: A prospective study of a birth cohort of young adults. Arch Gen Psychiatry 2005; 62: 769-75.

[10] Griffiths M, Parke A, Wood R, Parke J. Internet gambling: An overview of psychosocial impacts. UNLV Gam Res Rev J 2006; 10: 27-39.

[11] Hollander E, Buchalter AJ, DeCaria CM. Pathological gambling. Psychiatr Clin North Am 2000; 23: 629-42.

[12] Ladd GT, Petry NM. Disordered gambling among university-based medical and dental patients: a focus on Internet gambling. Psych Addict Behav 2002; 16: 76-9.

[13] Volberg RA. The future of gambling in the United Kingdom: increasing access creates more problem gamblers. Br Med J 2000; 320: 1556.

[14] Petry NM. Internet gambling: an emerging concern in family practice medicine? Fam Pract 2006; 23: 421-6.

[15] Griffiths M. Internet Gambling: Preliminary results of the first U.K. prevalence study. From http://www.camh.net, retrieved 2008-06-27.

[16] Smeaton M, Griffiths M. Internet gambling and social responsibility: An exploratory study. CyberPsychol Behav 2004; 7: 49-57.

[17] LaBrie RA, LaPlante DA, Nelson SE, Schumann A, Shaffer HJ. Assessing the playing field: a prospective longitudinal study of internet sports gambling behavior. J Gambling Studies 2007; 23: 347-62.

[18] Meier SE, Brigham TA, Handel G. Effects of feedback on legally intoxicated drivers. J Stud Alcohol 1984; 45: 6.

[19] Nau PA, Van Houten R, Rolider A, Jonah BA. The failure of feedback on alcohol impairment to reduce impaired driving. J Appl Behav Anal 1993; 26: 361-7.

[20] Rydon P, Stockwell T, Syed DA, Jenkins EM. Blood alcohol levels of patrons leaving licensed premises in Perth, Western Australia. Aust J Public Health 1993; 17: 339-45.

[21] Lawpoolsri S, Li J, Braver ER. Do speeding tickets reduce the likelihood of receiving subsequent speeding tickets? A longitudinal study of speeding violators in Maryland. Traffic Inj Prev 2007; 8: 26-34.

[22] Lipkus IM, Prokhorov AV. The effects of providing lung age and respiratory symptoms feedback on community college smokers' perceived smoking-related health risks, worries and desire to quit. Addict Behav 2007; 32: 516-32.

[23] Nelson SE, LaPlante DA, Peller AJ, Schumann A, LaBrie RA, Shaffer HJ. Real limits in the virtual world: Self-limiting behavior of Internet gamblers. under review.

Table 1: Descriptive statistics for maximum amount of euros deposited by time period

	Euro in 24 hours	Euro in 30 days
Mean (SD)	111 (258)	243 (725)
Percentile		
25^{th}	25	30
50^{th} (Median)	40	50
75^{th}	100	150
90^{th}	250	500
95^{th}	500	1050
99^{th}	1000	3768

Table 2: Gambling behavior in users who did and did not exceed deposit limits

Gambling behavior measure		Fixed-odds (n = 46267)			Live-action (n = 32277)		
		Users who did exceed limits (n = 159)	Users who did not exceed limits (n = 46108)	Difference test	Users who did exceed limits (n = 149)	Users who did not exceed limits (n = 32128)	Difference test
Percentage of active betting days	Mean (SD)	21 (20)	25 (29)		26 (28)	31 (37)	
	Median	14	13		16	11	
	Log Mean (SD)	--	--	t = -1.90	--	--	t = -1.71
Average number of bets per active betting day	Mean (SD)	7 (13)	4 (7)		8 (14)	4 (5)	
	Median	3	2		4	3	
	Log Mean (SD)	0.60 (0.40)	0.44 (0.32)	t = 6.12*	0.68 (0.42)	0.46 (0.34)	t = 7.98*
Average size of bet in Euro	Mean (SD)	25 (55)	11 (30)		27 (41)	11 (25)	
	Median	8	4		12	4	
	Log Mean (SD)	0.96 (0.60)	0.67 (0.51)	t = 7.14*	1.07 (0.58)	0.65 (0.53)	t = 9.59*
Categorized percentage of losses							
Overall winners	n (%)	26 (16.4)	6755 (14.7)		25 (16.8)	6924 (21.6)	
Lowest percentage of losses	n (%)	59 (37.1)	12367 (28.8)		73 (49.0)	10548 (32.8)	
Intermediate percentage of losses	n (%)	56 (35.2)	19338 (41.9)		40 (26.8)	9533 (29.7)	
Highest percentage of losses	n (%)	18 (11.3)	7648 (16.6)	Chi^2 = 10.91*	11 (7.4)	5123 (15.9)	Chi^2 = 20.58*

* $p < .05$.

Table 3: Proportions of most involved bettors (MIB)[1] among users who did and did not exceed deposit limits

	Fixed-odds (n = 46267)			Live-action (n = 32277)		
MIB group	Users who did exceed limits (n = 159)	Users who did not exceed limits (n = 46108)	Odds ratio (95% CI)	Users who did exceed limits (n = 149)	Users who did not exceed limits (n = 32128)	Odds ratio (95% CI)
Total number of bets	6.3%	1.0%	6.78 (3.55 – 12.95)	6.0%	1.0%	6.53 (3.30 – 12.94)
Total amount of wagers	8.8%	1.0%	9.84 (5.64 – 17.17)	11.4%	0.9%	13.44 (8.01 – 22.55)
Net loss	9.4%	1.0%	10.64 (6.20 – 18.26)	12.1%	0.9%	14.38 (8.68 – 23.85)

[1]MIB are defined as the top 1% of the sample regarding the total number of bets, total amount of wagers, and net loss on fixed-odds or live-action betting.

Table 4: Gambling behavior before and after exceeding deposit limits

Gambling behavior measure		Fixed-odds (n = 143) Before	After	Difference test	Live-action (n = 105) Before	After	Difference test
Percentage of active betting days	Mean (SD)	23 (22)	26 (26)		27 (23)	26 (25)	
	Median	14	17		20	19	
	Log Mean (SD)	--	--	t = -1.37	--	--	t = 0.11
Average number of bets per active betting day	Mean (SD)	6 (12)	7 (15)		11 (18)	9 (17)	
	Median	3	3		6	5	
	Log Mean (SD)	0.59 (0.38)	0.49 (0.43)	t = 4.10*	0.78 (0.42)	0.71 (0.44)	t = 2.47*
Average size of bet in Euro	Mean (SD)	21 (48)	44 (107)		25 (43)	32 (45)	
	Median	7	9		11	17	
	Log Mean (SD)	0.90 (0.57)	1.04 (0.70)	t = -3.63*	1.03 (0.57)	1.17 (0.59)	t = -4.27*
Categorized percentage of losses							
Overall winners	n (%)	30 (21.0)	20 (14.0)		17 (16.2)	21 (20.0)	
Lowest percentage of losses	n (%)	41 (28.7)	40 (28.0)		59 (56.2)	43 (410)	
Intermediate percentage of losses	n (%)	56 (39.2)	47 (32.9)		24 (22.9)	31 (29.5)	
Highest percentage of losses	n (%)	16 (11.2)	36 (25.2)	Chi^2 = 15.30	5 (4.8)	10 (9.5)	Chi^2 = 9.38

* $p < .05$.

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Inside the virtual casino: a prospective longitudinal study of actual Internet casino gambling

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Background: Participation in Internet gambling is growing rapidly, as is concern about its possible effects on the public's health. This article reports the results of the first prospective longitudinal study of actual Internet casino gambling behaviour. **Methods:** Data include 2 years of recorded Internet betting activity by a cohort of gamblers who subscribed to an Internet gambling service during February 2005. We examined computer records of each transaction and transformed them into measures of gambling involvement. The sample included 4222 gamblers who played casino games. **Results:** The median betting behaviour was to play casino games once every 2 weeks during a period of 9 months. Subscribers placed a median of 49 bets of €4 each playing day. Subscribers lost a median of 5.5% of total monies wagered. We determined a group of heavily involved bettors whose activity exceeded that of 95% of the sample; these players bet every fifth day during 17.5 months. On each playing day, these most involved bettors placed a median of 188 bets of €25. Their median percent of wagers lost, 2.5%, was smaller than that lost by the total sample. **Conclusion:** Our findings suggest that Internet casino betting behaviour results in modest costs for most players, while some, roughly 5%, have larger losses. The findings also show the need to consider time spent as a marker of disordered gambling. These findings provide the evidence to steer public health debates away from speculation and toward the creation of empirically-based strategies to protect the public health.

Keywords: epidemiology, gambling, Internet, Internet gambling, public health

Introduction

Pathological gambling is a public health problem associated with many physiological, psychological and social repercussions—some of which are shared with other expressions of addiction and some of which are unique to excessive gambling behaviour.[1] There are many influences on the prevalence of pathological gambling among the general population.[2,3] For example, researchers have identified an association between increases in opportunities to gamble and changes in population-level gambling behaviour.[4,5] Researchers and gambling advocates alike worry that Internet-related increases in gambling opportunities can lead to excessive gambling among segments of the population.[6–12] To date, very little research has examined population-level Internet gambling behaviour. This article provides the first glimpse into the actual gambling behaviour, as opposed to self-reported gambling behaviour, of online casino gamblers.

Internet gambling and public health

Rates of Internet gambling currently are low compared to other types of gambling.[13–16] However, researchers and advocates have suggested that online gambling will grow and attract players because of some uniquely appealing aspects, such as anonymity, proximity and a greater sense of control.[17–21] Moreover, the loose regulations implemented by many gambling websites,[22] combined with younger generations' familiarity with, interest in and access to computer technology, has created uneasiness concerning the possibility of an increase in underage gambling.[17]

Studies have reported higher prevalence rates of Internet gambling in special populations, suggesting differential popularity and potency of Internet gambling for these groups.[15,23–25] For example, Ladd and Petry[26] investigated the gambling behaviour of people seeking treatment at University of Connecticut health clinics ($n = 389$) and found that 8.1% of the cohort affirmed gambling on the Internet in their lifetime; those who gambled on the Internet were more likely to be younger, non-Caucasian and have higher scores on the South Oaks Gambling Screen[27] in comparison to non-Internet gamblers. However, these prevalence studies have gathered data via self-report measures, which often provide inaccurate or biased data due to participants' emotional responses to the events in question and difficulty with recall.[28] Baumeister *et al.*[21] simply state that people's accounts of their actions do not often correlate with their actual behaviours and thus these discrepancies lead to inaccurate reports. Evaluating gamblers' actual online behaviour provides a valid record of gambling activities and more accurate knowledge about players' behaviour patterns.

Assessing actual online gambling behaviour

LaBrie *et al.*,[29] provided the first report of actual gambling behaviours of a longitudinal sample of Internet sports gamblers. This study revealed primarily moderate gambling behaviour at the population level (i.e. 2.5 bets of €4 each every fourth day), suggesting that Internet sports gambling does not encourage excessive gambling for many players. However, the research also showed that a small percentage of subscribers (i.e. 1%) exhibited behaviours that deviated markedly from the norm (i.e. the median activity profile of this group was to place 4.7 bets of €44 each every other day).

Similarly, analyses of temporal patterns of sports gambling behaviour showed evidence of rapid population-level adaptation to online gambling.[30] The observed cycle of sports

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gambling activity indicated short-term increases in activity followed by a swift decline, a model consistent with prototypical public health adaptation curves.[12] The rapid adaptation might be a result of previous gambling experience; the novelty of the Internet might have generated the initial short-term increases in activity. LaPlante and colleagues[30] noted a small segment of the population (1%) which did not adapt, consistent with the findings of LaBrie *et al.*[29]

Hypotheses

Our previous research[29] provided a unique description of actual Internet sports gambling, and a description of actual Internet poker play is forthcoming. Both types of betting are referred to as 'skill' games. In comparison, chance governs casino games entirely. As a result, we expect that casino game play will differ in a few important ways from sports gambling and poker play. Structurally, casino play is more rapid; therefore, we expect that volume measures, such as number of bets, will be greater for casino gambling than for sports betting. Our research focusing on the gambling behaviour of 2356 people in treatment for gambling-related problems[31–33] suggests that casino games are the game of choice for people seeking treatment. Despite the absence of epidemiologic evidence other than that presented here, we hypothesize that individuals betting in virtual casinos will exhibit riskier behaviours, such as more excessive loss patterns or time spent gambling, than observed among Internet sports bettors and poker players. However, we expect to find moderate and consistent gambling among the majority of the population with a small minority (i.e. 5% or less) exhibiting excessive gambling behaviour.

Present study

This article describes the actual Internet casino gambling behaviour of a large cohort of participants during 2 years of a longitudinal study. We established a research cohort and accumulated their subsequent casino gambling transactions at a gambling website. The cumulative information base of these transactions documents each player's gambling behaviour at that site. Although previous investigations examined the self-reported betting activity of Internet gambling on various types of games,[34] this is the first study to document the actual gambling behaviour of Internet gamblers playing casino-type games of chance. We present three types of results: (i) an epidemiological description of demographic characteristics of 4222 sequentially subscribed Internet casino gamblers; (ii) an epidemiological description of the casino gambling behaviour of these Internet gamblers and (iii) an epidemiological description of the Internet casino gambling behaviour of an empirically-determined group of heavily involved bettors.

Methods

Sample

The full research cohort included 48 114 people who opened an account with the Internet betting service provider, *bwin* Interactive Entertainment, AG (*bwin*), in February 2005. The majority of subscribers engaged primarily in sports gambling. As expected, relatively few, 8472 (18%), elected to play some casino games, and half of those, 4225 participants, were excluded for playing fewer than 4 days during the study period. The large number of bettors excluded for limited involvement is typical of people curious enough to try the product, but not sufficiently interested to continue casino betting. We also eliminated 10 bettors who played for 'fun' (i.e. only played with betting service promotional funds). Finally, we excluded 15 bettors because they had limited exposure to casino play, starting their casino play less than 1 month before the end of the current study period (i.e. between 1 January and 30 January 2007). The longitudinal cohort eligible for the study consisted of 4222 participants.

Measures

The available demographic characteristics of the research sample included age, gender, country of residence and preferred language. At enrollment, participants elected to interact with the wagering system in one of 22 languages.

The gambling behaviour measures are based on participants' monetary deposits to, and withdrawals from, their wagering accounts, as well as daily aggregates of betting activity records. The daily betting aggregates include the number of bets made, total monies wagered and winnings credited to the bettors' accounts. The daily aggregations provided summary measures of gambling behaviour. We obtained number of bets and total wagered by summing the daily aggregations. We measured the duration of gambling involvement as the number of days from the first eligible bet to the last (i.e. duration). We defined the frequency of involvement as the percent of days within duration that included a bet (i.e. frequency). We obtained the average bets per day by dividing the total number of bets made by the total number of days on which a bet was placed (i.e. bets per day) and the average size of bets by dividing the total monies wagered by the total number of bets (i.e. euros per bet). The net result of gambling (i.e. net loss) is the difference between total wagers and total winnings. The dominant outcome is a net loss and, by subtracting total winnings from total wagers, positive values indicate net losses, the cost of gambling. Converting net losses to a percent of total wagers (i.e. percent lost) provides an index of losses that is independent of the total amount wagered.

Procedures

We conducted a secondary data analysis of the subscriber database obtained from *bwin* as described above. We received approval from our Institutional Review Board to conduct this secondary data analyses.

Data analysis

We summarized the participants' demographics and gambling behaviour using descriptive statistics. Tests for differences between group means included testing the assumption of equal variances and, if necessary, adjusting for unequal variances. We organized the analyses into three sections: (i) cohort characteristics; (ii) cohort gambling behaviour and (iii) the behaviour of heavily involved bettors. For cohort characteristics, we reported gender and country distributions, as well as gambling behaviour differences by gender. For cohort gambling behaviour, we reported gambling involvement by time (i.e. duration and frequency), betting intensity (i.e. number of bets, bets per day, euros per bet), and monetary outcomes (i.e. total wagered, net loss and percent lost). For gambling behaviour, we report medians because of the skewed nature of the gambling data.

Results

Cohort characteristics

General demographics

The cohort average age was 30 years (SD = 9.0) and most (93%) were male. The players represented 46 countries. The majority indicated residence in Germany (19%), Austria (11%),

Greece (11%) and Spain (10%), but substantial proportions of participants were from France (9%), Denmark (8%), Italy (8%), Turkey (8%) and Poland (5%). The remaining 10% of participants were evenly distributed among 37 other countries.

Betting behaviour was similar across genders with the single exception that women placed significantly more bets per day than men ($M_{women} = 141$, SD = 206 versus $M_{men} = 114$, SD = 191, $P < 0.05$). Consequently, the data did not justify additional gender-specific analyses.

Internet casino gambling behaviour

The wagering of this cohort on casino games included >206 000 records of daily aggregates that tracked 14.8 million bets, risking €114.7 million and losing a total of €3.5 million. Table 1 summarizes the betting activity for this cohort ($N = 4222$). The typical number of days of playing casino games is roughly 18; we estimated the number by multiplying the median duration (261 days) by the median percent of days (7%) gambled within the duration (frequency). We estimated the typical cost per day by dividing the median net loss (€117) by the typical number of days of play. Briefly, the central tendencies (medians) describe a cohort that plays casino-type games about once every 2 weeks during a 9-month period and loses about €6.5 at each session. The relationships between the means and the medians, and the size of the standard deviations in relation to the means, indicate that the total distribution is markedly skewed (i.e. extreme betting activity limits the ability of the means to adequately describe the general betting activity of the population majority). We will consider the heavily involved bettors in a later section.

Relationships between behaviours

The distributions of the measures violate assumptions of bivariate normality required for product-moment correlations. Consequently, our analysis of the independence among measures used non-parametric rank-order correlation procedures to avoid the undue influence from extreme observations.

Table 1 Gambling behaviour of internet casino bettors

	Casino Bettors ($n = 4222$)	
Measure	Mean (SD)	Median
Duration (in days)	299 (237)	261
Frequency	16% (21)	7%
Number of bets	3515 (12 210)	532
Bets per day	116 (192)	49
Euros per bet	35 (184)	4
Total wagered	27 172 (109 604)	2603
Net loss	840 (3229)	117
Percent lost	7.7 (12)	5.5

Table 2 presents the Spearman rank-order correlations between pairs of measures. In large samples, relatively small correlations (in this case, as small as 0.05) are statistically significant. Only one correlation presented in Table 2, the correlation between duration and bets per day, was not statistically significant. Therefore, it is important to consider the size of these correlations as well as their significance.

In Table 2, most of the correlations between measures are both significant and large. Participants who wagered larger amounts of money also placed more total bets, more bets per day, wagered more per bet and lost more money overall. Percent lost was negatively correlated with all other measures of betting involvement, indicating that bettors who bet more and more often lost a lower percent of their total wagers than others. Though duration and frequency were highly negatively correlated, indicating that the longer subscribers remained active on the site the lower the percent of days on which they bet, these two measures did not correlate highly with the other measures of gambling behaviour.

Gambling behaviour of heavily involved bettors

We examined subject centile plots to identify empirically whether subgroups within our sample evidenced discontinuously high involvement with casino wagering. Similar to interpreting a screen plot by identifying the 'elbow' of that plot, Figure 1 demonstrates for total wagered a discontinuous distribution beginning at the 95th centile. This also was the case for net loss. The total wagered and net loss measures of

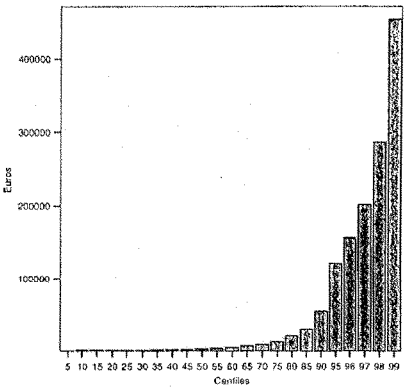

Figure 1 Total stakes wagered on casino games

Table 2 Correlations among gambling behaviour measures for fixed-odds betting ($n = 4222$)

	Duration	Frequency	No. of bets	Bets per day	Euro per Bet	Total wagered	Net loss	Percent lost
Duration	–	−0.63	0.26	0.01§	0.05	0.27	0.23	−0.07
Frequency	−0.63	–	0.22	0.13	0.09	0.27	0.16	−0.18
No. of Bets	0.26	0.22	–	0.87	−0.24	0.66	0.49	−0.26
Bets per day	0.01§	0.13	0.87	–	−0.41	0.41	0.33	−0.14
Euros per Bet	0.05	0.09	−0.24	−0.41	–	0.52	0.32	−0.27
Total wagered	0.27	0.27	0.66	0.41	0.52	–	0.70	−0.43
Net loss	0.23	0.16	0.49	0.33	0.32	0.70	–	0.20
Percent lost	−0.07	−0.18	−0.26	−0.14	−0.27	−0.43	0.20	–

Duration, interval in days between first and last bet; frequency, percent of days within duration when a bet was placed; net loss, total wagers minus total winnings; Percent lost, net loss divided by total wagered. Non-parametric Spearman correlations all $P < 0.001$, unless indicated by §.

Table 3 Gambling behaviour of extreme 5 and 95% subgroups of casino bettors

	Most involved casino bettors top 5% ($n=212$)		Other 95% of participants ($n=4010$)	
Measure[a]	Mean (SD)	Median	Mean (SD)	Median
Age	34 (9)	32	30 (9)	28
Duration	476 (232)	529	290 (233)	246
Frequency	24% (17%)	20%	16% (21%)	7%
Number of bets	24 558 (36 779)	10 465	2403 (7819)	486
Bets per day	285 (344)	188	107 (176)	46
Euros per Bet	213 (682)	25	25 (97)	4
Total wagered	345 579 (354 890)	233 195	10 338 (19 360)	2284
Net loss	8746 (11 213)	6698	422 (939)	107
Percent lost	2.6 (3)	2.5	8.0 (12)	5.9

a: All measures significantly different between groups at $P<0.001$

involvement are highly correlated (Spearman $r=0.70$) and two-thirds of the most involved bettors were common to both measures of money at risk. As shown in Table 2, total wagered was correlated more highly with betting activity, both total bets and bets per day, and was considered a better measure of gambling involvement. The temporal measures of duration and frequency were skewed but not markedly discontinuous. We analysed the most top 5% of casino gamblers identified by total wagered (i.e. the top 5%) separately to provide a more complete description of the most heavily involved Internet casino gamblers.

As Table 3 shows, the top 5% of players and their less involved counterparts significantly differed on a number of variables. The single exception was gender. The proportion of females in the top 5% group was lower, 4.2%, compared to the other players, 7.2%; however, this difference was not statistically significant ($\chi^2=2.69$, $P=0.10$). The top 5% players were significantly older by 4 years ($t=6.4$, ndf = 233, $P<0.001$). The top 5% exhibited significantly increased gambling behaviour compared to other gamblers on all measures of activity and spending. However, the top 5% lost a significantly smaller percent of their total wagers compared to the rest of the cohort ($t=21.0$, ndf = 871, $P<0.001$).

Discussion

Although Internet gambling is often the subject of public health debate and concern, there is little empirical evidence available to inform such debate and address that concern. Stakeholders, however, have speculated about Internet gambling and related public policy in both the popular press and public health circles.[6,8–10,26,35,36] Fortunately, empirical data describing population-level Internet gambling behaviour is mounting. Contributing to this growth, this study presents the first ever analysis of real-time betting behaviour of Internet casino gamblers. These findings provide a description of the Internet casino gambling behaviour evidenced by a large cohort of bettors followed prospectively for 2 years. We also identified and reported the characteristics of a distinct group of heavily involved players who comprise five percent of the overall cohort. This information will allow stakeholders to participate in evidence-based public health debate, rather than rely on conventional wisdom and professional speculation.

Cohort characteristics

It is important for public health officials who might be developing Internet gambling-related policy to understand the magnitude of a population's involvement in various types of Internet gambling. We hypothesized that games of chance would not be a popular gambling choice for our longitudinal cohort of sports bettors. During the 2-year study period, 18% of the cohort tried their hand at casino games but half of them did not play on more than 3 days. The finding that only 9% of the cohort played casino-type games to any extent confirms our expectation about the popularity of this gambling option for sports bettors. This finding suggests that, rather than a general interest in Internet gambling, participants are likely to be selective in the types of games that they choose to play.

The service provider that generated the sample of gamblers for the current investigation is most well known for its sports betting services; consequently, it is not entirely clear whether our findings suggest population-level game preferences or indicate a level of specificity only observed among Internet sport gamblers. We noted that females are underrepresented in the longitudinal cohort and this might be the result of gender differences in game preferences. However, gender does not appear to influence actual betting behaviour; neither this study of casino gambling nor the sports gambling study[29] observed behavioural differences sufficient to discriminate between genders. Although casino gamblers comprise a small portion of the longitudinal sample, both the full subscriber sample and the subsample of casino gamblers are large (i.e. 4222). The experience of >4000 gamblers observed for as long as 2 years constitutes a significant empirical information base about Internet casino-style games of chance. As we hypothesized, the typical daily cost of casino gambling is modest, but considerably larger than the sports betting costs of this cohort. As we noted in the Results section, the typical daily cost of gambling on casino games was €6.5 per day which is larger than the €1.2 typical daily cost of gambling on fixed-odds sports propositions and the €0.8 typical daily cost for live-action bets.[29] However, the cohort of casino bettors played less frequently than the sports bettors. Casino bettors played about twice a month (median frequency = 7%) compared to about seven times a month for fixed-odds bettors (median frequency = 23%) and live-action bettors (median frequency = 27%).[29] The observation that casino game bettors incur larger losses at each gambling session compared to sports bettors is consistent with our hypothesis that casino-type games offer an additional risk for players.

The correlation analyses provide important insights about general patterns of Internet gambling behaviour. The high correlations exhibit the consistency of casino betting patterns among these bettors. The correlation between the total number of bets made and the average number of bets per day (Spearman $r=0.87$) reflects the day-to-day betting consistency of casino players. The correlation between total monies wagered and net loss (Spearman $r=0.70$) is necessarily high because the outcome of casino gambling is a function of chance and the house odds. In our cohort, we also observed a general tendency for rational decision making. The total amount of money wagered correlated negatively with the percent that was lost; wagering decreased as losses increased. Similarly, measures of betting activity and amount per bet also correlated negatively with percent lost. These findings suggest that for this cohort, bad luck was a disincentive for gambling, though more research focused on the temporal nature of these patterns is necessary to confirm this suspicion.

Although many gambling outcomes were uniform (i.e. positively correlated), we also observed a population level split in type of gambling engagement. More specifically, the time involvement measures, duration and frequency, were negatively correlated. This suggests two styles of casino play in our sample: playing on more days during a shorter total play period, and playing less frequently but for a longer period of time. Both play styles had similar outcomes as measured by monies lost. Percent lost correlated negatively with both frequency (Spearman $r = -0.18$) and duration (Spearman $r = -0.07$) More frequent play was associated with a smaller percent lost than was a longer duration of play. Although future research is necessary to clarify this issue, our findings suggest that winning reinforces playing on adjacent days more than it reinforces playing over a longer period of time.

Heavily involved players of casino games

Similar to our earlier analysis of Internet sports gamblers,[29] the pattern of gambling involvement in this cohort of casino gamblers was discontinuous. A 5% subgroup of the longitudinal cohort ($n = 212$) was more involved with casino gambling than the rest of the cohort. It is notable that among sport gamblers, discontinuity occurred at 1%;[29] hence, a greater proportion of our sample of casino gamblers participated in more extreme gambling behaviour than did sports bettors. It is also worth noting that, on average, the extreme 5% subgroup lost €77 per day compared with the remaining casino players who lost €2.3 per day. All measures reflected this increased gambling involvement for this 5% subgroup. If such groups of heavily involved players indicate noteworthy rates of disorder, behavioural algorithms comprised of temporal, intensity and financial gambling measures might be useful indices for developing website warning systems.

Time involved and money spent

Because financial losses are arguably the most obvious consequence of pathological gambling, common sense suggests that public health attention would feature interventions that concentrate on potential financial and/or material problems and treatment outcomes. However, an equally important consequence of pathological gambling might be how gamblers redistribute their time (e.g. spending less time with family or at work). Defined by financial risk, the extreme 5% subgroup were active casino players during a longer period, they played on more days during the time they were active, and the measure of time spent at casino sessions (i.e. median bets per day) was four times larger than the remainder of the sample. The heavily involved players played frequently, for a long duration, and were recognized by their financial commitment. However, the correlations based on the total sample suggest that some gamblers might experience personal problems unrelated to the amount of money risked. In the full sample, duration and frequency are strongly negatively correlated (Spearman $r = -0.61$), and both have modest correlations with the Euros per bet (Spearman $r = 0.05$ and 0.09, respectively). The negative correlation could signal the presence of gamblers who played intensely but for only a few days: an episodic loss of control that could be problematic, but associated with only limited financial losses. The relatively small correlations of duration and frequency with monies wagered could signal the presence of gamblers who spent a long time playing casino games, but did not (or could not) bet more than very small sums. In this case, the time engaged in casino betting, rather than the amount lost, could be the negative outcome of disordered gambling. The time-related findings confirm the suggestion that interventions need to target a range of behaviours and that identification of disordered gambling behaviour needs to move beyond financially related consequences.

Limitations

Despite the strength of this sample and the research focus on actual gambling behaviour, this study is not without limitations. The observed Internet betting behaviour might not represent a participant's total online gambling behaviour. In addition to playing other types of games on *bwin* (e.g. sports betting), unlike land-based gambling venues, bettors can access Internet sites easily, play at several venues and move among them readily. The proffered payback rates vary from site to site and it would not be unusual for gamblers to 'shop' for the most favourable rates. It also is possible that multiple individuals bet using the same account. The casino games players in this study are a minority (9%) of the longitudinal cohort. The service provider, *bwin*, is best known as a sports gaming service. It is possible that many gamblers whose primary interest is casino games would select sites that emphasize casino games. The casino players in this sample also bet on sports and might represent bettors with more varied gambling interests than players at sites that emphasize casino games. Although epidemiological information from this and other studies derived from our longitudinal cohort[29] advance our understanding of Internet gambling, additional research is necessary to determine how well these findings generalize to other types of Internet gambling. Research has indicated that game preferences at casinos and other land-based gambling venues (e.g. the lottery, bingo, casino games) depend upon the players' demographic, economic and health-related factors[32] as well as cultural and social acceptability.[37] Researchers now need to consider whether the observed patterns of games played at land-based gambling venues carry over to Internet gambling.

Games people play

Our data did not provide information about the specific casino games that individuals in our sample played. However, published reports of provider odds might shed light on this issue. The outcomes of casino games are governed by chance with the odds set by the provider. The website indicates that Video Poker and Slots had the lowest returns to the players, overall losses of 6.2 and 5.8%, respectively (https://casino.*bwin*.com/casino.aspx?view=payoutTable). Casino table games were most favourable with a loss rate of 2.3%, followed by card games with a rate of 2.9%. It is possible that the lower fractional losses for the most heavily involved players (median = 2.5%) are due to a preference for table and card games. Similarly, the higher fractional loss (median = 5.9%) experienced by the large majority of more casual players might be consistent with a preference for slots and video poker. This is an important direction for future research and eventually could suggest directions for targeted public health interventions based on gaming preferences.

Conclusion

The purpose of our research collaboration with *bwin* is to provide an empirical foundation to guide the development and implementation of strategies that will protect the public health. The rapid expansion of Internet access and services outpaces

the acquisition of empirical evidence necessary to develop effective regulations and policies to assure public safety and health. However, an advantage of Internet capabilities is the ability to collect the actual behaviour of a large research sample over a long period of time. This allows research to avoid the nuances of self-report and the prohibitive logistical constraints of repeatedly surveying large samples. This study is a necessary step toward informing the wide range of gambling stakeholders about the behavioural epidemiology of Internet gambling on casino-type games. Research must next begin to identify the population segments at greater or lesser risk for developing Internet gambling-related addiction problems. The determinants for increasing or decreasing the likelihood of developing Internet gambling problems can then serve as a guide for the development of prevention and treatment programs.

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Conflicts of interest: None declared.

Key points

- This is the first study to provide evidence about the actual gambling behaviour of a large cohort of Internet gamblers who played casino games during a 2-year period.
- The study revealed moderate gambling behaviour at the population level: the median betting behaviour of Internet casino gamblers was to play casino games once every 2 weeks, placing a median of 49 bets of €4 each.
- A small percentage of the cohort (i.e. 5%) exhibited behaviours that deviated markedly from the norm: the most involved bettors played every fifth day, placing a median of 188 bets of €25 each.
- Two patterns of Internet casino play emerged among the cohort: playing on more days during a shorter total play period, and playing less frequently but for a longer period of time. Little evidence suggested a difference in outcomes across these distinct play styles.
- Internet casino gamblers incurred greater daily losses and played less frequently (about twice a month) than Internet sports gamblers (about 7 times per month).

References

1 Shaffer HJ, LaPlante DA, LaBrie RA, et al. Toward a syndrome model of addiction: multiple expressions, common etiology. *Harvard Rev Psychiat* 2004;12:367–74.

2 Gill T, Grande ED, Taylor AW. Factors associated with gamblers: a population-based cross-sectional study of South Australian adults. *J Gambl Stud* 2006;22:143–64.

3 Volberg RA, Abbott MW, Roennberg S, et al. Prevalence and risks of pathological gambling in Sweden. *Acta Psychiatr Scand* 2001;104:250–6.

4 Welte JW, Wieczorek WF, Barnes GM, et al. The relationship of ecological and geographic factors to gambling behavior and pathology. *J Gambl Stud* 2004;20:405–23.

5 Shaffer HJ, LaBrie RA, LaPlante DA. Laying the foundation for quantifying regional exposure to social phenomena: considering the case of legalized gambling as a public health toxin. *Psychol Addict Behav* 2004;18:40–8.

6 Bray H. Could the future of Internet gambling in the US lie in Antigua? 2006. Available from: www.boston.com (accessed 30 March 2006).

7 Federal Trade Commission. Online gambling and kids: A bad bet. [world wide web] 2003. Available from: http://www.ftc.gov/gamble (accessed 20 December 2003).

8 General Accounting Office. Internet gambling: An overview of the issues. Washington, DC: United States General Accounting Office; 2002 December 2. Report No.: GAO-03-89.

9 McBride J. Internet gambling among youth: a preliminary examination. *Youth Gambl Int* 2006;6:1.

10 Mitka M. Win or lose, internet gambling stakes are high. *J Am Med Assoc* 2001;285:1005.

11 Wall Street Journal. Should online gambling be banned? Online News Roundup 2006. Available from: www.wsj.com (accessed 4 April 2006).

12 LaPlante DA, Shaffer HJ. Understanding the influence of gambling opportunities: expanding exposure models to include adaptation. *Am J Orthopsychiat* 2007;77:616–23.

13 Welte JW, Barnes GM, Wieczorek WF, et al. Gambling participation in the U.S.—Results from a national survey. *J Gambl Stud* 2002;18:313–37.

14 Azmier JJ. *Canadian Gambling Behavior and Attitudes: Summary Report Calgary*. AB: Canada West Foundation, 2000.

15 Welte JW, Barnes GM, Wieczorek WF, et al. Gambling participation and pathology in the United States—A sociodemographic analysis using classification trees. *Addict Behav* 2004;29:983–9.

16 Wardle H, Sproston K, Orford J, et al. *British Gambling Prevalence Survey 2007*. London: UK National Centre for Social Research, 2007.

17 Watson S, Pearson LJ, Moore RS, et al. The legalization of internet gambling: a consumer protection perspective. *J Public Policy Mark* 2004;23:209–13.

18 Wood RT, Williams RJ, Lawton PK. Why do Internet gamblers prefer online versus land-based venues: Some preliminary findings and implications. *J Gambl Issues* 2007. Available from: http://www.camh.net/egambling/issue20/07wood.htm (accessed 7 September 2007).

19 Griffiths MD. Internet gambling: issues, concerns, and recommendations. *Cyberpsychol Behav* 2003;6:557–68.

20 Griffiths MD, Parke A, Wood R, et al. Internet gambling: an overview of psychosocial impacts. *UNLV Gaming Res Rev J* 2006;10:27–39.

21 Baumeister RF, Vohs KD, Funder DC. Psychology as the science of self-reports and finger movements: Whatever happened to actual behavior? *Perspect. Psychol. Sci* 2007;2:396–403.

22 Girwood RS. Place your bets on the keyboard: are Internet casinos legal? *Campbell Law Rev* 2002;25:135–50.

23 Petry NM. Internet gambling: an emerging concern in family practice medicine? *Fam Pract* 2006;23:421–6.

24 Woodruff C, Gregory S. Profile of Internet gamblers: Betting on the future. *UNLV Gaming Res Rev J* 2005;9:1–14.

25 Petry NM, Weinstock J. Internet gambling is common in college students and associated with poor mental health. *Am J Addictions* 2007;16:325–30.

26 Ladd GT, Petry NM. Disordered gambling among university-based medical and dental patients: a focus on Internet gambling. *Psychol Addict Behav* 2002;16:76–9.

27 Lesieur HR, Blume SB. The south oaks gambling screen (SOGS): a new instrument for the identification of pathological gamblers. *Am J Psychiatry* 1987;144:1184–8.

28 Volberg RA, Gerstein DR, Christiansen EM, et al. Assessing self-reported expenditures on gambling. *Manag Decision Econ* 2001;22:77–96.

29 LaBrie RA, LaPlante DA, Nelson SE, et al. Assessing the playing field: a prospective longitudinal study of internet sports gambling behavior. *J Gambl Stud* 2007;23:347–62.

30 LaPlante DA, Schumann A, LaBrie RA, et al. Population trends in Internet sports gambling. *Comput Hum Behav*, Available online 24 March 2008.

31 Shaffer HJ, LaBrie RA, LaPlante DA, et al. *The Iowa Department of Public Health Gambling Treatment Services: four years of evidence.* Boston: Division on Addiction, Harvard Medical School, 2002. Report No.: 101102-200.

32 LaPlante DA, Nelson SE, LaBrie RA, et al. Men and women playing games: gender and the gambling preferences of Iowa Gambling Treatment Program participants. *J Gambl Stud* 2006;22:65–80.

33 Shaffer HJ, LaBrie RA, LaPlante DA, et al. The Iowa Gambling Treatment Program: treatment outcomes for a follow-up sample. *J Gambl Stud* 2004;21:59–71.

34 Wood RT, Griffiths MD, Parke J. Acquisition, development, and maintenance of online poker playing in a student sample. *Cyberpsychol Behav* 2007;10:354–61.

35 Griffiths MD, Parke J. The social impact of Internet gambling. *Soc Sci Comput Rev* 2002;20:312–20.

36 Griffiths MD. Gambling technologies: prospects for problem gambling. *J Gambl Stud* 1999;15:265–83.

37 Productivity Commission. *Australia's Gambling Industries: Final Report.* Canberra: AusInfo, 1999. Report No.: 10.

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Population trends in Internet sports gambling

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Abstract

The Internet is a controversial new medium for gambling. This study presents the first longitudinal analysis of online gambling participation and activity among a population of newly subscribed Internet bettors. Our analyses indicate that this population of gamblers adapted to the new subscription service rapidly, as evidenced by quickly developing declines in population participation, number of bets, and size of stakes. Adaptation was not uniformly evident in our population. Among subgroups of heavily involved bettors, adaptation was generally slower or not apparent. Rather than adapt, involved bettors often maintained the high level of betting they escalated to in the days following subscription. This was particularly evident for one type of game: live-action betting. These involved individuals and the effect of live-action play require close scrutiny and ongoing examination.

Keywords: Gambling; Public health; Internet

1. Population trends in Internet sports gambling

Ten years ago, the division on addictions published the first meta-analytically derived estimates of lifetime and past year pathological gambling for the United States and Canada (Shaffer & Hall, 2001; Shaffer, Hall, & Vander Bilt, 1997; Shaffer, Hall, & Vander Bilt,

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1999). Those point-in-time estimates indicated that 1–2% of the adult population met criteria for lifetime pathological gambling. Subsequent updates incorporating international research (Stucki & Rihs-Middel, 2007) indicate little change in these rates. Some research indicates that rates of gambling-related problems among segments of the population that gamble are higher (Gerstein et al., 1999); however, researchers still are narrowing in on the prevalence of pathological gambling in society at-large and among gamblers and other vulnerable populations (Shaffer, LaBrie, LaPlante, Nelson, & Stanton, 2004). The most recent estimate from a nationally representative survey in the United States (Petry, Stinson, & Grant, 2005) found lower population rates (i.e., 0.4%) of lifetime pathological gambling within the general population than those generated by the original meta-analyses; nevertheless, even these lower rates represent a substantial number of individuals.

The aforementioned studies provide the prevalence of respondents who, at one point-in-time, self-reported the number of gambling-related problems they experienced during certain time periods. The findings illustrate the extent of gambling and gambling-related problems in society. However, isolated retrospective self-reports are limited in terms of what they can tell us about changes in gambling behavior that occur over time, and, in response to individual or environmental events, such as new gambling opportunities. Studies that utilize a prospective design can provide detailed information about the intricacies of both internally and externally influenced behavior change.

Most of the available temporally-related research presents point-in-time estimates of self-reported gambling and gambling-related problems before and after events considered likely to produce changes, such as casino openings and lottery expansion (Costello, Compton, Keeler, & Angold, 2003; Govoni, Frisch, Rupcich, & Getty, 1998; Grun & McKeigue, 2000; Jacques & Ladouceur, 2006; Jacques, Ladouceur, & Ferland, 2000; LaBrie, Nelson et al., 2007; LaPlante & Shaffer, 2007; Room, Turner, & Ialomiteanu, 1999; Wallisch, 1996). The information provided by these studies is mixed; some studies indicate increases in gambling and gambling-related problems, others indicate no change or inconsistent patterns over time (LaPlante & Shaffer, 2007). One reason the available temporally-related research might be inconsistent is because it relies on self-reported gambling behavior. The validity and reliability of self-reported behavior is often uncertain (National Research Council., 1999) and different types of self-report can conflict for the same information (Jacques & Ladouceur, 2006; Shaffer et al., 2004).

To date, there has been no research illustrating population, or population segment, gambling trends in real time. Consequently, although the existing studies have provided important information about the effect of environmental changes on individuals' perceptions of gambling and gambling-related problems, they cannot illustrate with specificity real time changes in actual gambling in a population.

1.1. Present research

Some forms of gambling are more amenable to the study of real time gambling behavior than others. For example, machine games, such as video lottery terminals (VLTs), can be equipped with player tracking software to collect real time gambling behavior over long periods of time. Those VLT systems with central registries can even track player behavior across machines and gambling locations. Similarly, the Internet provides a unique opportunity to record and explore actual gambling behavior because many companies record all gambling and non-gambling online activity using web-based technology. Examining actual

gambling behavior avoids well-known issues related to retrospective self-reports (e.g., poor recall, self-presentation strategies, etc.), and provides an unbiased record of population trends in gambling activity.

In this paper, we present the first real time longitudinal analysis of Internet gambling behavior among a population of new subscribers to an online gambling service, which specializes in sports betting. This population is of interest for several reasons: (a) the worldwide ramifications of recent congressional legislation defining Internet sports gambling as illegal in the United States (i.e., the Unlawful Internet Gambling Enforcement Act); (b) the paucity of empirical research related to Internet gambling (e.g., Division on Addictions., 2007; Griffiths, 2001; Ialomiteanu, Adlaf, & M., 2002; LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007; LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Ladd & Petry, 2002; Petry & Mallya, 2004; Woodruff & Gregory, 2005); and (c) there are no longitudinal studies of actual Internet gambling activity. This study examines daily records of actual Internet gambling activities prospectively observed over a period of 18 months.

1.2. Hypotheses

Popular opinions hold that Internet gambling is a particularly virulent form of gambling, which will have profound adverse effects on the population. People have argued that certain characteristics specific to Internet gambling present additional risks for developing gambling problems, such as the lack of control over participants, the immediacy of access, and the ready availability of a wide range of types of gambling opportunities (e.g., Bulkeley, 1995; Federal Trade Commission, 2003; General Accounting Office., 2002; Griffiths, 1999, 2003; Griffiths, Parke, Wood, & Parke, 2006; Mitka, 2001). If it is correct that these characteristics are especially dangerous, we would expect to observe enduring or escalating gambling activity over time among new Internet gambling service subscribers.

Enduring or escalating betting trends should be especially evident for gambling propositions that might exaggerate the potentially dangerous characteristics of Internet gambling (i.e., games that promise relatively quicker action at any time). For Internet sports gambling, live-action betting (i.e., bets made on real time propositions about outcomes within a sporting event), as opposed to fixed-odds betting (i.e., bets made on the outcomes of sporting events or games), might have more chance of inducing this effect. Online gambling that does not involve sports betting (i.e., casino-type games) might exceed even live-action in this respect; however, the investigation of Internet casino games is beyond the scope of this paper and we refer the reader to LaBrie, Kaplan, LaPlante, Nelson, and Shaffer (in press).

2. Methods

2.1. Sample

This research cohort included all persons ($N = 47{,}603$) who registered with the Internet betting service provider, *bwin* Interactive Entertainment AG (*bwin*), during February 2005. In this cohort, some players received promotional funds, but everyone in the sample deposited and played with their own monies. We monitored bettors for the next 18 calendar months, until August 31, 2006. We excluded persons who did not start to gamble until one month before the end of the study period (i.e., started gambling after July 31, 2006)

and persons who did not wager on sports during the study period. We further excluded persons who evidenced having exceptional financial means, because *bwin* exempted this subgroup from company-imposed deposit limits, which could allow for non-representative betting behaviors ($N = 6$).

The final sample for the analysis included 46,339 sports bettors, 42,590 (91.9%) men and 3749 (8.1%) women who reported ages ranging from 14 to 105 years (Mean = 30.36, SD = 9.86) from 84 countries, with the majority (57.5%) from Germany. Most bettors played both fixed-odds and live-action propositions at least once ($n = 30{,}642$; 66.1%); 14,961 (32.3%) played fixed-odds only, and 736 (1.6%) played live-action only.

2.2. Measures

Gambling behavior measures included aggregates of betting activity (i.e., number of bets and monies wagered per calendar day for both fixed-odds and live-action betting) for each bettor during the 18-month observation period.

2.3. Procedures

We conducted a secondary data analysis of an 18-month subscriber database obtained from *bwin*. We received approval from our institutional review board to conduct secondary data analyses of the available information.

2.3.1. Analyses

To generate population-level data, we first computed the number of bets and the sum of monies wagered for each bettor. We did this for each day and for each consecutive 30-day period (i.e., a prototypical "month"), starting with the individual's registration day. All bettors had at least 18 complete 30-day periods, regardless of when they registered during February. Because not everyone had a complete 19th "month" of observation, we dropped the final month from all analyses, leaving 18 periods of 30 consecutive days, which we refer to as "months" in this report.

Next, we summed the number of bets and monies wagered over the entire sample for each month and each day. We further obtained the number of active persons (i.e., persons who had at least one bet on fixed-odds or live-action in a given month or on a given day). All analyses use these sample-level sums and thus refer to betting activity during the first, second, third etc. month or day, as defined by registration day, rather than calendar dates. That is, month 1 is comprised of a range of 30-day period calendar dates that depend on population members' registration date.

We present population trends of betting activity over time for fixed-odds and live-action in the total sample and in the subgroup of the most involved bettors (MIB). As empirically justified by a scree-type analysis of centile plots (LaBrie, LaPlante et al., 2007), we defined the subgroup of MIBs as the top 1% of the sample regarding the variables of interest (i.e., number of bets and sum of monies staked). This strategy yielded four non-exclusive MIB groups: fixed-odds number of bets (FO-B; $n = 456$), fixed-odds amount of stakes (FO-S; $n = 454$), live-action number of bets (LA-B; $n = 310$), and live-action amount of stakes (LA-S; $n = 313$). We examined correlation matrices of the gambling behavior measures for months and days, fixed-odds and live-action betting, and gambling behavior measures and time.

3. Results

3.1. Betting activity: full sample

We examined the monthly and daily patterns for the total monies wagered (i.e., Stake), total number of bets (i.e., Bets), and total number of active persons (i.e., *N* Valid) using the full sample. The various measures of betting activity within game (i.e., FO and LA) all correlated at greater than .91 (Table 1), indicating that patterns of activity on all three measures were very similar. Fixed-odds and live-action betting in the full sample also correlated with each other for the various measures of betting activity (Table 2), indicating that patterns of fixed-odds and live-action activity were similar over time. For the full sample, correlations indicated decreasing gambling activity and participation over time, for both months and days (Table 3). Graphical illustration of betting activities over time shows that the greatest betting activities of the sample occurred during the very first

Table 1
Correlation matrices for fixed-odds and live-action betting behavior in the full sample

	Stake	Bets	*N* valid
Fixed-odds			
Stake	1.00	0.96	0.97
Bets	0.99	1.00	0.99
N valid	0.99	0.98	1.00
Live-action			
Stake	1.00	0.93	0.91
Bets	0.94	1.00	0.99
N valid	0.91	0.98	1.00

Values above the diagonals are days and values below the diagonals are months. For all correlations, $p < .001$.

Table 2
Correlations between fixed-odds and live-action betting behavior by time in the full sample

	Stake	Bets	*N* valid
Months	0.93	0.97	0.99
Days	0.78	0.88	0.97

For all correlations, $p < .001$.

Table 3
Correlations of fixed-odds and live-action betting behavior with time by type of game in the full sample

	Stake	Bets	*N* valid
Fixed-odds			
Months	−0.65**	−0.65**	−0.58*
Days	−0.94	−0.96	−0.95
Live-action			
Months	−0.72**	−0.59*	−0.53*
Days	−0.73	−0.83	−0.89

Unless otherwise indicated, for all correlations, $p < .001$.
* $p < .05$.
** $p < .01$.

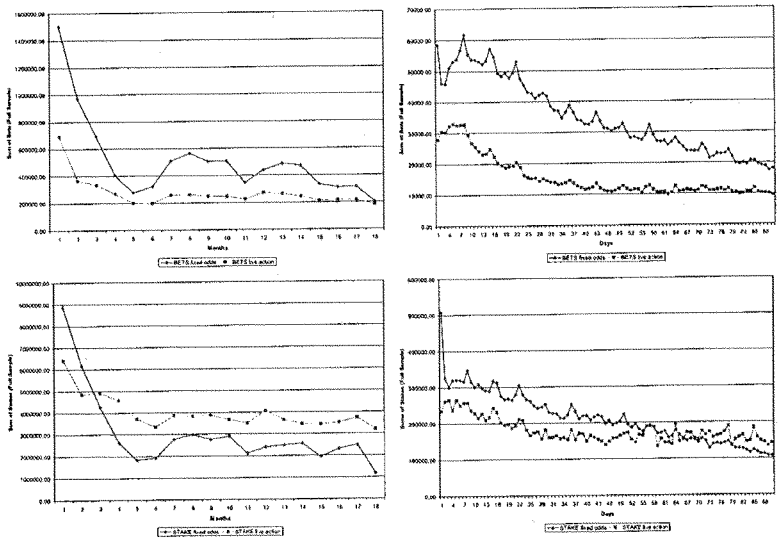

Fig. 1. Number of bets and Sum of stakes on fixed-odds and live-action by month and day for the full sample.

month, followed by a sharp decrease in betting activities during the first 6 months (Fig. 1). Thereafter, the activity fluctuated around a slightly increased level.

We examined the daily patterns of gambling behavior during the first 90 days to determine if the monthly analyses obscured any short-term trends. In general, the daily patterns confirmed that the highest betting activity of the sample occurred almost immediately, followed by a short increase for Bets (i.e., about one week), and then broader decreases in betting activity. All gambling behavior measures for fixed-odds and live-action betting showed the highest activity no later than on the eighth day. The daily patterns revealed periodic increases in betting activity about every seven days. This pattern was most evident for bets. The declines in betting activity were greater for fixed-odds than for live-action betting.

3.2. Betting activity: most involved bettors (MIBs)

We analyzed the patterns of betting activity (i.e., Stake and Bets) and participation (i.e., *N* Valid) separately for the four groups of MIBs: fixed-odds number of bets (FO-B); fixed-odds amount of stakes (FO-S); live-action number of bets (LA-B); and live-action amount of stakes (LA-S). As with the full sample, the vast majority of measures of betting activity within game (i.e., FO or LA) correlated with each other; however, unlike the full sample, the range of correlations for live-action betting was greater among the MIB groups (Table 4). In contrast with the full sample analyses, some correlations in the MIB analyses were quite small. The smallest correlation ($r = .09$) was between the number of active participants and the daily sums of live-action stakes over 18 months for the FO-S MIBs. Hence, for the complete sample the number of active bettors was nearly synonymous with the other measures. Interestingly, when we look at the MIB groups, we do not find this dominance of *N* Valid.

Compared to the full sample, betting activity on the two games over time was less consistent for the MIB groups (Table 5). Nevertheless, for most groups and variables FO *N* Valid rates and LA *N* Valid rates correlated over time. Hence, although MIB groups tended to be active on FO and LA on the same days/months, betting activity on these types of games was not necessarily synchronous (i.e., 10 of 16 correlations indicated no significant relationship between betting activities).

We observed declines in FO betting across the 18 months study period for all MIB groups (Table 6). However, the trends in LA betting across the 18 months were less consistent, and often increasing. For example, the FO-B group exhibited increases in LA Stakes and Bets over the course of the study period. Similarly, the FO-S and LA-B groups showed increases in LA Stakes during the same period. One exception was a decrease in LA Bets for the LA-S group.

During the first 90 days, FO betting activity also was inconsistent among MIBs; and, as in the analyses across months, we observed substantial increases in betting activity for a number of variables. Most notable are the increases in Bets and Stakes for the LA-B and LA-S groups, respectively. Finally, although the number of active players over time decreased for monthly and daily analyses in the full sample, the number of active MIB players did not change over time in a consistent way. Monthly and daily patterns of live-action and fixed-odds betting often conflicted for the MIB. For example, the FO-B group experienced significant decreases in FO participation across the study period, but there was no temporal relationship with LA participation during that time. Conversely,

this group evidenced no relationship between FO participation and time during the first 90 days, but showed a significant increase in LA participation during this period.

The patterns in the subgroups of the MIBs were markedly different from the full sample and each other (Figs. 2 and 3). For the two MIB Bets groups (i.e., FO-B & LA-B), compared to the generally decreasing monthly trends of fixed-odds activity, which included broad fluctuations, the monthly patterns of live-action betting were relatively flat or increasing. A closer examination revealed increasing trends in FO Bets for both groups

Table 4
Correlation matrices for fixed-odds and live-action betting behavior in the most involved bettor subgroups

	Stake	Bets	*N* valid
FIXED-ODDS			
FO-B			
Stake	1.00	0.76	0.66
Bets	0.87	1.00	0.75
N valid	0.88	0.89	1.00
FO-S			
Stake	1.00	0.79	0.78
Bets	0.82	1.00	0.69
N valid	0.85	0.92	1.00
LA-B			
Stake	1.00	0.62	0.59
Bets	0.82	1.00	0.55
N valid	0.80	0.91	1.00
LA-S			
Stake	1.00	0.40	0.47
Bets	0.88	1.00	0.50
N valid	0.83	0.94	1.00
LIVE-ACTION			
FO-B			
Stake	1.00	0.33**	0.29**
Bets	0.78	1.00	0.48
N valid	0.42ns	0.64**	1.00
FO-S			
Stake	1.00	0.39	0.46
Bets	0.48*	1.00	0.50
N valid	0.09ns	0.70	1.00
LA-B			
Stake	1.00	0.82	0.80
BETS	0.80	1.00	0.88
N valid	0.74	0.87	1.00
LA-S			
Stake	1.00	0.62	0.76
Bets	0.61**	1.00	0.62
N valid	0.55*	0.91	1.00

Values above the diagonals are days and values below the diagonals are months. Unless otherwise indicated, for all correlations, $p < .001$. ns = not significant.

* $p < .05$.

** $p < .01$.

Table 5
Correlations between fixed-odds and live-action betting behavior by time in the most involved bettor subgroups

	Stake	Bets	*N* valid
FO-B			
Months	−0.02ns	0.31ns	0.82
Days	0.32**	0.03ns	0.50
FO-S			
Months	−0.41	0.56*	0.87
Days	0.48	0.08ns	0.25*
LA-B			
Months	−0.34ns	0.35ns	0.35ns
Days	0.10ns	0.23*	0.38
LA-S			
Months	−0.09ns	0.65**	0.75
Days	0.02ns	−0.12ns	−0.07ns

Unless otherwise indicated, for all correlations, $p < .001$. ns = not significant.
* $p < .05$.
** $p < .01$.

Table 6
Correlations of fixed-odds and live-action betting behavior with time by type of game in the full sample

	Stake	Bets	*N* valid
FIXED-ODDS			
FO-B			
Months	−0.51*	−0.50*	−0.54*
Days	0.18ns	0.47	0.09ns
FO-S			
Months	−0.72**	−0.65**	−0.77
Days	−0.15ns	0.04ns	−0.41
LA-B			
Months	−0.69**	−0.68**	−0.68**
Days	−0.01ns	0.22*	−0.01ns
LA-S			
Months	−0.76	−0.85	−0.92
Days	−0.22*	−0.29**	−0.46
LIVE-ACTION			
FO-B			
Months	0.66**	0.49*	−0.01ns
Days	0.37	−0.01ns	0.38
FO-S			
Months	0.53*	0.15ns	−0.43ns
Days	0.36	−0.03ns	0.29**
LA-B			
Months	0.48*	0.20ns	0.38ns
Days	0.86	0.84	0.86
LA-S			
Months	0.04ns	−0.55*	−0.54*
Days	0.76	0.53	0.81

Unless otherwise indicated, for all correlations, <.001. ns = not significant.
* $p < .05$.
** $p < .01$.

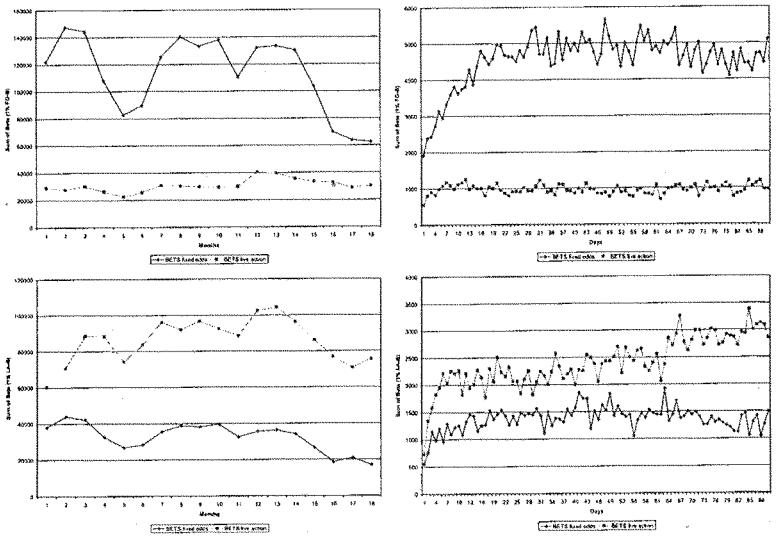

Fig. 2. Number of bets on fixed-odds and live-action by month and day for the most involved bettors on Bets.

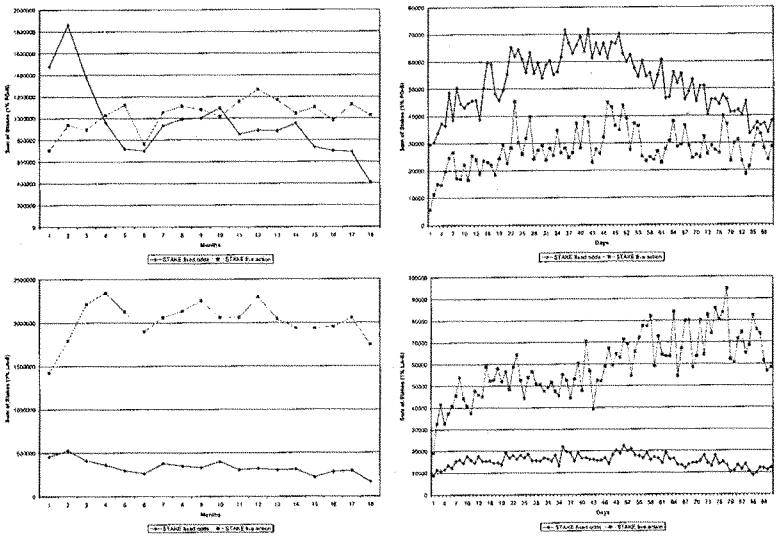

Fig. 3. Number of bets on fixed-odds and live-action by month and day for the most involved bettors on Stake.

during approximately the first 30 days, followed by leveling and indications of decreasing activity. In contrast, whereas LA Bets were unchanged over time for the FO-B group, LA Bets increased steadily during the first 90 days for the LA-B group.

For the two MIB Stakes groups (i.e., FO-S & LA-S), the monthly trends for Stakes were essentially the same as for Bets among the Bets groups. However, trends during the first 90 days were occasionally dissimilar. For example, among the FO-S group, there was a much more dramatic decrease in FO Stakes following an initial increase during approximately the first 30 days – yielding an inverse U-shaped trend. In addition, rather than staying relatively flat, during this time LA Stakes increased for the FO-S group. Trends for the LA-S groups and LA-B groups on Stakes and Bets, respectively, were similar.

4. Discussion

This study presents the first longitudinal analysis of real time Internet sports gambling behavior for a large sample of newly subscribed gamblers. Patterns of gambling behavior in our population were consistent for activity (i.e., number of bets and size of stakes) and for games (i.e., FO and LA). There were, however, notable magnitude differences over time for games: the number of bets people made for FO always exceeded those for LA, and by the third month of the study period, the amount of stakes placed on LA bets always exceeded those for FO. In other words, the population cumulatively made fewer, but larger bets on LA compared to FO. Any changes in population-level observations over time might be attributable to subscriber attrition in our population.

In the introduction, we speculated that LA betting might be riskier than FO betting. These results lend some support to this speculation because the population made fewer, but larger LA wagers. Alternatively, the results might only reflect the better odds and smaller cost of gambling on LA games (nearly 50/50). People might be wagering more on LA games because they have a greater statistical likelihood of winning. It is worth noting that earlier research indicated that fewer subscribers participated in LA than FO betting (LaBrie, LaPlante et al., 2007); so, the small number of people involved in LA betting was likely to be responsible for these higher rates.

We observed decreasing trends of gambling behavior over time. This was true for monthly and daily analyses. Actual participation (i.e., *N* Valid) also declined uniformly and most obviously during the first 90 days. Consequently, we did not find evidence to support concerns that Internet gambling will overwhelm populations of gamblers, causing escalating rates of participation, or even sustained rates of participation. Rather, our daily analyses of gambling activity indicated rapid adaptation to the new service, as illustrated by a short-term increase in activity, peaking by the eighth day of activity and rapidly declining thereafter. This pattern is consistent with prototypical adaptation curves for populations (LaPlante & Shaffer, 2007). The intra-curve peaks in activity occurred every seventh day. This pattern might reflect fan-based betting (i.e., weekly games); similar to the overall pattern for gambling, this weekly cycle also degrades over time after an initial increase in interest. Both LA and FO gambling seemed to reach a fairly stable lower level, around which population activity fluctuated. Longer term analyses will be necessary to provide important information about the stability of these initial findings.

It is important to note that the rapid adaptation observed among this population of gamblers might only generalize to people who already gamble. It is likely that the people who are new subscribers to an Internet service already have some gambling experience in their lifetime; though, there likely will be some exceptions to this rule. On the other hand, the novelty of Internet gambling is more likely the rule, and even those people who gambled previously might not have gambled exactly this way and this conveniently. Additional research on different populations is required to determine whether the observed patterns are specific to gamblers, or might generalize to people who are newly exposed to gambling and/or Internet gambling. Research on gambling exposure effects (LaPlante & Shaffer, 2007; Shaffer, Vander Bilt, & Hall, 1999; Volberg, 2002) suggest that newly exposed people might differ, by taking a longer time to adapt, from people who already gamble.

4.1. Gambling Involvement and gambling behavior over time

We identified and examined four groups of involved bettors: groups of individuals who were in the top 1% of behavioral distributions for FO Bets, LA Bets, FO Stake, and LA Stake. Previous analyses indicated that the cumulative gambling behavior of such involved bettors is distinct from the population as a whole (LaBrie, LaPlante et al., 2007). Our longitudinal analyses were consistent with these analyses. For example, whereas measures of betting activity correlated with each other within the full sample, relationships among these measures were weaker and less consistent for betting activity in the MIB groups. This was particularly evident for LA betting, indicating more independent betting activity. This observation is consistent with a greater focus and attention to the type of game of choice and betting activity among MIB groups.

Compared to the full population, we also observed greater variation in individuals' activities across game types. Whereas stakes and bets were very similar for FO and LA activity in the full sample, in the MIB groups, betting activity on one type of game was relatively independent of activity on the other game. This was apparent even though MIBs, regardless of group, tended to be active or inactive on FO and LA betting at the same time. These findings suggest that individuals who were members of MIB subgroups were not necessarily extreme in all of their betting activity on both games. Unlike in the full population, for MIB groups, elevated activity on one game did not spill over to another game.

The MIB groups also were distinct from the full population in terms of adaptation. That is, we did not always observe evidence of rapid adaptation in the MIB groups. Rather, three of the MIB groups showed escalating patterns of LA gambling behavior during the first 90 days of activity. LA betting was relatively flat during this period for the FO-B group. This contrasts sharply with population analyses, which reveal relatively sharp declines for both FO and LA activity starting by the eighth day of activity, at the latest. Hence, for very involved bettors, participation in LA gambling became increasingly attractive after their initial foray – monthly analyses indicated that these MIBs maintained their interest for the study duration. In contrast, FO behavior did not confirm an escalating trend, but more closely approximated patterns of adaptation, with longer term increases in activity evident, followed by flattening and/or decline. Adaptation, however, was not rapid as in the full sample, and this trend only seemed to emerge after 45 days or so.

4.2. Limitations

Although the findings presented here provide a unique and seminal description of actual Internet sports gambling behavior, some limitations are worth discussing. For example, we cannot determine whether the individuals who subscribed to the betting service subscribed and/or participated in multiple online gambling activities. It is possible that subscribers offset the decreases in gambling activities on this service by going to another service. If this is the case, this study would underestimate our participants' overall Internet gambling activity. We also cannot determine whether multiple individuals used the same gambling service subscription account. If so, the total number of people contributing to sums of bets and stakes would increase. Other information in our database is difficult to verify. For example, the age range for our study included ages 14–105. Although it is certainly possible for individuals of these ages to subscribe and bet, it is also possible that some of the age outliers indicate inaccurate self-reporting by subscribers.

Individuals who comprised our MIB groups could belong to multiple MIB groups. Future research should include in depth analyses of overlap among MIB groups to isolate individuals who fall in the extreme ends of distributions and determine whether their patterns of gambling are distinct from those presented here. Our findings do not specifically address issues related to gambling-related problems. Consequently, the clinical relevance of our findings is not yet known. However, from a public health perspective, the analyses presented here provide researchers, policy-makers, and public health interests with important information about how Internet gambling can influence gambling behavior. Additional studies are necessary to uncover both the implications for psychopathology and other tangible consequences of gambling-related problems, such as ruined finances and social relationships.

4.3. Concluding thoughts

Although there has been much speculation about the nature of Internet gambling and its potential effect on gamblers, to date, research on this topic has been restricted to gamblers' self-reported gambling. At the population-level, this research challenges common assumptions that Internet gambling will stimulate excessive patterns of gambling. This study revealed that new Internet gambling subscribers tended to adapt fairly quickly to betting using the service. However, for individuals who are very involved in Internet gambling (i.e., MIBs), there might still be cause for concern. Adaptation was not uniformly apparent in the population, particularly for one type of game – LA betting. Heavily involved individuals and LA betting warrant closer attention.

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References

Bulkeley, W. M. (1995). Feeling luck? Electronics is bringing gambling into homes, restaurants and planes. *Wall Street Journal.*(A7), 1. August 16.

Costello, E. J., Compton, S. N., Keeler, G., & Angold, A. (2003). Relationships between poverty and psychopathology: A natural experiment. *JAMA: Journal of the American Medical Association, 290*(15), 2023–2029.

Division on Addictions. (2007). Internet gambling: Caught in the web? *The Brief Addiction Science Information Source*, 12(4).

Federal Trade Commission. Retrieved December 20, 2003, from the World Wide Web http://www.ftc.gov/gamble.

General Accounting Office. (2002). *Internet gambling: An overview of the issues* (GAO-03-89). Washington, DC: United States General Accounting Office.

Gerstein, D., Murphy, S., Toce, M., Hoffmann, J., Palmer, A., Johnson, R. et al. (1999). *Gambling impact and behavior study: Report to the national gambling impact study commission*. Chicago: National Opinion Research Center.

Govoni, R., Frisch, G., Rupcich, N., & Getty, H. (1998). First year impacts of casino gambling in a community. *Journal of Gambling Studies, 14*(4), 347–358.

Griffiths, M. (2003). Internet gambling: Issues, concerns, and recommendations. *CyberPsychology and Behavior, 6*(6), 557–568.

Griffiths, M., Parke, A., Wood, R., & Parke, J. (2006). Internet gambling: An overview of psychosocial impacts. *UNLV Gaming Research and Review Journal, 10*(1), 27–39.

Griffiths, M. D. (1999). Gambling technologies: Prospects for problem gambling. *Journal of Gambling Studies, 15*(3), 265–283.

Griffiths, M. D. (2001). *Internet gambling: Preliminary results of the first UK.* prevalence study. Centre for addiction and mental health. Retrieved June 3, 2004, from the World Wide Web: http://www.camh.net/egambling/issue5/research/griffiths_article.html.

Grun, L., & McKeigue, P. (2000). Prevalence of excessive gambling before and after introduction of a national lottery in the United Kingdom: Another example of the single distribution theory. *Addiction, 95*(6), 959–966.

Ialomiteanu, A., Adlaf, E. M. (2002). *Internet gambling among Ontario adults.* Centre for addiction and mental health. Retrieved June 3, 2004, from the World Wide Web: http://www.camh.net/egambling/issue5/research/ialomiteanu_adlaf_article.html.

Jacques, C., & Ladouceur, R. (2006). A prospective study of the impact of opening a casino on gambling behaviours: 2- and 4-year follow-ups. *Canadian Journal of Psychiatry, 51*(12), 764–773.

Jacques, C., Ladouceur, R., & Ferland, F. (2000). Impact of availability on gambling: A longitudinal study. *Canadian Journal of Psychiatry, 45*(9), 810–815.

LaBrie, R. A., Kaplan, S. A., LaPlante, D. A., Nelson, S. E., & Shaffer, H. J. (in press). Inside the virtual casino: A prospective longitudinal study of actual Internet casino gambling. *European Journal of Public Health.*

LaBrie, R. A., LaPlante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007). Assessing the playing field: A prospective longitudinal study of internet sports gambling behavior. *Journal of Gambling Studies, 23*(3), 347–362.

LaBrie, R. A., Nelson, S. E., LaPlante, D. A., Peller, A. J., Caro, G., & Shaffer, H. J. (2007). Missouri casino self-excluders: Distributions across time and space. *Journal of Gambling Studies, 23*(2), 231–243.

LaBrie, R. A., Shaffer, H. J., LaPlante, D. A., & Wechsler, H. (2003). Correlates of college student gambling in the United States. *Journal of American College Health, 52*(2), 53–62.

Ladd, G. T., & Petry, N. M. (2002). Disordered gambling among university-based medical and dental patients: A focus on Internet gambling. *Psychology of Addictive Behaviors, 16*(1), 76–79.

LaPlante, D. A., & Shaffer, H. J. (2007). Understanding the influence of gambling opportunities: Expanding exposure models to include adaptation. *American Journal of Orthopsychiatry, 77*, 616–623.

Mitka, M. (2001). Win or lose, internet gambling stakes are high. *Journal of the American Medical Association, 285*(8), 1005.

National Research Council. (1999). *Pathological gambling: A critical review.* Washington, DC: National Academy Press.

Petry, N. M., & Mallya, S. (2004). Gambling participation and problems among employees at a university health center. *Journal of Gambling Studies, 20*(2), 155–170.

Petry, N. M., Stinson, F. S., & Grant, B. F. (2005). Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: Results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry, 66*(5), 564–574.

Room, R., Turner, N. E., & Ialomiteanu, A. (1999). Community effects of the opening of the Niagara casino. *Addiction, 94*(10), 1449–1466.

Shaffer, H. J., & Hall, M. N. (2001). Updating and refining prevalence estimates of disordered gambling behaviour in the United States and Canada. *Canadian Journal of Public Health, 92*(3), 168–172.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canada: A meta-analysis.* Boston: Presidents and Fellows of Harvard College.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89*(9), 1369–1376.

Shaffer, H. J., LaBrie, R., LaPlante, D., Nelson, S. E., & Stanton, M. V. (2004). The road less traveled: Moving from distribution to determinants in the study of gambling epidemiology. *Canadian Journal of Psychiatry, 49*(8), 504–516.

Shaffer, H. J., Vander Bilt, J., & Hall, M. N. (1999). Gambling, drinking, smoking, and other health risk activities among casino employees. *American Journal of Industrial Medicine, 36*(3), 365–378.

Stucki, S., & Rihs-Middel, M. (2007). Prevalence of adult problem and pathological gambling between 2000 and 2005: An update. *Journal of Gambling Studies, 23*(3), 245–257.

Volberg, R. A. (2002). *Gambling and problem gambling in Nevada.* Northampton, MA: Gemini Research Ltd.

Wallisch, L. S. (1996). *Gambling in texas: 1992 Texas survey of adult and adolescent gambling behavior.* Austin: Texas Commission on Alcohol and Drug Abuse.

Woodruff, C., & Gregory, S. (2005). Profile of internet gamblers: Betting on the future. *UNLV Gaming Research and Review Journal, 9*(1), 1–14.

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ORIGINAL PAPER

Real Limits in the Virtual World: Self-Limiting Behavior of Internet Gamblers

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Abstract The recent expansion of Internet gambling has stimulated debate, policy, and research on this relatively new phenomenon and its potential consequences. The current study focuses on bettors experiencing problems by sampling Internet gamblers who imposed limits on the amount they were allowed to deposit to a betting site. We analyzed the betting transactions over 18 months of all gamblers who subscribed to an online betting site in February, 2005 ($N = 47{,}134$), 567 of whom utilized the site's self-limit feature. Self-limiting gamblers played a wider variety of games and placed more bets than others prior to imposing limits. After imposing limits, self-limiters reduced their activity, but did not reduce the amount they wagered per bet. Time spent gambling, not just money spent, appears to be an important indicator of gambling problems. Self-limit programs appear to be promising options for Internet gamblers at-risk for gambling problems.

Keywords Gambling · Internet gambling · Gambling problems · Self limits · Harm reduction

Introduction

The advent and expansion of Internet gambling during the past decade has caused considerable controversy among policymakers (e.g., Richtel 2004), advocates (e.g., No More Gambling 2005), and researchers alike (e.g., Smeaton and Griffiths 2004). User anonymity, increased access to gambling, and lack of regulation of online betting services raise

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suspicions that Internet gambling might facilitate the development of gambling-related problems (Griffiths 2003). Given the number of poor mental health outcomes associated with disordered gambling, the potential that Internet gambling can lead to gambling problems is a significant public health concern (Petry 2006).

Research on Internet Gambling

Speculation about the risks of Internet gambling is abundant, but there is little consensus about the prevalence of Internet gambling (estimates range from 0.2% in the UK to 36.5% among Detroit casino-goers; American Gaming Association 2006; Griffiths 2001; Ialomiteanu and Adlaf 2002; LaBrie et al. 2003; Ladd and Petry 2002; Meerkerk et al. 2006; Petry 2006; Petry and Mallya 2004; Welte et al. 2002; Woodruff and Gregory 2005). Further, there is very little research about the prevalence of disordered Internet gambling. Three published studies (Ladd and Petry 2002; Petry 2006; Petry and Mallya 2004), all using convenience samples, have investigated the relationship between Internet gambling and gambling problems. One of these studies found that among a sample of people seeking free or reduced-cost treatment at a health care center, participants who reported Internet gambling endorsed more gambling problems according to the South Oaks Gambling Screen (SOGS: Lesieur and Blume 1987) than other gamblers (Ladd and Petry 2002); another found that, among a similar sample of people seeking health care, disordered gamblers (i.e., those endorsing 5+ criteria on the SOGS) were more likely to report Internet gambling than other gamblers (Petry 2006); the last found no relationship between Internet gambling and SOGS scores among health center employees (Petry and Mallya 2004). All of these studies relied on self-reported gambling behavior.

The first empirical study of actual Internet gambling behavior (LaBrie et al. 2007a) examined the betting behavior during eight months of more than 40,000 online gamblers who subscribed consecutively to an Internet betting service. The study found that Internet sports gamblers typically made a few small bets every four or five days, and that those who bet the most were not necessarily the bettors who lost the most. Only a few bettors (i.e., approximately 1% for each variable) deviated from this basic pattern. The authors concluded that detecting problem gamblers might require knowing more than their typical gambling behavior; unusual patterns of play and changes in behavior could contribute to improving identification. A consequent study confirmed this suspicion; among the same sample of Internet betting service subscribers, most subscribers adapted their behavior by reducing their participation, bets, and bet size, but heavily involved bettors failed to adapt, instead maintaining a high level of involvement (LaPlante et al. 2008).

One way to identify people for whom gambling has become problematic, both on land and online, is to study people who seek treatment or employ self-help strategies for their gambling behavior (LaBrie et al. 2007b). Self-exclusion and self-limit programs employed by casinos are two examples of self-help programs whose enrollees likely have problems with gambling.

Self-Exclusion and Self-Limit Programs: Land-Based Casinos

Self-exclusion and self-limit programs have become popular tools for casinos attempting to provide responsible gaming services to their patrons. Self-exclusion programs allow patrons to ban themselves from casinos (see Napolitano 2003; Nowatzki and Williams 2002), requesting that these casinos do not allow them on the premises or accept their money and, in some cases, that their trespass result in criminal prosecution (e.g., the

Missouri Voluntary Exclusion Program: LaBrie et al. 2007b; Nower and Blaszczynski 2006). Self-limit programs, enforced by casinos, allow patrons to impose limits on certain gambling-related activities (e.g., the ability to cash checks or obtain credit at a given casino: American Gaming Association 2003). Though self-exclusion and self-limit programs are not equivalent and likely attract different clientele, both serve gamblers who are seeking help to regulate their gambling behavior.

Research about self-exclusion programs has demonstrated that, not surprisingly, the majority of people who utilize the service meet criteria for having clinically significant problems with gambling (Ladouceur et al. 2000), and that self-exclusions, to some extent, increase with closer gambling proximity and greater availability (LaBrie et al. 2007b). These findings support the concept that self-exclusion is a good indicator that gambling problems are present among those seeking exclusion.

Self-limit programs, which might be considered a harm reduction technique, likely attract people with gambling problems who wish to regulate better, but not necessarily stop, their gambling. However, prior to this report, there has been no published empirical research about self-limit programs or their enrollees.

In addition to serving as potentially useful markers of samples with gambling problems, self-exclusion and self-limit programs can be evaluated to assess their effectiveness in reducing or eliminating gambling problems. As stated above, to date, no empirical research has been conducted on self-limit programs. The one available *longitudinal* study of casino self-exclusion found that participants, interviewed 6–24 months after self-excluding, were generally satisfied with the program and reported a reduction in gambling problems after joining the program (Ladouceur et al. 2007).

Self-Exclusion and Self-Limit Programs: Applications to Internet Gambling

Until now, no research has examined how self-exclusion and self-limit tools might extend to online gambling. As part of a research collaboration with the Division on Addictions, the online betting company, *bwin* Interactive Entertainment, AG (*bwin*) implemented a self-limit program. At the time of this study, *bwin* had a default limit on deposits €5,000 in a 30 day period and €1,000 in a 24-h period. Through the *bwin* self-limit program, subscribers can impose lower limits on the amount they are allowed to deposit in a given month; the company computer system then enforces these limits. Our interest in this potentially at-risk population segment (i.e., subscribers who impose self-limits) rests on the assumption that self-imposition of limits, similar to enrollment in self-exclusion and self-limit programs in land-based casinos, could be an indicator of potential disordered gambling. Subscribers who impose limits on their online gambling accounts likely recognize that they are, or perhaps have been in the past, (a) capable of gambling more than they intend, (b) not able to control their gambling involvement without help, and/or (c) at-risk for excessive gambling. Given the possibility that this population segment has experienced these or other gambling concerns or problems, examining their gambling behavior prior to initiating self-limits might provide information about how disordered gambling manifests among online gamblers. In turn, examining how that behavior changes after adopting lower limits will measure the effectiveness of a self-limit strategy.

Current Study

The current study investigates the prospective longitudinal gambling behavior of *bwin* subscribers who elected to self-limit their gambling expenditures. The database for this

study consists of the daily aggregate of individuals' betting transactions and avoids the inaccuracies incumbent in self-report. Based on the assumptions listed above, we hypothesized that subscribers who imposed self-limits would be more heavily involved than other subscribers in Internet gambling prior to self-limiting their gambling behaviors, and that their gambling behaviors would improve (i.e., decreased stakes, bets, and frequency of betting) after the imposition of limits. We also explored how self-limitation related to type of bets placed (i.e., fixed-odds or live-action sport betting, poker, or other games).

Method

Participants

Participants included 47,603 Internet gamblers who subscribed to *bwin* during February 2005 and placed bets on that site between February 2005 and September 2006. We excluded participants who had not placed a bet by August 1st, 2006 to ensure at least a month of exposure after active betting behavior began. This reduced the sample to 47,478 subscribers. Five hundred and ninety-three of those subscribers imposed self-limits on their accounts between the beginning of November 2005—when *bwin* implemented their self-limit policy—and the end of March 2006. This sampling time period allowed us to measure these participants' gambling behavior for at least six months after they had elected self-limits. We excluded participants who placed limits on their accounts between April 1st 2006 and August 31st 2006, as well as participants who placed self-limits on their accounts that were the same or higher than *bwin*-imposed limits, resulting in a final sample of 47,134 [567 self-limiters (1.2%) and 46,567 other subscribers (98.8%)].

Though the vast majority of *bwin* subscribers engage primarily in sports betting, subscribers also can engage in other activities, such as casino games or poker. Within the sample of 47,134, there were 12,121 subscribers (25.7%) who played games on the site in addition to or instead of placing fixed-odds and/or live-action wagers on sport events.

Procedures

We obtained from *bwin* de-identified datasets of all transactions made on their site over the 18 month study period by individuals who subscribed to the betting service during February, 2005. We obtained approval from the Cambridge Health Alliance Institutional Review Board to conduct secondary data analyses on these datasets.

Measures

The daily aggregate betting database provided by *bwin* includes information necessary to create variables measuring betting behavior. These include days from first to last bet within the 18 month time period of the study (i.e., duration), percents of days on which a bet was placed within that duration (i.e., frequency), number of bets placed per day (i.e., bets/day), average bet size (i.e., stakes/bet), stakes wagered (i.e., total wagered), stakes wagered minus winnings (i.e., net loss), and net loss divided by amount wagered (i.e., % loss). The database also provides information about demographics and types of games played. In this paper, we focus on two forms of sports gambling—fixed-odds, and live-action—as well as betting on poker and other games (e.g., casino, lottery). Fixed-odds betting refers to the

more familiar type of sports wager in which players bet on the outcome of future athletic events. Live-action bets can be placed in real time on propositions posed by *bwin* while the sporting event is in progress (e.g., who will score the next goal). Fixed-odds bets are relatively slow-cycling betting propositions. The bets can be made well in advance of the event and the outcome of bets made just before the event begins may not be known for hours. Live-action sports betting provides many relatively quick-paced betting propositions. For both types of bets the players accept the payoff offered at the time of the bet. The other games available at *bwin* include casino games, supertoto, soft games, lottery, flash casino, and poker.

Analysis Plan

We first aggregated daily betting behavior and derived measures for self-limiting subscribers before and after they first imposed limits. Because the time periods of pre-limit and post-limit betting varied for each self-limiting subscriber and were not directly comparable to the betting time periods of subscribers who did not utilize self-limits, we focused our analysis on betting behaviors that were averages (e.g., bets/day) or proportions (e.g., % loss) rather than sums (e.g., total number of bets). We also created variables that controlled for duration, as we describe in more detail later.

We conducted descriptive analyses of the characteristics of self-limiting subscribers compared to the rest of the sample, as well as the limits they imposed. Next, we compared the pre-limit behavior of self-limiting subscribers to the rest of the sample. We then examined the change in the betting behavior of self-limiters after they imposed limits. We conducted all of these analyses separately for participants' live-action and fixed-odds betting, as well as their betting on poker and other games (i.e., casino, supertoto, soft-games, lottery, and flash games combined). We also conducted analyses examining the change in betting behavior of self-limiting subscribers by their preferred game, defined as the game on which they wagered the most money. Subscribers who did not have pre-limit data for a given game were excluded from comparisons to the rest of the sample. Subscribers who did not have both pre-limit and post-limit data for a given game were excluded from pre-post analyses. To adjust for the number of comparisons (i.e., approximately 60 primary comparisons), we utilized a Bonferroni correction resulting in an alpha level for each test of $p = .0009$, which we rounded to $p < .001$, to obtain a study-wide alpha level of $p < .05$.

Results

Five hundred and sixty-seven subscribers to *bwin* (1.2% of the final sample) chose to impose self-limits between November 1st, 2005 and March 31st, 2006. Self-limits, which subscribers imposed on the amount they were allowed to deposit within a 30 day period, ranged from €9.27 to €4,177.55. Approximately seven percent (7.1%) of self-limiters (SLs) placed limits on their accounts prior to engaging in any betting, and 10.6% ceased all betting after imposing self-limits.

Four hundred and ninety-eight (87.8%) of SLs made no further changes to their self-imposed limits during the course of the study (i.e., by the beginning of September, 2006). Fifty-two SLs (9.2%) changed their self-limit once, 6 (1.1%) changed their limits twice, and 11 (1.9%) changed their limits three or more times. SLs who changed their limits only once tended to decrease the amount they were allowed to deposit (41 of 52, 78.8%); those

who changed their limit more than once tended to fluctuate (16 of 17 fluctuated; the other increased steadily).

Self-Limiter Demographics

SLs came from 20 different countries; the five most prevalent countries of residence were Germany (61.2%), Turkey (7.2%), Poland (6.5%), France (6.3%), and Spain (3.4%). These were also the five most prevalent countries of residence in the rest of the sample (i.e., non-SLs). Compared to non-SLs, SLs were slightly younger ($M = 29.3$, compared to $M = 30.4$, $t[47132] = 2.53$, $p < .05$), and slightly more likely to be male, (95.9% compared to 91.7%, $\chi^2[1] = 13.30$, $p < .01$), though these findings did not reach significance at $p < .001$.

Self-Limiter Game Choices

All but five SLs placed fixed-odds bets (99.1%); this proportion was only slightly higher than that of non-SLS (96.0%, $\chi^2[1] = 14.1$, $p < .001$). However, 81.7% of SLs placed live-action bets, compared to only 65.8% of other subscribers, $\chi^2(1) = 63.0$, $p < .001$. More than 30% (31.4%) of SLs played other games online at *bwin*, compared to 25.6% of other subscribers, $\chi^2(1) = 9.7$, $p < .01$. Figure 1 illustrates the pattern of games played by SLs and non-SLs. On average, SLs played 2.5 types of games (including fixed-odds and live-action betting), compared to an average of 2.1 games for non-SLs, $t(47132) = 9.57$, $p < .001$.

Self-Limiter Pre-Limit Gambling Behavior

Five hundred and twenty-seven SLs (92.9%) placed bets prior to imposing limits on their play. The average duration from first bet to self-imposition of limits for these 527 was 213 days (median = 247 days). For comparison, the study duration was 549–577 days,

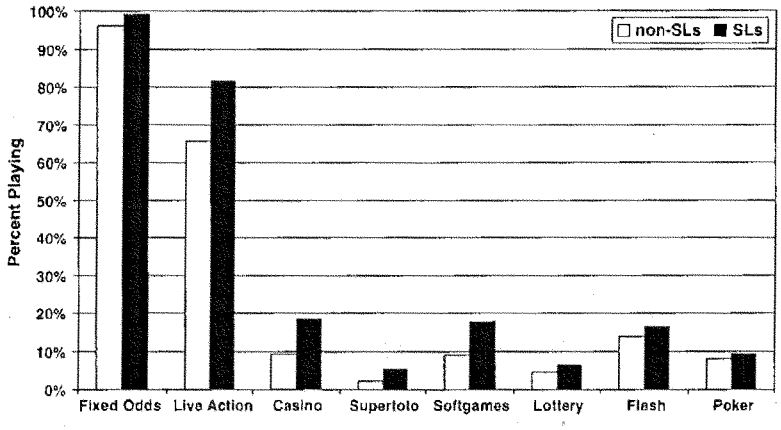

Fig. 1 Game choice of SLs and non-SLs. SL = self-limiter; non-SL = non-self-limiter (i.e., rest of the sample)

depending on date of enrollment, and the average duration from first to last bet in the entire sample was 299 days (median = 350 days).

We first compared SLs' behavior to that of non-SLs for all sports gambling, and then compared their behavior to that of non-SLs for fixed-odds and live-action betting separately. We also compared SL's and non-SL's behavior for poker and for other games (i.e., casino, softgames, supertoto, flash, and lottery).

For combined betting on both fixed-odds and live-action propositions, prior to imposing self-limits, SLs bet on more days within their interval of betting and placed more bets per day than non-SLs. However, they wagered less money per bet. Their total wagered and net loss were not significantly different from non-SLs ($M = 3224.98$ vs. $M = 2724.81$, $t[45960] = 0.94$, $p > .05$, and $M = 362.98$ vs. $M = 253.78$, $t[45960] = 2.15$, $p > .01$, respectively), even though they did not have the full range of possible betting days afforded the rest of the sample (i.e., their duration could only entail the time from registration to limit-setting, whereas non-SLs' duration entailed the time from registration until either account close or the end of the study). To correct for this, we created two variables, net loss divided by duration and amount wagered divided by duration. On these variables, SLs and non-SLs did not differ significantly. Finally, SLs' % loss was similar to that of non-SLs. Table 1 summarizes these findings.

Separate comparisons of fixed-odds and live-action betting revealed similar patterns. Almost everyone placed fixed-odds bets (SLs = 98.7%; non-SLs = 96.0%) and fixed-odds betting mirrored the pattern of significant differences observed for total sports wagering; SLs bet more frequently and made more but smaller bets per day than non-SLs. Prior to placing their limits, live-action betting was more popular among SLs (75.3%) than non-SLs (65.8%), $\chi^2(1) = 21.2$, $p < .001$. For live-action betting, SLs also placed more bets per day but wagered less money per bet than non-SLs. However, the live-action frequency did not differ significantly between SLs and non-SLs (see Table 1).

SLs who played poker prior to placing limits (5% of SLs) did not differ significantly on any of the available poker variables from non-SLs who played poker (8% of non-SLs). The 22% of SLs (prior to placing limits) and 22% of non-SLs who played other games (i.e., casino, supertoto, flash, lottery, and/or softgames) did not differ significantly on any variables related to those other games except the amount wagered per bet. Non-SLs wagered more per bet on other games than SLs (see Table 1).[1]

Though the comparisons between SLs and non-SLs detected statistically reliable differences, the effect sizes, presented in Table 1, indicate that all of these differences were small.

Self-Limiter Post-Limit Gambling Behavior

Five hundred and seven SLs (89.4%) continued to bet after imposing limits on their play. We first compared SLs' post-limit behavior to their pre-limit behavior for combined sports gambling, and then compared their behavior for fixed-odds and live-action betting, as well

[1] Previous analysis of this sample (LaBrie et al. 2007) empirically established that the top 1% of the sample on certain variables exhibited behavior that was extreme compared to the rest of the sample. Based on that finding, we repeated the comparisons between SLs and non-SLs presented in Table 1 excluding non-SLs whose bets per day, stakes per bet, total wagered, or net loss placed them in the top 1% of the sample. (Frequency and % loss did not exhibit the same discontinuous distribution.) This resulted in 1,410 non-SLs being excluded. These comparisons revealed a pattern of differences identical to the pattern presented in the Table with the following exception: for live-action betting and betting on other games, euros per bet were no longer significantly different between SLs and non-SLs.

Table 1 Gambling behavior of SLs before imposing limits, compared to the rest of the sample

Variable	All sports betting *M*(SD)			Fixed-odds betting *M*(SD)			Live-action betting *M*(SD)			Poker[a] *M*(SD)			Other games *M*(SD)		
	SL pre-limit (n = 522)	Non-SL (n = 45,439)	η^2	SL pre-limit (n = 520)	Non-SL (n = 44,705)	η^2	SL pre-limit (n = 397)	Non-SL (n = 30,626)	η^2	SL pre-limit (n = 30)	Non-SL (n = 3,703)	η^2	SL pre-limit (n = 121)	Non-SL (n = 10,657)	η^2
Frequency	33.42* (29.72)	28.05* (29.89)	0.0004	32.62* (30.28)	26.60* (29.32)	0.0004	34.12 (34.38)	33.04 (37.57)	<0.0000	–	–	–	43.26 (41.20)	42.55 (41.71)	<0.0000
Bets/day	6.72* (6.74)	4.76* (5.00)	0.0010	4.69* (5.21)	3.70* (4.01)	0.0004	5.45* (5.44)	3.97* (4.10)	0.0009	–	–	–	19.93 (19.06)	20.04 (17.08)	<0.0000
Stakes/bet (Euros)	6.57* (11.12)	12.00* (30.08)	0.0025	6.15* (10.51)	11.46* (30.85)	0.0027	7.73* (15.28)	11.05* (24.82)	0.0006	–	–	–	14.01* (41.67)	31.44* (171.14)	0.0016
Wagered/ duration	16.90 (55.81)	16.06 (73.11)	<0.0000	7.00 (14.86)	8.80 (35.67)	0.0002	17.40 (59.29)	16.55 (81.05)	<0.0000	23.50 (26.58)	41.50 (201.61)	0.0025	159.29 (1093.40)	172.81 (1184.23)	<0.0000
Netloss/ duration	3.00 (9.93)	3.75 (24.77)	0.0001	2.09 (8.39)	3.07 (23.19)	0.0001	1.71 (7.00)	2.33 (20.24)	0.0001	7.82 (15.77)	7.56 (88.90)	<0.0000	7.02 (36.84)	11.69 (62.79)	0.0002
% Loss	0.25 (0.37)	0.29 (0.49)	0.0001	0.28 (0.49)	0.31 (0.55)	<0.0000	0.19 (0.43)	0.23 (0.59)	0.0001	0.30 (0.30)	0.26 (0.60)	0.0002	0.20 (0.28)	0.20 (0.45)	<0.0000

Note: SL = self-limiter; non-SL = rest of the sample. Frequency = percent of days within interval from first to last bet (or first bet to limit imposition for pre-limit behavior of SLs) on which a bet was placed; Wagered = total amount wagered; Net loss = sum of wagers minus sum of winnings; % Loss = net loss/amount wagered; Duration = interval from first to last bet. Bonferroni correction resulted in an alpha criterion of .001 for significance

* Significant difference between SLs and non-SLs, $p < .001$

[a] Information for poker limited to aggregate wager and winning amounts

as poker and other games separately. Finally, we considered SLs' pre- and post-limit betting behavior on their preferred game, defined as the game on which they wagered the most money prior to imposing limits.

Generally, SLs' behavior after imposing self-limits moved in the direction of fewer bets and less money bet. As Table 2 shows, overall, SLs significantly reduced their number of sports bets per day after imposing self-limits. Amount wagered on sports bets, controlling for duration, also decreased. Frequency of betting days, amount wagered per bet, net loss, and % loss did not change for overall sports betting.

Table 2 also summarizes separate comparisons of fixed-odds and live-action betting, as well as poker and other games. Fixed-odds betting demonstrated a similar pattern of change to that found for overall sports betting. For fixed-odds betting, SLs reduced the frequency of days on which they bet, placed fewer bets per day, and reduced their total amount wagered, controlling for duration, after imposing limits. For live-action betting, poker, and other games, SLs who continued to play did not significantly change their behavior after imposing limits; this might be due, particularly for poker and other games, to the limited number of cases in these subsamples.

As measured by the amount they wagered on each game, the majority of SLs preferred fixed-odds (64.1%) or live-action (22.4%) betting prior to imposing limits. Less than 2% (1.9%) preferred poker, and 9.9% preferred other games. Analysis of post-limit changes in betting behavior by preferred game did not reveal any unique trends. SLs significantly reduced the number of bets they placed per day on their preferred game after imposing limits. Their frequency of betting, and the overall amount they wagered also decreased, but these decreases did not reach significance ($.001 < p < .01$). SLs did not alter the size of their bets and their net loss and % loss did not change (see Table 3).

Self-Limiter Post-Limit Strategies: Abstinence vs. Harm Reduction

Some differences between fixed-odds, live-action, and other forms of betting behavior before and after self-limits possibly reflect different player strategies to stop or limit play on these different types of betting. The previous analyses examined behavior only from individuals who continued to engage in each type of betting after imposing limits. To address this issue, we compared the proportion of SLs who initiated and ceased different types of betting before and after imposing limits (see Fig. 2), and also investigated whether SLs' preferred game changed after imposing limits (see Table 4).

SLs' likelihood to stop betting on a given game after imposing limits differed significantly by game ($\chi^2(3) = 22.2$, $p < .001$). More SLs stopped placing bets on live-action after imposing limits (20.9%) than stopped placing bets on fixed-odds (13.8%). SLs who played poker or other games were even more likely to stop play on those games after imposing limits—23.3% and 31.4%, respectively. Figure 2 displays pre- and post-limit play for fixed-odds, live-action, poker, and other games. The percentages in the figure differ from percentages presented above because the percentages presented above consider all SLs who played a given game prior to imposing limits, whereas the percentages in the figure reflect all SLs who played a given game either before or after imposing limits.

Analyses by preferred game revealed that the majority of players continued to prefer the same game after imposing limits, but that the proportion who stopped betting or switched their preferred game differed by type of game ($\chi^2(16) = 542.6$, $p < .001$). Three quarters of SLs who initially preferred fixed-odds betting continued to prefer fixed-odds after imposing limits, and 11% stopped betting. However, only 64% of preferred live-action

Table 2 Gambling behavior of SLs before and after imposing limits

Variable	All sports betting *M*(SD) [*n* = 461]			Fixed-odds betting *M*(SD) [*n* = 448]			Live-action betting *M*(SD) [*n* = 314]			Poker[a] *M*(SD) [*n* = 23]			Other games *M*(SD) [*n* = 85]		
	SL pre-limit	SL post-limit	η^2	SL pre-limit	SL post-limit	η^2	SL pre-limit	SL post-limit	η^2	SL pre-limit	SL post-limit	η^2	SL pre-limit	SL post-limit	η^2
Frequency	32.45 (29.20)	28.88 (25.99)	0.0100	31.85* (29.80)	25.19* (23.85)	0.0340	33.79 (33.66)	32.26 (33.41)	0.0010	–	–	–	39.12 (39.11)	29.32 (34.23)	0.0340
Bets/day	6.88* (6.84)	5.88* (6.87)	0.0350	4.82* (5.39)	3.91* (4.57)	0.0500	5.81 (5.64)	4.98 (6.24)	0.0300	–	–	–	19.33 (17.50)	13.73 (11.63)	0.0870
Stakes/bet (Euros)	6.54 (11.35)	7.41 (13.29)	0.0080	5.98 (10.59)	6.34 (10.36)	0.0020	8.18 (16.51)	8.92 (16.45)	0.0030	–	–	–	13.53 (30.57)	12.38 (31.06)	0.0010
Wagered/ duration	17.77* (59.03)	12.63* (33.71)	0.0100	7.10* (15.44)	4.31* (8.91)	0.0340	20.39 (66.18)	15.39 (43.23)	0.0060	21.12 (25.75)	21.50 (30.78)	<0.0000	76.02 (181.27)	64.10 (227.00)	0.0030
Netloss/ duration	3.02 (10.24)	2.56 (8.98)	0.0010	2.04 (8.80)	1.18 (5.13)	0.0070	2.17 (7.38)	3.65 (20.29)	0.0050	4.02 (5.54)	2.37 (3.60)	0.0880	3.66 (8.62)	3.86 (12.84)	<0.0000
% Loss	0.23 (0.36)	0.25 (0.49)	<0.0000	0.26 (0.47)	0.26 (0.57)	<0.0000	0.19 (0.40)	0.23 (0.45)	0.0050	0.26 (0.28)	0.18 (0.21)	0.1080	0.14 (0.23)	0.22 (0.27)	0.0590

Note: SL = self-limiter; non-SL = rest of the sample. Frequency = percent of days within interval from first to last bet (or first bet to limit imposition for pre-limit behavior of SLs) on which a bet was placed; Wagered = total amount wagered; Net loss = sum of wagers minus sum of winnings; % Loss = net loss/amount wagered; Duration = interval from first to last bet. Bonferroni correction resulted in an alpha criterion of .001 for significance

* Significant difference between pre-limit and post-limit, $p < .001$

[a] Information for poker limited to aggregate wager and winning amounts

Table 3 Gambling behavior of SLs on preferred game before and after imposing limits. [*M*(SD)]

Variable	SL pre-limit	SL post-limit	η^2
Frequency ($N = 441$)	32.52 (30.08)	27.80 (26.30)	0.0160
Bets/day ($N = 441$)	7.79 (9.42)*	6.28 (7.91)*	0.0460
Stakes/bet (Euros) ($N = 441$)	9.20 (19.01)	9.48 (20.16)	<0.0000
Wagered/duration ($N = 452$)	29.34 (97.79)	18.64 (61.89)	0.0170
Net loss/duration ($N = 452$)	3.31 (10.47)	3.23 (17.25)	<0.0000
% Loss ($N = 452$)	0.22 (0.35)	0.21 (0.52)	<0.0000

Note: SL = self-limiter; non-SL = rest of the sample. Frequency = percent of days within interval from first to last bet (or first bet to limit imposition for pre-limit behavior of SLs) on which a bet was placed; Wagered = total amount wagered; Net loss = sum of wagers minus sum of winnings; % Loss = net loss/amount wagered; Duration = interval from first to last bet. *N*'s differ for each analysis because three variables were not available for SLs who preferred poker. Bonferroni correction resulted in an alpha criterion of .001 for significance

* $p < .001$

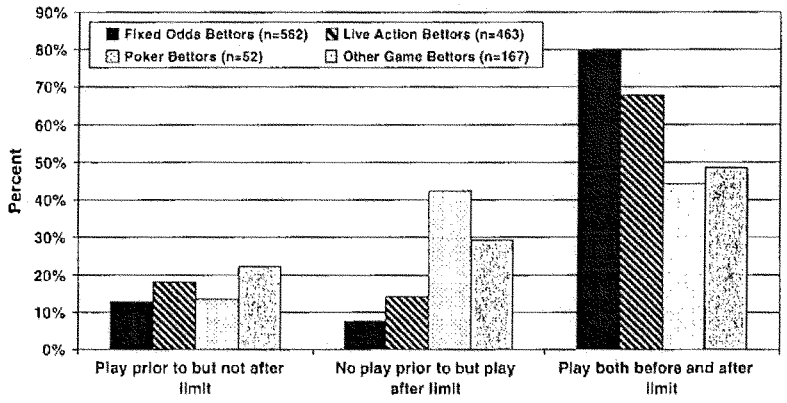

Fig. 2 Play patterns of self-limiters before and after imposing limits. The *y*-axis refers to percent of SLs playing the given game who fell into the given category on the *x*-axis

bettors continued to prefer live-action after imposing limits—21% switched to fixed-odds, and 13% stopped betting. See Table 4.

Discussion

Previous research with this sample of *bwin* subscribers has shown that, as a whole, the sample demonstrates relatively moderate betting behavior, as demonstrated by frequency of betting (i.e., less than half of available days and fewer than 4 bets per betting day) and amount bet (i.e., <5 Euros per bet) (LaBrie et al. 2007a). The current study focused on a sub-sample who likely experienced or were at-risk for gambling problems: subscribers who placed limits on the amount they could deposit into their *bwin* betting account. Analyses of these subscribers' betting behavior before and after they placed self-limits confirmed our

Table 4 Preferred games of SLs before and after imposing self-limits

Preferred game prior to self-limit	Preferred game after self-limit				
	None (no bets placed)	Fixed-odds	Live-action	Poker	Other games
None (no bets placed)	0 (0.0%)	24 (60.0%)	13 (32.5%)	0 (0.0%)	3 (7.5%)
Fixed-odds	37 (10.9%)	**252 (74.6%)**	37 (10.9%)	2 (0.6%)	10 (3.0%)
Live-action	16 (12.6%)	27 (21.3%)	**81 (63.8%)**	2 (1.6%)	1 (0.8%)
Poker	0 (0.0%)	1 (10.0%)	0 (0.0%)	**8 (80.0%)**	1 (10.0%)
Other games	6 (11.5%)	8 (15.4%)	6 (11.5%)	6 (11.5%)	**26 (50.0%)**

Note: SL = self-limiter. Preferred game = game on which most money wagered. Percentages use number of SLs who played a given game prior to imposing self-limits as the denominator. Bold numbers indicate SLs who maintained stable preferences from pre- to post-limit

hypotheses that their betting behavior was meaningfully different from that of other subscribers who did not place limits on their account deposits; these results also confirmed that SLs altered that behavior after imposing limits. In addition, these analyses allowed us to determine what types of behaviors might be markers of risk for gambling problems and whether SLs' game preferences differed from the rest of the sample.

Activity vs. Expenditure

The overall pattern that emerged across analyses was that SLs were more active bettors than the rest of the sample across a variety of measures. They placed less money at stake per bet and did not lose a greater percent of their wagers than the rest of the sample, but they were more likely to bet on live-action in addition to fixed-odds propositions and more likely to play other games at *bwin*. In addition, they placed more bets, and they bet on more of the days during which their account was active, though these differences were small.

These findings indicate that *involvement*, as measured by the time spent engaging in gambling behaviors might be as important a potential indicator of gambling problems as money wagered or lost. Indeed, previous research has shown that gambling expenditure and frequency are strong *independent* predictors of gambling problems (Currie et al. 2006). Inclusion of time spent engaging in gambling as another criterion for diagnosis of disordered gambling could help clinicians and public health practitioners to identify a wider range of disordered gamblers in need of treatment services. People who exhibit disordered gambling because of time spent gambling and not due to money lost or wagered might represent a subtype of disordered gamblers with unique treatment needs. As with other expressions of addiction (e.g., substance use disorders), disordered gambling supplants other previously valued and important activities and relationships (e.g., time with family, work, hobbies, etc.) with gambling activity. Thus, over-involvement in gambling activities might have as much potential to destroy these relationships as money lost from gambling.

Game Type

As noted above, SLs were more likely to engage in live-action betting than the rest of the sample. Live-action betting is rapid-cycling and provides nearly immediate results. This type of betting might be riskier for some subscribers because of these characteristics, which allow for continued play without much reflection. In contrast to fixed-odds betting, SLs who continued to play live-action after imposing limits did not significantly alter their

betting behavior. However, it is notable that SLs who played both games were more likely to cease live-action play after imposing their limits than to cease fixed-odds play, suggesting that players considered live-action play more perilous.

SLs and non-SLs who played other games, a small proportion of the total sample, did not differ in their betting behavior on those games, and SLs did not significantly alter their betting on those games after imposing limits. However, SLs were more likely than non-SLs to play these other games, again indicating *level of involvement* (i.e., number of types of games played) as a possible risk marker for gambling problems.

SLs' preferred game type tended to remain consistent before and after they placed self-limits. However, SLs who initially preferred live-action or betting on other games were more likely to either stop gambling or switch their preference to fixed-odds than other SLs. This might indicate that these SLs recognized that these games were more risky for them than fixed-odds betting.

Self-Limits as a Self-Help Tool?

Like land-based casino self-limit and self-exclusion programs, *bwin*'s self-limit option allows subscribers to seek help in controlling their gambling behavior by establishing external controls. Research about the effectiveness of self-exclusion programs is limited but promising (see Ladouceur et al. 2007), and research about self-limit programs, online or otherwise, is non-existent.

A limited number of *bwin* subscribers (approximately 1.2%) participated in the self-limit program. To date, we cannot determine whether this is because of the nature of the program provided by *bwin*, general hesitancy to self-limit online gambling behavior, the absence of need, or other reasons. Future research ought to investigate the accessibility of self-limit programs, as well as gamblers' impressions of these programs.

The current study found that subscribers who imposed self-limits did reduce some of their gambling behaviors after imposing those limits, and did so in a way that shifted their behavior toward that of the rest of the sample. Primarily, SLs reduced their frequency of play, both the number of days on which they placed bets and the number of bets they placed per betting day. The amount they wagered per bet did not change significantly, though they did reduce the total amount they wagered. These behavioral changes again highlight the importance of activity level, not just money bet or lost, as a risk for gambling problems and as a target for change.

More than 10% of the sample ceased all betting on *bwin* after imposing limits. It is possible that for this group, the very act of using *bwin*'s self-limit feature influenced them to reconsider their gambling behavior.

Limitations

A strength of the current study is the access it provides to the real-time betting transactions of a large cohort of online gamblers. However, because the study includes only behavioral measures and no self-report measures, we do not know how satisfied subscribers were with the self-limit program, which behaviors they believed were problematic, and how their expenditure related to their income.

Another caveat is that, though self-limiting subscribers are likely to have experienced gambling problems, they might not be representative of all subscribers with problems. Only a small minority of people with a gambling problem will actively seek help for that problem (Slutske 2006). Thus, we are limited in the conclusions we can draw about the

online gambling behavior of people with gambling problems who do not seek help. Similarly, some self-limiting subscribers might not be experiencing problems but instead be using the self-limit option to avoid potential problems. This is especially likely for the 7% of self-limiters we found who placed limits prior to engaging in any betting activity.

These analyses included only subscribers' *bwin* betting activity. It is possible that SLs began or increased betting on other sites after imposing limits on their *bwin* betting. In particular, the 10.6% who ceased all *bwin* betting might have switched their activity to another site. However, *bwin* self-limits can be changed, so it is unlikely that subscribers participated in betting on other sites just to avoid their limits.

Finally, *bwin* is primarily a sports betting site; consequently, these analyses mainly focused on sports bettors. The gambling behaviors and effects of a self-limit program on those behaviors might be very different for Internet gamblers who focus on other games, such as casino games or poker. Future research will be necessary to clarify this issue.

Implications

If the history of Internet commerce and casinos are indicators, Internet gambling will grow exponentially during the next decades. Responsible gambling programs, similar to those now implemented by almost all casinos, likely will accompany that growth. *bwin*'s self-limit program is one of the first of its kind and, as the findings from this study show, might be a promising option for subscribers experiencing or at-risk for gambling problems. This type of program appears to help subscribers reduce their betting activity (i.e., frequency of betting, bets per day, and total wagered) and in some cases possibly cease their gambling behavior. More studies of this kind are necessary both to examine the effect of responsible gaming efforts on Internet gambling and to continue to assess the effect of casino self-exclusion and self-limit programs on patrons' behavior.

In addition, the analyses from this study reveal that individuals who believe that they are having problems with gambling (i.e., those who imposed self-limits) exhibit higher activity levels, but not necessarily higher expenditures than other bettors. This implies that, in considering risk, researchers and clinicians might need to pay at least as much attention to time spent gambling in relation to other activities as to money spent or lost.

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References

American Gaming Association. (2003). Responsible gaming rules of conduct. Retrieved September 1st, 2007, from http://www.americangaming.org/programs/responsiblegaming/code_public.cfm.

American Gaming Association. (2006). *2006 State of the states: The AGA survey of casino entertainment*. Washington D.C.: American Gaming Association.

Currie, S. R., Hodgins, D. C., Wang, J., el-Guebaly, N., Wynne, H., & Chen, S. (2006). Risk of harm among gamblers in the general population as a function of level of participation in gambling activities. *Addiction (Abingdon, England), 101*, 570–580. doi:10.1111/j.1360-0443.2006.01392.x.

Griffiths, M. D. (2001). Internet gambling: Preliminary results of the first U.K. prevalence study. *eGambling: The Electronic Journal of Gambling Issues* Retrieved June 3, 2004, from http://www.camh.net/egambling/issue5/research/griffiths_article.html.

Griffiths, M. D. (2003). Internet gambling: Issues, concerns, and recommendations. *Cyberpsychology & Behavior, 6*(6), 557–568. doi:10.1089/109493103322725333.

Ialomiteanu, A., & Adlaf, E. M. (2002). Internet gambling among Ontario adults. *eGambling: The Electronic Journal of Gambling Issues* Retrieved June 3, 2004, from http://www.camh.net/egambling/issue5/research/ialomiteanu_adlaf_article.html.

LaBrie, R. A., LaPlante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007a). Assessing the playing field: A prospective longitudinal study of internet sports gambling behavior. *Journal of Gambling Studies, 23*(3), 347–362. doi:10.1007/s10899-007-9067-3.

LaBrie, R. A., Nelson, S. E., LaPlante, D. A., Peller, A. J., Caro, G., & Shaffer, H. J. (2007b). Missouri casino self-excluders: Distributions across time and space. *Journal of Gambling Studies, 23*(2), 231–243. doi:10.1007/s10899-006-9037-1.

LaBrie, R. A., Shaffer, H. J., LaPlante, D. A., & Wechsler, H. (2003). Correlates of college student gambling in the United States. *Journal of American College Health, 52*(2), 53–62.

Ladd, G. T., & Petry, N. M. (2002). Disordered gambling among university-based medical and dental patients: A focus on Internet gambling. *Psychology of Addictive Behaviors, 16*(1), 76–79. doi:10.1037/0893-164X.16.1.76.

Ladouceur, R., Jacques, C., Giroux, I., Ferland, F., & Leblond, J. (2000). Analysis of a casino's self-exclusion program. *Journal of Gambling Studies, 16*(4), 453–460. doi:10.1023/A:1009488308348.

Ladouceur, R., Sylvain, C., & Gosselin, P. (2007). Self-exclusion program: A longitudinal evaluation study. *Journal of Gambling Studies, 23*, 85–94. doi:10.1007/s10899-006-9032-6.

LaPlante, D. A., Schumann, A., LaBrie, R. A., & Shaffer, H. J. (2008). Population trends in internet sports gambling. *Computers in Human Behavior, 24*, 2399–2414.

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *The American Journal of Psychiatry, 144*(9), 1184–1188.

Meerkerk, G.-J., Van Den Eijnden, R. J. J. M., & Garretsen, H. F. L. (2006). Predicting compulsive Internet use: It's all about sex!. *Cyberpsychology & Behavior, 9*(1), 95–103. doi:10.1089/cpb.2006.9.95.

Napolitano, F. (2003). The self-exclusion program: Legal and clinical considerations. *Journal of Gambling Studies, 19*(3), 303–315. doi:10.1023/A:1024259521729.

No More Gambling. (2005). The dangers of online gambling. Retrieved August 16, 2007, from http://www.nomorebets.com/online-gambling.html.

Nowatzki, N. R., & Williams, R. J. (2002). Casino self-exclusion programmes: A review of the issues. *International Gambling Studies, 2*, 3–25. doi:10.1080/14459790208732297.

Nower, L. M., & Blaszczynski, A. P. (2006). Characteristics and gender differences among self-excluded casino problem gamblers: Missouri data. *Journal of Gambling Studies, 22*(1), 81–99. doi:10.1007/s10899-005-9004-2.

Petry, N. M. (2006). Internet gambling: An emerging concern in family practice medicine? *Family Practice, 23*, 421–426. doi:10.1093/fampra/cml005.

Petry, N. M., & Mallya, S. (2004). Gambling participation and problems among employees at a university health center. *Journal of Gambling Studies, 20*(2), 155–170. doi:10.1023/B:JOGS.0000022307.09299.f5.

Richtel, M. (2004, March 26). Trade group says U.S. ban on Net gambling violates global law. *New York Times*.

Slutske, W. S. (2006). Natural recovery and treatment-seeking in pathological gambling: Results of two U.S. national surveys. *The American Journal of Psychiatry, 163*(2), 297–302. doi:10.1176/appi.ajp.163.2.297.

Smeaton, M., & Griffiths, M. D. (2004). Internet gambling and social responsibility: An exploratory study. *Cyberpsychology & Behavior, 7*(1), 49–57. doi:10.1089/109493104322820110.

Welte, J. W., Barnes, G. M., Wieczorek, W. F., Tidwell, M.-C., & Parker, J. (2002). Gambling participation in the U.S.—Results from a national survey. *Journal of Gambling Studies, 18*(4), 313–337. doi:10.1023/A:1021019915591.

Woodruff, C., & Gregory, S. (2005). Profile of Internet gamblers: Betting on the future. *UNLV Gaming Research & Review Journal, 9*(1), 1–14.

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Comparisons of Gambling and Alcohol Use Among College Students and Noncollege Young People in the United States

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Abstract. Objective: Gambling and alcohol use were compared for college and noncollege young adults in the US population. **Participants:** Participants were 1,000 respondents aged 18 to 21. **Methods:** Data were analyzed from a representative household sample of US young people aged 14 to 21 years old. Telephone interviews were conducted between August 2005 and January 2007. **Results:** After taking into account gender, age, race/ethnicity, and socioeconomic status, college student status did not predict gambling, frequent gambling, or problem gambling. In contrast, being a college student was associated with higher levels of alcohol use and problem drinking. Being male was the strongest predictor of both problem gambling and problem drinking. Blacks were less likely than whites to drink heavily; yet they were more likely than whites to gamble heavily. **Conclusion:** Young males should be targeted for prevention and intervention efforts for both problem gambling and problem drinking regardless of college student status.

Keywords: alcohol, college students, gambling, US population, young adults

The serious public health concern about binge drinking among college students has received widespread attention, spotlighted by federal task force initiatives to address the culture of drinking on college campuses.[1] In addition, alcohol misuse is correlated with other addictive behaviors, in particular problem gambling; that is, these behaviors co-occur in the same individuals.[2] However, much less research has been addressed to the issue of gambling among college students than alcohol use. Furthermore, it is not clear from college surveys if there are factors unique to the college culture contributing to heavy drinking and gambling or whether the patterns of alcohol misuse and problem gambling are characteristic of young adulthood more generally regardless of college status. There have been no large representative surveys of gambling among college students as compared with their same-aged counterparts in the general population. In addition, there have been no US surveys comparing the patterns of alcohol use and misuse with the patterns of gambling and problem gambling for US college students and the same-aged noncollege young adults. The present investigation will address this lack of comparative information on the prevalence of gambling and alcohol use among college students and similarly aged peers in the US population.

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Alcohol Use Among College Students

In a representative sample of four-year colleges in the United States, Wechsler and Nelson[3] reported that 2 in 5 college students (44%) were binge drinkers (also called heavy episodic drinkers), defined as consuming at least 5 drinks in a row for men or 4 drinks in a row for women during the 2 weeks prior to the survey. The National Survey on Drug Use and Health (NSDUH), a large annual household survey of persons 12 and older in the United States, showed that the rate of binge drinking (defined as consuming 5 or more drinks on the same occasion on at least 1 day in the past 30 days) peaked at the age of 21 with a rate of 49%, then decreased with advancing age.[4] Because this household sample also included college dormitories, a comparison of same-aged college and noncollege young people was possible. Young adults aged 18 to 22 enrolled full-time in college were more likely than their same-aged peers not enrolled full-time to binge drink (45.4% versus 38.4%).[4] Similarly, another large representative household survey of alcohol consumption in the United States (the National Epidemiologic Survey on Alcohol and Related Conditions [NESARC]) showed that episodic heavy drinking, ie, consuming 5 or more drinks for

men and 4 or more drinks for women in a single day in the past year, was higher among full-time college students (44.3%) than among part-time college students (30.7%) or noncollege young adults (37.4%).[5]

Gambling Among College Students

In a US survey of gambling among college students, LaBrie et al[6] asked over 10,000 college students, attending the 119 colleges in the 2001 College Alcohol Study, questions about their gambling behavior. Forty-two percent (42%) of the college students gambled in the last school year, but only 2.6% gambled weekly or more often. Other investigators have carried out gambling surveys within selected colleges. An early college survey was carried out in 1995 by Winters and colleagues[7] in 2 Minnesota universities. Among the sample of 1,361, gambling was common with 87% of the students having gambled once or more often in the past year and 12% reported gambling at least weekly; 4.4% reported a South Oaks Gambling Screen (SOGS)[8] score in the potential pathological range of 3 or 4 problem indicators and an additional 3% of the participants scored in the probable pathological range (5+ on the SOGS). On 4 campuses of the Connecticut State University, Engwall et al[9] reported that 67% of the students had gambled in their lifetime and 11% (18% of men and 4% of women) were classified as problem or pathological gamblers (ie, 3+ negative consequences) using a shortened version of the SOGS.[8]

Within the college environment, investigators have identified specific groups of students at high risk for problem gambling. Rockey and associates[10] surveyed 954 Greek- and non–Greek-affiliated college students who attended 9 large state universities in the southeastern United States. In the total sample, there were no statistically significant differences in the prevalence of gambling and problem gambling for Greek-affiliated and non–Greek-affiliated students. However, among males the differences were significant: Greek-affiliated male students had a rate of 14.8% problem gambling as compared with a 5.4% rate among males who were not affiliated with Greek organizations, suggesting the influence of peer pressure and an enabling environment for problem behaviors.

Likewise, there has been concern about gambling among athletes on college campuses. A large national study of gambling among US college athletes ($n = 20,739$) was sponsored by the National Collegiate Athletic Association (NCAA) in 2003 due to concerns about the integrity of intercollegiate sports.[11] This survey showed that 62% of the male athletes and 43% of the female athletes had gambled in the previous year; 4.3% of men and 0.4% of women were classified as problem or pathological gamblers (ie, 3 or more criteria using the American Psychiatric Association's DSM-IV classification[12]). Although this was a national college survey, nonathletes in colleges were not surveyed and therefore there is no comparison group. In a study of gambling among student-athletes ($n = 736$) and a comparison cohort of students ($n = 1,071$) at 4 universities, Weinstock and colleagues[13] showed that student-athletes reported similar rates of gambling frequency and disordered gambling as other students. These investigators concluded that problems associated with gambling are a university-wide issue warranting improved prevention and intervention efforts on campuses.

Because there have been no large representative US surveys of gambling among college students as compared with their same-aged counterparts in the general population, it is not known if patterns of gambling and problem gambling are different for college students and the same-aged noncollege young adults in the general population. Furthermore, it is not known if the predictors of gambling and alcohol use are similar or different in important population subgroups, ie, gender and racial/ethnic groups. The present investigation is the first study to our knowledge to address this lack of comparative information on the prevalence of gambling and alcohol among college and similarly aged peers in the US population. This study also will take into account important socioeconomic factors—age, gender, race/ethnicity, socioeconomic status, and living arrangements—in comparing alcohol and gambling behaviors among young people in college and not in college.

METHODS

Data

The present study is an analysis of 18- to 21-year-olds from the National Survey of Youth and Gambling (NSYG). The NSYG is a nationally representative household sample of 2,274 US young people aged 14 to 21 years, living in the United States. The study was designed to determine the prevalence of gambling behaviors and gambling problems as well as alcohol and other substance use among youth in the United States. The study was reviewed and approved by the Social and Behavioral Sciences Institutional Review Board at the University at Buffalo. Participants were interviewed between August 2005 and January 2007 by trained interviewers using computer-assisted telephone interviewing. The sample was selected using random-digit-dial telephone sampling procedures. Interviews were conducted in all 50 states and the District of Columbia. Subjects were mailed a check for $25 for their time participating in the study. The response rate based on completed interviews divided by completed interviews plus refusals was 71%. Weighting adjustments were used to align the sample with the age and race distributions from the US census for 2005. (See Welte et al[14] and Barnes et al[2] for a detailed description of the sampling and interviewing procedures.)

The present study consists of 1,000 18- to 21-year-olds. This represents all of the 18- to 21-year-olds in the sample except for 103 cases who were excluded because they reported still being in high school. Thus this analysis is comprised of *college students*, defined as those young people 18 to 21 years old who were currently enrolled in two-year or four-year colleges and universities; and *noncollege students*, who were 18 to 21 year olds not enrolled in two-year or four-year colleges. The weighted proportion of college students among

the 18- to 21-year-olds in this sample is 58% (578 ÷ 1,000). The US Census for 2005 shows that the proportion of 18- to 21-year-olds in degree-granting institutions is 46%.[15,16] Thus college students are well-represented in this household sample.

Dependent Measures

Gambling

Participants were asked whether or not they had ever gambled for money on each of 15 types of gambling, for example: participated in office pools, raffles, or charitable small stakes gambling; played the lottery; gambled for money on the Internet; played cards for money; bowled or played basketball, pool, golf, backgammon, darts, or some other game of skill—other than cards—for money; played Bingo for money; and bet on sports events. For each type of gambling ever done, the participant was then asked whether s/he had gambled on that type in the past 12 months, and if so, the frequency—everyday, at least once a week (if so, how many days per week), at least once a month (if so, how many days per month), at least once in the past 12 months (if so, how many days during the past 12 months). These items were previously developed by the present authors for a US national study of gambling among adults.[17] From these gambling behavior items, 2 measures were derived for the present analyses.

Gambling in the Past Year

This was a dichotomous variable defined as gambling at least once in the past year based on the 15 types of gambling. *Frequent gambling* was a dichotomous measure defined as gambling 52 or more times in the past year. This level of gambling is roughly equivalent to gambling once a week or more often and permits comparisons with other samples that have used comparable definitions for frequent/heavy gambling.[18,19]

Gambling Problems

Participants who indicated that they had gambled more than 5 times in their life were asked a series of questions about gambling problems using the South Oaks Gambling Screen, Revised for Adolescents (SOGS-RA).[20] This instrument is a modified version of the SOGS (South Oaks Gambling Screen).[8] The SOGS-RA consists of 12 items that are related to the DSM criteria for pathological gambling. Examples of the items are going back another day to win back money you lost (chasing); telling others you were winning money when you really weren't winning; having problems such as arguments with family or friends, or having problems at school or work caused by gambling; gambling with more money than you had planned to; and borrowing or stealing money in order to bet or cover gambling debts in the past 12 months. In the total sample of the 2,274, 14- to 21-year-olds in the National Survey of Youth and Gambling, the Cronbach alpha was.74, demonstrating good internal consistency reliability.[14] A dichotomous variable was used to be consistent with other studies[14] that represents *at-risk/problem gambling* and is defined as having 2 or more symptoms on the SOGS-RA in the past 12 months.

Alcohol Consumption

A drink of alcohol was defined as a drink of beer, ale, malt liquor, wine, fortified wine, wine coolers, liquor, and flavored malt beverages or any other beverage containing alcohol. *Drinkers* were defined as those respondents who indicated that they had a drink of any beverage containing alcohol in the past 12 months. A dichotomous measure of *heavy drinking* was based on whether or not respondents indicated that they drank 5 or more drinks in 1 day on 12 or more days in the past year.

Problem Drinking

Respondents who answered that they had had a drink of any alcoholic beverage more than 5 times in their life were asked a series of 57 questions taken from the Adolescent Diagnostic Interview (ADI), Light[21] based on the DSM-IV criteria for alcohol abuse and dependence.[12] Of the 57 questions, 19 questions asked about *alcohol abuse* symptoms in the past 12 months, including missing school or work more than once or twice; driving a car or motorcycle while drunk on alcohol; having sex when drunk on alcohol; having legal problems because of alcohol; having problems with friends or family; getting into physical fights; and having frequent arguments with your parents or other adults about your alcohol use. The remaining 38 items asked about *alcohol dependence* symptoms, including tolerance (needing larger amounts of alcohol than previously to get drunk), withdrawal (having shakes or tremors of the hands after stopping or cutting down on drinking), having to use alcohol to relieve or reduce hangover or withdrawal symptoms, and trying to reduce or control your alcohol use. Cronbach alpha for the 57-item scale was.92 in the total NSYG sample. The *problem drinking* dichotomous measure was defined as having 3 or more alcohol symptoms in the past year.

Predictor Measures

Predictor measures were college student status and sociodemographic characteristics. *College student status* was coded 1 for those young people 18 and older who were not in high school or college and 2 for those young people 18 and older who were enrolled in two-year or four-year colleges or universities. *Gender* was coded 0 for females, 1 for males. *Age* was measured in years (18 to 21). Participants were asked whether they considered themselves Spanish, Hispanic, Latino, or Chicano. They were also asked, "What is your race?" Response choices were White (or White Hispanic); Black or African American (or Black Hispanic); Asian; American Indian or Alaska Native; and Mixed/Unknown. *Socioeconomic status* (SES) was based on the mean of 4 equally weighted factors: mother's years of education, father's years of education, mother's occupational prestige, and father's occupational prestige. Occupational

prestige was coded from census occupation categories using the method described by Hauser and Warren.[22] Because we knew from previous studies that a portion of youth are unable to supply information on their parents' education and occupation, we asked a series of questions (home ownership, number of books in the home, receipt of food stamps, etc.) that were then used as predictor variables to impute education or occupational prestige when these variables were missing. Imputation was performed by the SPSS Missing Value program. Socioeconomic status was categorized into thirds for the present analyses. A dichotomous living arrangement variable was derived based on the question, "Are you currently living on your own or in the home of your parent or guardian?" The variable, *Live Independently*, was coded 0 for those living with parents or guardians and 1 for those living on their own.

RESULTS

Table 1 gives the demographic profile of college students and noncollege students in this US sample. There were no significant differences in the gender distributions for college and noncollege students. The remaining demographic factors were significantly different between college and noncollege students (see χ^2 statistics in Table 1). As compared with their noncollege counterparts, college students were somewhat younger; they were more likely to be white as compared with being classified in a minority group except Asian; college students were much more likely to be in the highest SES group. College students were somewhat more likely to live with parents than their noncollege student counterparts. These demographic factors were controlled in later multivariate analyses.

A comparison of gambling among college students and noncollege young adults revealed no significant differences in the overall prevalence rates or in the age- and race/ethnic-specific prevalence rates. For instance, three quarters (75%) of college students and 70% of the noncollege young adults gambled in the past year ($\chi^2 = 2.8$; $df = 1$; $p = .10$) (Table 2). However, with regard to frequent gambling (52+ times in the past year), noncollege young people had significantly higher rates (25%) than college students (18%) ($\chi^2 = 8.7$; $df = 1$; $p = .003$). These differences were further observed for females where noncollege females had twice the rate of frequent gambling (12%) as college females (6%) ($\chi^2 = 6.3$;

TABLE 1. Demographic Profile of College Students and Noncollege Young Adults, Aged 18 to 21 Years Old: US Youth and Gambling Survey ($N = 1,000$)

	College students ($N = 578$)	Noncollege young adults ($N = 422$)
Gender		
Female	54%	49%
Male	47%	51%
Not significant ($\chi^2 = 1.7$; $df = 1$)		
Age		
18–19 years	50%	42%
20–21 years	50%	59%
$p < .01$ ($\chi^2 = 7.7$; $df = 1$)		
Race/ethnicity		
White, not Hispanic	66%	56%
Black, not Hispanic	11%	17%
Hispanic	15%	19%
Asian	7%	2%
American Indian	1%	3%
Mixed, Unknown	1%	3%
$p < .001$ ($\chi^2 = 33.4$; $df = 5$)		
Socioeconomic status		
Low third SES	20%	48%
Middle third SES	36%	33%
High third SES	45%	19%
$p < .001$ ($\chi^2 = 112.5$; $df = 2$)		
Living arrangements		
Live with parents	77%	71%
Live independently	23%	29%
$p < .05$ ($\chi^2 = 5.0$; $df = 1$)		

TABLE 2. Gambling, Alcohol Use, Frequent/Heavy Use, and Related Problems (Past Year) for College Students (N = 578) and Noncollege Young Adults (N = 422) Aged 18 to 21 Years Old in the United States

	Gambled		Drank alcohol		Gambled 52+ times		Drank 5+ drinks on 12 or more days		At-risk/problem gambling (2+ symptoms on SOGS-RA)		Problem drinking (3+ symptoms)	
Sociodemographic group (n)	College students	Noncollege young adults	College students	Noncollege young adults	College students	Noncollege young adults	College students	Noncollege young adults	College students	Noncollege young adults	College students	Noncollege young adults
Total sample	75%	70% *NS*	76%	61%***	18%	25%**	30%	27% *NS*	6%	9% *NS*	27%	19%**
Female	67%	62% *NS*	72%	53%***	6%	12%**	20%	17% *NS*	2%	5%*	21%	12%**
Male	83%	79% *NS*	80%	70%**	31%	38% *NS*	42%	36% *NS*	11%	14% *NS*	35%	26%*
18–19 years	76%	71% *NS*	70%	56%***	18%	24% *NS*	27%	23% *NS*	7%	10% *NS*	27%	19%*
20–21 years	73%	69% *NS*	81%	65%***	18%	26%*	33%	29% *NS*	5%	8% *NS*	27%	20%*
White, not Hispanic	79%	73% *NS*	82%	72%**	17%	23%*	37%	33% *NS*	6%	10% *NS*	31%	23%*
Black, not Hispanic	67%	67% *NS*	53%	43% *NS*	26%	32% *NS*	11%	13% *NS*	7%	11% *NS*	21%	16% *NS*
Hispanic	71%	72% *NS*	73%	55%*	18%	22% *NS*	23%	25% *NS*	2%	8% *NS*	26%	17% *NS*

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

$df = 1$; $p = .012$). There were no significant differences in rates of frequent gambling for college and noncollege males ($\chi^2 = 2.5$; $df = 1$; $p = .113$); indeed both groups of males had high rates, 31% and 38%, respectively. Older (20- to 21-year-old) noncollege young people had significantly more frequent gambling than their college counterparts (26% versus 18%; $\chi^2 = 5.7$; $df = 1$; $p = .017$). White noncollege young people had significantly more frequent gambling (52+ times in the past year) than their white college counterparts (23% versus 17%; $\chi^2 = 4.1$; $df = 1$; $p = .04$). Comparisons of problem gambling for college and noncollege young adults revealed only one significant difference—college females had a 2% rate of problem gambling compared with a 5% rate for females not attending college ($\chi^2 = 4.5$; $df = 1$; $p = .03$).

The comparisons of alcohol use for college students and noncollege young adults are different than the comparisons for gambling. Noncollege young people had lower overall rates of drinking alcohol (61%) than their college student counterparts (76%) ($\chi^2 = 22.7$; $df = 1$; $p = .000$). Noncollege young people were also less likely to be problem drinkers (19%) than college students (27%) ($\chi^2 = 8.6$; $df = 1$; $p = .003$). These differences held for both males and females. However, the rates of heavy drinking (5+ drinks on 12 more days during the past year) were not significantly different for the 2 groups ($\chi^2 = 1.3$; $df = 1$; $p = .25$).

Because of popular notions that particular forms of gambling, such as sports betting and Internet gambling, may be more prevalent for college students as compared with noncollege young people, Table 3 shows the rank order for various forms of gambling for college students, noncollege young adults, and for each gender. In the overall ranked comparisons, the top 5 types of gambling are the same for college and noncollege young people. According to frequency of occurrence, these forms are lottery, card games, office pools/raffles/charitable small stakes gambling, sports betting, and games of skill. Internet gambling has the lowest frequency of participation of any of the forms listed (3% for college students and 1% for noncollege young people). There are striking gender differences in frequency of participation in various forms of gambling regardless of college student status. Although males play most forms of gambling more often than females, some forms of gambling, such as sports betting and games of skills (eg, bowling, basketball, pool) are 3 or more times more common among males than females. Bingo is the fourth most prevalent form of gambling for both college and noncollege females.

To address the question as to whether or not college student status predicts gambling and alcohol behaviors, we carried out a series of logistic regressions—first with college student status entered alone and then with college student status and demographic controls entered together (Table 4). College student status did not predict overall gambling or problem gambling in the analysis with college student status entered alone or when college student status was entered with all of the demographic controls. When college student status was entered alone, college students had a significantly lower odds of frequent gambling, ie, 52+ times in the past year; however, once the demographic controls were entered, college status was no longer significant in predicting frequent gambling. Thus, being a college student or not did not have an effect on gambling behavior. Male gender is the variable with the largest effect on gambling regardless of college student status—with males having approximately 5 times the odds of being a frequent gambler or problem gambler as females.

The effects of college student status on alcohol use and problem drinking showed a different pattern from that of gambling. College students had 1.9 times the odds of being a drinker as compared with young people not in college and college students had a significantly increased odds (1.6) of being a problem drinker than their noncollege counterparts. This finding was observed when college student status was entered alone or when it was considered with all of the control variables. Male gender greatly increased the probability of drinking, heavy drinking, and problem drinking—consistent with the significant effect of male gender on the increased probability of gambling, frequent gambling, and problem gambling. Other demographic factors showed different relationships to alcohol and gambling variables. Increased age in this sample of 18 to 21 year olds significantly predicted increased drinking and heavy drinking but did not have any effect on gambling behaviors. Being black decreased the odds of drinking and heavy drinking by 70%, respectively, yet being black increased the odds of frequent gambling by 60%. Being Hispanic was not related to either alcohol or gambling behaviors. Higher socioeconomic status predicted a somewhat increased probability of drinking and heavy drinking, whereas higher socioeconomic status lowered the odds of problem gambling. Living independently was not related to any gambling variables; on the other hand, young people who lived independently from their parents or guardians had 1.7 times the odds of being a problem drinker as those who lived with their parents or guardians.

COMMENT

There has been widespread public concern over high-risk addictive behaviors among college students, especially binge drinking and, to a lesser extent, gambling. Since the 1990s, there have been federal task forces and numerous college initiatives to address the concern of college binge drinking; yet the question remains if rates of problem behaviors such as excessive drinking and gambling among college students are high due to specific aspects of the college experience—such as increased freedom from parental supervision and increased peer influences—or if these problems are associated with the age group of young adulthood more generally conceived, regardless of current college status. If these high-risk behaviors are age related regardless of college status, then prevention and intervention efforts must necessarily be targeted beyond the college environment.

This is the first US national study to our knowledge to compare both gambling and alcohol use behaviors among

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TABLE 3. Percent Participating in Various Types of Gambling (Past Year) (Listed by Frequency of Occurrence Among College Students): College Students and Noncollege Young Adults Aged 18 to 21 Years Old in the United States ($N = 1,000$)

	College students			Noncollege young adults		
Type of gambling	Female ($n = 309$)	Male ($n = 269$)	Overall ($n = 578$)	Female ($n = 208$)	Male ($n = 214$)	Overall ($n = 422$)
Lottery	41%	45%	43%	45%	49%	47%
Card games	21%	59%	38%	18%	46%	32%
Office pools, raffles, charitable small stakes gambling	31%	45%	38%	16%	38%	27%
Sports betting	13%	35%	23%	11%	36%	23%
Games of skill—eg, bowling, basketball, pool, golf, backgammon, darts	11%	31%	20%	7%	36%	22%
Casino gambling	10%	21%	15%	8%	17%	13%
Bingo	16%	10%	13%	14%	16%	15%
Slot machines, poker machines and other gambling machines	10%	11%	10%	6%	13%	10%
Dice games	3%	13%	8%	4%	19%	11%
Pull tabs	6%	10%	8%	6%	10%	8%
Bet on horses, dogs or other animals	3%	12%	7%	3%	10%	7%
Video keno—eg, Quick Draw or Quick Cash	3%	5%	4%	4%	10%	7%
Trading cards—such as sports cards for the resale of the insert cards	0%	6%	3%	1%	3%	2%
Internet gambling	0%	7%	3%	1%	2%	1%

TABLE 4. Logistic Regressions Predicting Gambling, Alcohol Use, Frequent/Heavy Use and Related Problems (Past Year) for College Students and Noncollege Young Adults 18 to 21 Years Old in the United States (n = 1,000)

	Dichotomous dependent variable					
Predictor	Gambled OR[a]	Drank alcohol OR[a]	Gambled 52+ times/past year OR[a]	Drank 5+ drinks on 12 or more days OR[a]	At-risk or problem gambling (2+ symptoms on SOGS-RA) OR[a]	Problem drinking (3+ symptoms) OR[a]
College student entered alone	1.3^{ns}	1.9***	0.6**	1.2^{ns}	0.6^{ns}	1.6**
College Student entered with demographic controls						
College student	1.3^{ns}	1.6**	0.7^{ns}	1.1^{ns}	0.8^{ns}	1.8***
Male	2.4***	1.8***	5.5***	3.1***	4.6***	2.3***
Age (years)	1.0^{ns}	1.4***	1.1^{ns}	1.3***	0.9^{ns}	1.1^{ns}
Black	0.7^{ns}	0.3***	1.6*	0.3***	1.0^{ns}	0.7^{ns}
Hispanic	0.9^{ns}	0.8^{ns}	0.9^{ns}	0.8^{ns}	0.5^{ns}	0.8^{ns}
SES	1.0^{ns}	1.2***	0.9^{ns}	1.1*	0.8*	0.9^{ns}
Live independently	1.3^{ns}	1.1^{ns}	0.7^{ns}	1.4^{ns}	1.3^{ns}	1.7**

[a]OR = odds ratio.
*p <.05.
**p <.01.
***p <.001.

college students as well as other similarly aged young adults in the general population. The scope of this study permits us to determine if college students, as compared with other young adults, are at high risk for problem gambling as they have been shown to be regarding heavy alcohol use.

Consistent with findings from the few other national surveys of alcohol use that included both college and noncollege young adults,[4,5] this study shows that the rates of alcohol use and problem drinking are significantly higher for college students than for similarly aged noncollege young adults. However, the rates of heavy drinking, often referred to as binge drinking, were not significantly different for college and noncollege young people in this study. The lack of differences between the 2 groups should not detract from the extent of the problem of alcohol misuse for both college and noncollege adults. In particular, over a third of the males in both groups were classified as heavy drinkers, that is, they drank 5 or more drinks a day on 12 or more days in the past year.

Monitoring the Future survey investigators[23] followed respondents from their US national secondary school survey 1 to 4 years past high school and found that college students had a significantly higher prevalence of heavy drinking (ie, 5 or more drinks in a row in the past 2 weeks) than their same-age peers (40% versus 35%). Interestingly, in high school, the college-bound students drank *less* than their non–college-bound peers, yet the alcohol consumption of college-bound students *was greater* than that of their noncollege peers during the college years. Thus, from past research and the present study, there does appear to be evidence of a college context factor that contributes to more drinking in college than would be explained by the young adult age alone. As in other national surveys,[4,5] heavy drinking in the present study is much more prevalent among white young people than among black young people regardless of college student status.

Using this sample[2] and other general population samples,[18,19] we have shown that alcohol misuse and gambling problems co-occur within a problem behavior syndrome. Furthermore, young males have a higher co-occurrence of alcohol problems and gambling problems (r = .42) than do females (r = .21).[2]

The patterns of gambling for college and noncollege young people show some differences from the patterns of alcohol use. Whereas rates of overall alcohol use and problem drinking were higher for college students than for noncollege adults, the rates of frequent gambling were higher for noncollege young adults than for college students, particularly for females. There were no significant differences in the prevalence of overall gambling or problem gambling for the 2 groups. However, college student status was no longer significant in predicting frequent gambling once demographic factors were entered. Being male and being black were the important factors in increasing the risk for frequent gambling. Being male and having lower SES increased the risk

for problem gambling (that is, having 2 or more symptoms on the SOGS-RA). These findings that males, blacks, and lower SES persons are at higher risk than others for problem gambling are consistent with findings from our national US surveys of adults.[24] Males may have more problems associated with gambling due to the fact that they engage in more forms of gambling more frequently than females. It has been speculated that blacks and lower SES persons may be more likely than others to see gambling as a form of investment and a possible escape from poverty.[24]

Thus, in this study, being a college student does not put a young person at added risk for gambling, frequent gambling, or problem gambling. In addition, the top 5 most popular forms of gambling are the same for college males and noncollege males; these forms are lottery, card games, pool and raffles, sports betting, and games of skill. Regardless of college status, the most popular forms of gambling for females are lottery, card games, pools and raffles, and bingo. It is also interesting that Internet gambling is a low prevalence form of gambling for college and noncollege young people. Findings from this study support the position that gambling and problem gambling are influenced by broad sociodemographic factors, especially gender and race, and not by college factors per se. Therefore, prevention efforts must be targeted broadly across young adulthood regardless of college status. Because there are no other comparable national studies of gambling including college and noncollege young people, these findings remain to be replicated by future studies.

Limitations

This sample was one of household telephone numbers, and therefore cell phone numbers were not intentionally included in the sample. Nonetheless, some cell phone numbers became a part of the sample because phone numbers from land-line exchanges may be ported to cell phones, and some telephone exchanges (often in less populated areas) contain both land-line and cell numbers. Estimates from the National Health Interview Survey for 2005–2006[25] show that between 7.6% and 8.6% of US households with children had only wireless telephone service or no telephone service. Weighting can reduce potential bias created by not including cell-phone-only users in a household sample; this was done in the present study as described above.

Conclusions

College student status significantly increases the odds that a young person will drink alcohol and experience problems associated with alcohol use. However, college student status does not appear to put young people at added risk of gambling or gambling problems. The most important and consistent risk factor for both alcohol and gambling behaviors is being a young male whether in college or noncollege settings. Age- and gender-targeted prevention and intervention strategies are warranted to reduce the serious consequences of alcohol use and gambling among young adult males in the US population.

NOTE

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REFERENCES

1. National Institute on Alcohol Abuse and Alcoholism, US Department of Health and Human Services, National Institutes of Health. *What Colleges Need to Know Now*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; November 2007. NIH Publication No. 07-5010.

2. Barnes GM, Welte JW, Hoffman JH, Tidwell M-C. Gambling, alcohol and other substance use among youth in the U.S. *J Stud Alcohol Drugs*. 2009; 70:134–142.

3. Wechsler H, Nelson TF. What we have learned from the Harvard School of Public Health College Alcohol Study: focusing attention on college student alcohol consumption and the environmental conditions that promote it. *J Stud Alcohol Drugs*. 2008; 69:481–490.

4. Substance Abuse and Mental Health Services Administration. *Results from the 2006 National Survey on Drug Use and Health: National Findings*. Rockville, MD:Substance Abuse and Mental Health Services Administration, 2007. Office of Applied Studies, NSDUH Series H-32. DHHS Publication No. SMA 07-4293.

5. Chen CM, Dufour MC, Yi H. Alcohol consumption among young adults ages 18–24 in the United States: results from the 2001–2002 NESARC Survey. *Alcohol Research & Health*. 2004/2005; 4:269–280.

6. LaBrie RA, Shaffer HF, LaPlante DA, Wechsler H. Correlates of college student gambling the United States. *J Am Coll Health*. 2003; 52:53–62.

7. Winters KC, Bengston P, Dorr D, Stinchfield R. Prevalence and risk factors of problem gambling among college students. *Psychol Addict Behav*. 1998; 12:127–135.

8. Lesieur HR, Blume SB. The South Oaks Gambling Screen (SOGS): a new instrument for the identification of pathological gamblers. *Am J Psychiatry*. 1987; 144: 1184–1188.

9. Engwall D, Hunter R, Steinberg M. Gambling and other risk behaviors on university campuses. *J Am Coll Health*. 2004; 52:245–255.

10. Rockey DL, Beason KR, Howington EB, Rockey CM, Gilbert JD. Gambling by Greek-affiliated college students: an association between affiliation and gambling. *J Coll Student Dev*. 2005; 46:75–87.

11. Huang JH, Jacobs DF, Derevensky JL, Gupta R, Paskus TS. A national study on gambling among US college student-athletes. *J Am Coll Health*. 2007; 56:93–99.

12. American Psychiatric Association. *DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC:American Psychiatric Association; 1994.

13. Weinstock J, Whelan JP, Meyers AW, Watson JM. Gambling behavior of student-athletes and a student cohort: what are the odds? *J Gambl Stud*. 2007; 23:13–24.

14. Welte JW, Barnes GM, Tidwell M-C, Hoffman JH. The prevalence of problem gambling among U.S. adolescents and young adults: results from a national survey. *J Gambl Stud*. 2008; 24:119–133.

15. US Census Bureau. *Current Population Survey, 2005 Annual Social and Economic Supplement*. Internet release date: October 26, 2006. Available at: http://www.census.gov/population/www/socdemo/education/cps2005.html. Accessed February 17, 2010.

16. US Department of Education, National Center for Education Statistics. *2005 Integrated Postsecondary Education Data System*. Washington, DC:US Department of Education; Spring 2006.

17. Welte JW, Barnes GM, Wieczorek, WF, Tidwell M-C, Hoffman JH. Type of gambling and availability as risk factors for problem gambling: a tobit regression analysis by age and gender. *Int Gambl Stud*. 2007; 7:183–198.

18. Welte JW, Barnes GM, Hoffman JH. Gambling, substance use and other problem behaviors among youth: a test of general deviance models. *J Crim Justice*. 2004; 32:297–306.

19. Barnes GM, Welte JW, Hoffman JH, Dintcheff BA. Effects of alcohol misuse on gambling patterns in youth. *J Stud Alcohol*; 2002; 63:767–775.

20. Winters KC, Stinchfield RD, Fulkerson J. Toward the development of an adolescent gambling problem severity scale. *J Gambl Stud*. 1993; 9:63–84.

21. Winters KC, Henley GA. *Adolescent Diagnostic Interview Schedule and Manual*. Los Angeles:Western Psychological Services; 1993.

22. Hauser R, Warren JR. Socioeconomic indexes for occupations: a review, update, and critique. *Sociol Methodol*. 1997; 27:177–298.

23. Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I, Secondary School Students*. Bethesda, MD:National Institute on Drug Abuse; 2007. NIH Publication No. 07-6205.

24. Welte, JW, Barnes, GM, Wieczorek, WF, Tidwell, M-CO, Parker, JC. Risk factors for pathological gambling. *Addict Behav*. 2004; 29:323–335.

25. Centers for Disease Control and Prevention (CDC). Cigarette smoking among adults- United States, 2006. *MMWR Mort Morb Wkly Rep*. 2007; 56:1157–1161.

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ORIGINAL PAPER

The Prevalence of Problem Gambling Among U.S. Adolescents and Young Adults: Results from a National Survey

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Abstract A random telephone survey was conducted with a representative sample of 2,274 U.S. residents aged 14–21. The prevalence of problem gambling, as measured by the SOGS-RA, was 2.1%. Sixty-eight percent (68%) of the respondents had gambled in the past year, and 11% had gambled more often than twice per week. Males had much higher gambling involvement than females, and gambling involvement increased among older respondents. Blacks were less likely than average to have gambled in the past year, but if they gambled, they were more likely to do so frequently. Low SES respondents were less likely to have gambled in the past year, but if they gambled, they were more likely to be problem gamblers. Life transitions that are associated with assuming adult roles (employment, living independently of parents, non-student status) are also associated with greater gambling involvement. The rates of problem and pathological gambling were lower than those in an adult survey conducted earlier, when measured with the same questionnaire.

Keywords Youth gambling · National survey · Youth problem gamblers

Introduction

Youth gambling has been the subject of increasing concern. Because of the expansion of legalized gambling in the U.S. in recent decades, young Americans have grown up in a society in which gambling is both common and highly visible. The popular press has frequently reported alarming incidents involving young gamblers. Numerous surveys of U.S. states have indicated high rates of youth problem gambling (e.g., Shaffer et al. 1997; Westphal et al. 2000). Research has shown that adolescent onset of gambling is associated with greater gambling involvement in adulthood (Burge et al. 2004). A key step in addressing the prevalence of problem gambling among youth is to conduct a national U.S. survey of youth gambling. We have conducted such a survey, and in the following article

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we will pursue these objectives: (1) to describe our findings on the prevalence of youth gambling and problem gambling, and compare these findings to other studies, (2) to describe how gambling involvement is distributed across demographic subgroups of the youth population, and to test the statistical significance of these distributions, controlling simultaneously for all demographic variables, (3) to describe how gambling involvement is distributed among jointly defined age and gender groups, and test the statistical significance of these joint distributions, and (4) to compare the rates of problem and pathological gambling in the current national U.S. youth survey to the rates in a national U.S. adult survey that used the same measure of gambling problems.

Surveys of the prevalence of problem gambling among youth in the U.S. have produced varied results, depending on the screening questionnaire and definition of problem gambling employed, as well as the geographic area involved. Shaffer et al. (1997) conducted a meta-analysis of 22 methodologically sound surveys of adolescent gambling in various parts of the U.S. They determined that the average rate for past-year level 3 gambling (their term for serious problem or pathological gambling) for adolescents was 5.77%, although they point out that there is great variance among the surveys, partly due to methodological differences. Jacobs (2004) also summarized the results from U.S. youth gambling surveys, including some more recent than those studied by Shaffer and colleagues. In nine selected surveys from 1989 to 2002, Jacobs found an average rate of problem/pathological gambling of 3.7%. (Note—this figure was calculated from data in Table 5 of Jacobs 2004). Many of the surveys reviewed by Shaffer et al. and by Jacobs used the South Oaks Gambling Screen, a 20-item screen originally developed for adults by Lesieur and Blume (1987). In Table 1, we have reviewed several youth gambling surveys which used the SOGS-RA (Winters et al. 1993), a version of the SOGS adapted for adolescents. This is the same instrument that we have used for the current study (see Methods). These surveys used representative samples of adolescents from five U.S. states and two foreign countries. Each used a standard of four or more items endorsed to define problem gambling. In the U.S. states of Louisiana, Oregon, Alabama, Mississippi and Minnesota, the rate of problem gambling as measured by the SOGS-RA ranged from 2.8% to 5.8%, with an average of 4.4%. The Canadian studies ranged from 2.2% to 5.8%, with an average of 3.7%. The Iceland study found a 2.7% rate of problem gambling among adolescents (Table 1).

The rates of youth problem/pathological gambling reflected in the figures cited above are higher than the rates generally found for adults. For example, although the meta-analysis by Shaffer and colleagues found a rate of 5.77% for adolescents, their meta-analysis of adult surveys found a rate of 1.14%. There has been a controversy in the literature about whether

Table 1 Adolescent gambling surveys using SOGS-RA past year problem gambling

Reference	Location	Date	Cutpoint	Pct (%)
Winters et al. (1995)	Minnesota	1990	4	2.8
Westphal et al. (2000)	Louisiana	1997	4	5.8
Carlson and Moore (1998)	Oregon	1998	4	4.1
Langhinrichsen-Rohling et al. (2004)	Alabama, Mississippi, and Oregon	2002	4	4.8
Poulin (2002)	Canadian Atlantic Provinces	1998	4	2.2
Wiebe et al. (2000)	Manitoba	1998	4	3.2
Adlaf and Lalomiteanu (2000)	Ontario	1999	4	5.8
Olason et al. (2006)	Iceland	2004	4	2.7

this is a valid relationship, or an artifact of methods. As Shaffer et al. (1997) point out, somewhat different methods have been used to measure pathological gambling for adolescents and adults. Although the conceptual criteria are the same, some criteria must be operationalized differently for adolescents. A question containing wording such as "borrowed money from your spouse or partner" or "borrowed money from in-laws" would not be appropriate for adolescents. Therefore, measures of adolescent pathological gambling use wording appropriate for adolescents. In addition, some adolescent studies have used a smaller number of endorsed items than adult studies to qualify for problem or pathological gambling. There are additional reasons why youth problem gambling rates might be inflated. Jacques and Ladouceur (2003) have pointed out that scoring errors have been made by some researchers using common screening instruments, and Ladouceur et al. (2000) have demonstrated the possibility that young respondents may misinterpret some questions in a way that inflates problem gambling scores. These arguments are summarized in a an article by Derevensky et al. (2003) which is aptly titled "Prevalence Rates of Youth Gambling Problems: Are the Current Rates Inflated?".

The uncertainty about the extent of teenage gambling pathology was underscored by the results obtained by the national U.S. telephone survey of 534,16 and 17-year-old respondents conducted for the National Gambling Impact Study Commission (NORC 1999). The investigators who conducted this study along with the larger adult study, devised their own measure of pathological gambling—the NORC DSM Screen for Gambling (NODS). They administered the NODS with the same wording in both the adolescent and adult studies, and they found a lifetime rate of pathological or problem gambling of 1.5% for adolescents, and a higher lifetime rate of 2.1% for adults. Past-year rates were not reported for adolescents because of the small *N*. In the current study, in addition to the SOGS-RA, we also administered the DIS for pathological gambling (see Methods), the same instrument that we used in a national U.S. survey of adult gambling. We administered the DIS in the current study so that we would have a measure of problem gambling that allowed a direct comparison between the current youth survey and the earlier adult survey. In the current article, we will compare youth and adult rates using the same screening instrument.

Surveys of youth gambling behavior show some consistent—and some inconsistent—findings with regard to demographic patterns. In a Louisiana survey of students in grades 6 through 12, Westphal et al. (2000) found that problem gambling was more prevalent among males than females, more prevalent among minority group members than whites. In a high school survey conducted in Alabama, Mississippi and Oregon, Langhinrichsen et al. (2004) had those same findings. In a telephone survey of New York State adolescents, Volberg (1998) found that frequent gambling was significantly more common among males, older adolescents, whites, and adolescents who were employed 10 more hours per week. A survey of Connecticut high school students sponsored by the Connecticut Council on Problem Gambling (1998) found that males and females had the same rates of ever having gambled (84%), but males were three times as likely to be problem gamblers. This study also found that minorities had higher rates of problem gambling than whites. Stinchfield et al. (1997) analyzed two large surveys, conducted in 1992 and 1995, of Minnesota 6th, 9th and 12th grade students. They found that boys gambled more often than girls, and that 9th and 12th graders gambled more frequently than 6th graders. White and Asian students gambled less frequently than Black, Hispanic and American Indian students. A survey of Texas adolescents (Wallisch 1993) found that males, older adolescents, Hispanics, and adolescents with disposable income of $50/week or more were more likely to be weekly gamblers. Blacks had lower rates of frequent gambling than whites or

Hispanics. In a survey of Washington adolescents, Volberg (1993) found that males and adolescents with incomes of $50/week or more were more likely to be problem gamblers. Race was not significantly related to problem gambling.

Surveys of youth gambling have of course been conducted outside of the U.S. Fisher (1999) analyzed a large sample of 12–15 year olds from schools in Britain and found that problem gambling was associated with being male, having a higher disposable income, and living in a single-parent family. In a Scottish survey, Moodie and Finnigan (2006) found males to have higher rates of problem gambling than females and, not surprisingly, 13–16 year olds to have higher rates than 11–12 year olds.

These are mixed results. The one consistent finding in the literature is that males gamble more, and have more problems, than females. Generally, young people who have more access to money have more gambling involvement. Some studies have found that youths who are members of minority groups are more likely to be problem gamblers, but this is not a universal finding. While one might expect gambling involvement to increase with age among teens and young adults, that is also not a universal finding. Results related to socioeconomic status and religion are sparse in the literature, because most researchers did not measure those factors, even though some results attributed to race might be confounded with socioeconomic status or religion. In the current large representative U.S. study, we will examine the relationship between youth gambling involvement and demographic variables including SES and religion, as well as life transition variables such as employment and living independently of parents.

Methods

We conducted a national random-digit-dial telephone survey with a representative sample of 2,274 U.S. residents aged 14–21. The random-digit-dial sample was purchased from Survey Sampling International of Fairfield, Connecticut. The telephone sample was selected randomly from a sampling frame of all working telephone blocks in the U.S. The sample was stratified by county and by telephone block within county. This resulted in a sample that was spread across the U.S. according to population, and not clustered by geographic area. The interviews were conducted by trained interviewers at the Research Institute on Addictions in Buffalo, NY. Each telephone number was called at least seven times to determine if that number was assigned to a household containing an eligible respondent. Once a household was designated as eligible, the number was called until an interview was obtained or refusal conversion had failed. The respondents were recruited by selecting randomly from the persons aged 14–21 years in each household by identifying the one with the next birthday. The 2,274 telephone interviews were conducted from August 2005 through January 2007. This relatively lengthy period of data collection allowed the use of a smaller but highly trained and carefully supervised crew of interviewers and captured possible seasonal variations in gambling. Interviews were conducted in all 50 states plus the District of Columbia. Results were statistically weighted to compensate for the number of potential respondents in the household. Weighting adjustments were also used to align the sample with gender, age and race distributions shown in the U.S. census estimates.

Respondent's age was assessed by asking for their date of birth, and then following up with a verification of their age. Respondents who did not want to give their date of birth were simply asked their age. Respondent's race/ethnicity was assessed by asking two questions. First, respondents were asked if they considered themselves to be Spanish,

Hispanic, Latino or Chicano. Second, they were asked for their race, and given the choices: White or White Hispanic, Black or Black Hispanic, Asian, and American Indian or Alaskan Native. We derived the mutually exclusive race/ethnicity variable be putting everyone who said that they were Hispanic in the "Hispanic" category. Religion was assessed by simply asking: "What is your religion?". Marital status was assessed by asking: "What is your marital status?", and giving the choices: never married, married, divorced/annulled/separated, and widowed. In a second question, respondents were asked if they were living with someone as if married. Employment status and educational status were assessed by asking: "Are you currently employed?", and "Are you currently enrolled in school?". Living independently was assessed by asking: "Are you currently living on your own or in the home of your parent or guardian?". Our measure of socioeconomic status was based on the mean of four equally weighted factors: father's years of education, mother's years of education, father's occupational prestige and mother's occupational prestige. Occupational prestige was coded from census occupation categories using the method described by Hauser and Warren (1997). Knowing that a few respondents would be unable to supply information on their parent's education and occupation, we asked a series of questions (home ownership, number of musical instruments and books in home, receipt of food stamps, etc.) gleaned from other studies that attempted to measure the SES of teens and young adults. We used these as independent variables to impute parental education or occupational prestige when these variables were missing. Imputation was performed by the SPSS Missing Value program.

Our primary measure of problem gambling was the SOGS-RA. The best known adult assessment of problem gambling, the South Oaks Gambling Screen (SOGS) (Lesieur and Blume 1987) was modified for use with adolescents by Winters, Stinchfield and Fulkerson (1993). Their instrument, the SOGS-RA, was first developed for a telephone survey. It demonstrated internal consistency reliability, and also demonstrated its validity by having a high correlation with frequent gambling. Since its original development, the SOGS-RA has been used successfully in numerous studies. The early studies using the SOGS-RA were reviewed by Shaffer et al. (1997), and some of the more recent studies were cited in our introduction. The SOGS-RA consists of 12 items, which are related to the DSM-III-R criteria for pathological gambling. An example is the "chasing" item: "In the past 12 months, how often have you gone back another day to try to win back the money that you lost?" Another example deals with loss of control: "In the past 12 months, have you ever gambled more than you planned to?" In the current study, the SOGS-RA items had a Cronbach's Alpha of 0.74, demonstrating good internal consistency reliability. Following the common practice in the literature, we refer to endorsement of two or three items as "at risk" gambling, and we refer to endorsement of four or more items as "problem gambling". The SOGS-RA was administered to every respondent who reported any gambling during his or her life.

For comparing problem/pathological gambling rates among youth with problem/pathological gambling rates from our national survey of adults, we used the Diagnostic Interview Schedule (DIS) for pathological gambling (Robins et al. 1996). The DIS for pathological gambling contains 13 items that map into the 10 DSM-IV criteria for pathological gambling, such as preoccupation with gambling and needing to gamble with increasing amounts of money to get the same excitement. In the current study, the DIS pathological gambling items had a Cronbach's Alpha of 0.79, demonstrating good internal consistency reliability. Endorsement of five or more criteria is considered pathological gambling, and for our purposes we considered endorsement of three or more criteria to be problem gambling. Respondents who endorsed the requisite number of criteria for the past

year are considered to be current pathological or problem gamblers. Before adopting this measure for the current study, we examined the items for applicability to adolescents and young adults. Based on face validity, 12 of the 13 items could be used unaltered, and we did so. For the 13th item, which asks about trouble with "spouse or partner", we changed the wording to "parent, other family member or close friend." We added a 14th item, which asks about missing a day or more of school because of gambling. This item was added to parallel an item about job trouble. These 14 questions are mapped into 10 DSM criteria. We will compare results from these questions to those obtained by almost identical questions in our adult national survey. In both the current youth survey and the earlier adult survey, we administered the DIS for pathological gambling to every respondent who reported any gambling during his or her life. In the current study, the DIS was administered after the SOGS-RA; in the previous adult survey the DIS was administered after the original adult version of the SOGS. Although having been administered after another screen for problem gambling could have influenced the DIS problem and pathological gambling rates in both surveys, comparability was maintained because the order effects were roughly the same for both surveys.

We based our examination of youth gambling on four dependent variables, each defined in terms of the 12 months before the interview: any gambling, frequent gambling (twice a week or more on average), at risk or problem gambling (2+ endorsements on the SOGS-RA) and problem gambling (4+ endorsements). Each of these is broken down by nine demographic and life transition variables, as shown in Table 3. In Table 4, these breakdowns are repeated among past-year gamblers only. For example, 18% of males were frequent gamblers, and 23% of males who gambled in the past year were frequent gamblers. We repeated the breakdowns with past-year gamblers only so that the decision to gamble and serious gambling involvement can be considered as separate steps. For an illustrative example, Table 3 shows that respondents in the lowest SES category are significantly less likely than middling SES respondents to have gambled in the past year. However, Table 4 shows that if they gambled, lower SES respondents are significantly more likely than others to be problem gamblers. The fact that low SES is oppositely related to gambling at these different steps suggests that the model which predicts who will gamble is different from the model which predicts those gamblers who will gamble frequently or with problems. Thus, separate examinations of all respondents and gamblers only are justified.

Significance tests were generated by logistic regressions, one for each column in Tables 3 and 4. In the first step, demographic variables (gender, age, race, SES and religion) were entered. The significance tests for each of these variables were done with the other four controlled. Life transitions (marital, employment, student status, living arrangement) were entered at the second step, so these significance tests are with all five demographics plus the other three life transition variables controlled. In the third step, interactions between gender and the other predictors were entered, and were tested with all main effects and other interactions controlled. The results of this third and last step appear in Table 5. The terms "ref" and "trend" in the first columns of Tables 3 and 4 show how the contrasts were arranged in the logistic regressions, with reference categories labeled "ref". For example, the reference category for race is "White", so the *** by "Asian" in the "any gambling" column means that Asian youth are significantly less likely than Whites to have gambled in the past year. The contrast category for SES is the three middle fifths, so that the highest and lowest fifths were compared with it. Age was a continuous independent variable, and therefore was tested as a trend.

Results

Table 2 shows the prevalence of SOGS-RA scores at each level up to five or more endorsements. The table shows that 87.3% of our respondents failed to endorse a single item. The most commonly published cutpoints on the SOGS-RA have been 4+ (problem gambling) and 2+ (at-risk or problem gambling), for which we found 2.1% and 6.5%, respectively. We have included this table so that our results can be compared with any study that used the SOGS-RA, regardless of the cutpoint that was used in the published results.

Table 3 shows the prevalence of various gambling measures. Sixty-eight percent of our respondents gambled in the past year, 11% gambled twice per week or more, 6.5% were

Table 2 U.S. youth and gambling survey past year problem gambling scores SOGS-RA

Number of items	%	Cumulative %
5+	1.3	1.3
4	0.8	2.1
3	1.0	3.1
2	3.4	6.5
1	6.2	12.7
0	87.3	100.0

Table 3 U.S. youth and gambling survey past-year gambling percentages respondents aged 14–21

	N	Any gambling (%)	Frequent gambling (%)	At-risk or problem gambling (%)	Problem gambling (%)
Overall	2,274	68	11	6.5	2.1
Male	1,148	77***	18***	10.6***	3.3***
Female (ref)	1,126	58	4	2.4	0.9
14–15 (trend)	588	60***	9**	5.0	1.7*
16–17	583	64	10	6.2	0.9
18–19	564	74	11	8.5	2.6
20–21	538	72	13	6.6	3.3
White (ref)	1,408	70	9	6.2	1.6
Black	334	60*	18***	8.1	3.4
Hispanic	373	71	14	6.5	2.8
Asian	83	48***	5	6.7	1.0
American Indian	27	83	28**	8.7	3.0
Mixed/unknown	50	45***	9	4.4	2.4
SES lowest 1/5	455	60***	16*	8.3	3.5
SES second 1/5 (ref)	454	67	12	5.0	1.0

Table 3 continued

	N	Any gambling (%)	Frequent gambling (%)	At-risk or problem gambling (%)	Problem gambling (%)
SES third 1/5 (ref)	456	75	11	8.0	3.5
SES fourth 1/5 (ref)	456	66	9	7.3	1.3
SES highest 1/5	454	70	6*	4.1*	1.1
Baptist	334	59***	13	8.0	2.0
Other protestant (ref)	858	71	10	6.4	2.4
Catholic	606	75	13	5.9	1.7
Mormon	65	37***	1	0.0	0.0
Jewish	36	58**	2	5.8	0.0
Other	77	42***	12	6.4	3.2
None	298	66*	10	8.1	2.5
Never married (ref)	2,143	67	11	6.4	1.9
Married	41	62	13	7.9	5.2
Living together	82	73	14	8.8	3.8
Employed full time	311	81**	16	7.7	5.5
Employed part time	578	70	9	6.0	0.6
Not employed (ref)	1,385	64	10	6.5	1.9
Not student (ref)	412	71	18	9.2	4.9
Student	1,862	67	9**	6.0	1.5
Lives with parents (ref)	2,011	66	11	6.4	1.7
Lives independently	263	76*	12	7.9	4.8*

* Significant at 0.05 level

** Significant at 0.01 level

*** Significant at 0.001 level

Note: "ref" indicates reference group; statistical significance from logistic regression

at-risk or problem gamblers, and 2.1% were problem gamblers. Males were very significantly higher than females on every measure of gambling involvement. Any gambling, frequent gambling, and problem gambling increased with age from 14 to 21. Blacks, Asians and "Mixed/Unknown" were less likely to have gambled than Whites. Blacks and American Indians were more likely to be frequent gamblers than Whites. Eighteen percent (18%) of Blacks and 28% of American Indians gambled twice per week or more, as compared to 9% of Whites. There were no detectable differences by race in at-risk/problem or problem gambling. The lowest SES respondents were least likely to gamble. However, frequent gambling was most common among low SES respondents, and least common among high SES respondents. Likewise, at-risk/problem gambling was least common at the high end of SES. Religion was related to "any gambling", with every religious group except Catholics less likely than "other (than Baptist) Protestants" to have gambled. Marital status showed no consistent relationship to gambling involvement.

Table 4 U.S. youth and gambling survey past-year gambling percentages respondents aged 14–21 past-year gamblers only

	N	Frequent gambling (%)	At-risk or problem gambler (%)	Problem gambler (%)
Overall	1,535	16	9.7	3.1
Male	878	23***	13.9***	4.3***
Female (ref)	657	7	4.1	1.5
14–15 (trend)	356	15*	8.2	2.7*
16–17	376	16	9.6	1.5
18–19	418	15	11.4	3.5
20–21	387	19	9.2	4.5
White (ref)	986	12	8.8	2.3
Black	201	30***	13.5	5.6
Hispanic	264	19	9.2	3.9
Asian	39	10	14.1	2.2
American Indian	22	34*	10.5	3.7
Mixed/unknown	22	20	9.7	5.3
SES lowest 1/5	275	26**	13.7	5.8*
SES second 1/5 (ref)	303	19	7.5	1.5
SES third 1/5 (ref)	341	15	10.7	4.7
SES fourth 1/5 (ref)	301	14	11.1	2.0
SES highest 1/5	316	8**	5.8*	1.6
Baptist	196	22*	13.6	3.5
Other protestant (ref)	611	14	9.0	3.4
Catholic	456	17	7.8	2.2
Mormon	24	2	0.0	0.0
Jewish	21	3	10.0	0.0
Other	33	29*	15.0	7.5
None	196	15	12.3	3.8
Never married (ref)	1,444	16	9.5	2.8
Married	26	20	12.8	8.5
Living together	60	19	12.1	5.2
Employed full time	251	20	9.6	6.8
Employed part time	402	13	8.6	0.9
Not employed (ref)	882	16	10.2	3.0
Not student (ref)	294	26	12.6	6.8
Student	1,241	14***	8.9	2.2
Lives with parents (ref)	1,335	16	9.6	2.6
Lives independently	200	16	10.4	6.3

* Significant at 0.05 level

** Significant at 0.01 level

*** Significant at 0.001 level

Note: "ref" indicates reference group; statistical significance from logistic regression

Table 5 U.S. youth and gambling survey past-year gambling percentages by gender and age

Age	*N*		Any gambling		Frequent gambling		At risk or problem gambling		Problem gambling	
	M	F	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)
14–15	282	306	68	53	*13*	*5*	7.3	2.4	2.6	0.6
16–17	282	301	76	52	*16*	*4*	10.9	1.1	1.9	0.0
18–19	289	276	83	65	*19*	*3*	14.3	2.9	4.3	0.9
20–21	274	265	80	64	*23*	*4*	10.2	3.1	4.6	1.9

Note: Italics indicates gender by age interaction significant at 0.05 level

Note that the statistical tests pertaining to employment, student status and living arrangement are all reported with every other predictor, including age, held constant. Those who were employed full time were significantly more likely to have gambled in the past year than those not employed. Non-students were significantly more likely to have gambled frequently than were students. Respondents who lived independently were significantly more likely to have gambled in the past year and to have been problem gamblers than those who lived with their parents. Although only these four contrasts on the life transition variables reached statistical significance, it may be worth noting that those who were employed full time, were not students and lived independently of their parents were higher than their counterparts on all measures of gambling involvement.

Table 4 reports the prevalence of frequent, at-risk and problem gambling only for those respondents who gambled in the past year. As mentioned earlier, we reported these results separately because the factors which predict whether an individual gambles or not may be different from those factors which predict which gamblers will become heavily involved. Male gender and increased age are associated with an increased probability of gambling in the past year (as Table 3 also shows) and also with increased gambling involvement among those who do gamble. Table 4 shows that male gamblers are higher than females on every measure, and that frequent gambling and problem gambling increase with age among those who gambled in the past year. Blacks are less likely than Whites to have gambled in the past year (Table 3), but if they gambled, Table 4 shows that they are much more likely than Whites (30% vs. 12%) to gamble frequently. Table 3 shows that respondents in the lowest fifth of SES are the least likely to have gambled in the past year. However, Table 4 shows that among those who gambled, the lowest SES is associated with the highest gambling involvement, and the highest SES is associated with the lowest gambling involvement. Among gamblers, the lowest fifth of SES had the highest rates of frequent gambling and problem gambling. The highest fifth of SES had the lowest rates of frequent gambling and at-risk/problem gambling. The results pertaining to religion also show reversals. Other religions (which include Moslem, Hindu, Buddhist, Jehovah's Witnesses and others) had a very low rate of having gambled in the past year (42%), but if they gambled, they had higher rates of frequent gambling than any other religious group. Similarly, Baptists were less likely than other Protestants to have gambled in the past year, but if they gambled, they had higher rates of frequent gambling.

Table 5 and Fig. 1 show the noteworthy result that emerged from our tests of gender interactions. Only one interaction between gender and the other predictors was significant—the interaction between gender and age, with frequent gambling as the dependent variable. Table 5 shows the gambling measures broken down jointly by gender and age. As Fig. 1 shows more dramatically than the table, frequent gambling increased with age among males, but not among females. There is a suggestion of this same pattern with

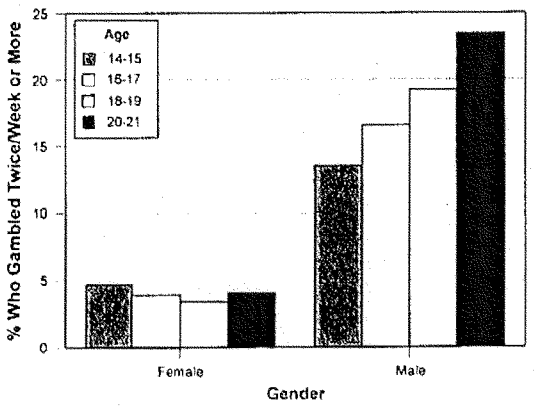

Fig. 1 Percentage of frequent gamblers by age and gender

at-risk/problem gambling and problem gambling, but these interactions were not statistically significant.

Table 6 shows a comparison between problem/pathological gambling rates in the current study and our national U.S. adult (18 and older) survey conducted in 2000. The other problem gambling results reported in this article were measured using the SOGS-RA, but these results were measured using the DSM-IV DIS for problem/pathological gambling. This measure was used in both studies, with only minor modifications as described in the methods section. The results for problem gambling (our term for an endorsement of 3+ DSM criteria) show that the rates for males in the two studies are identical (4.2%), but the rate for females in the adult study (2.9%) is much higher than the rate for females in the youth study (0.1%). As measured by DSM-IV criteria, problem gambling is almost nonexistent among adolescent and young adult females. The results for pathological gambling (last column of Table 6) show that adult males have a higher rate of pathological gambling than adolescent and young adult males, and that adult females have a much higher rate than adolescent and young adult females. In the youth survey, pathological gambling by DSM-IV criteria did not occur among females. These results do not support the supposition that problem gambling is more common among young people than adults. These results are consistent with the supposition that gambling problems develop later in life for females than for males.

Table 6 U.S. youth and adult gambling survey rates of problem and pathological gambling measured by DSM-IV criteria

		Problem gambling 3+ DSM-IV criteria (%)	Pathological gambling 5+ DSM-IV criteria (%)
Youth survey $N = 2,274$	Male	4.2	0.7
	Female	0.1	0.0
	Overall	2.2	0.4
Adult survey $N = 2,631$	Male	4.2	1.3
	Female	2.9	1.4
	Overall	3.5	1.4

Discussion

The rates of problem gambling found in the current study are not as high as the rates of problem gambling found in other surveys which used the SOGS-RA and defined problem gambling as 4 or more positive answers. It is possible that differences in study design might account for some of this difference. Among the eight surveys listed in Table 1, five were school surveys. The school surveys produced the three highest rates, but also the two lowest rates. The remaining three studies were telephone surveys. One of these sampled from listed numbers, and another used an "age-targeted", non-probability sample. Only one study (Carlson and Moore 1998) seems to have been a random-digit-dial survey. Our currently reported survey was sampled with a known probability from a frame that included all phone numbers, and therefore is closest to a representative household sample. Having made this observation, it is not clear why this would make our estimate of the rate of problem gambling lower than the others. For example, school surveys obtain data only from those who are attending school, but one would not think that this constitutes a bias for more problem behaviors. The 95% confidence interval for our 2.1% rate of problem gambling is roughly plus or minus half a percent, making it unlikely that the current study found a lower problem gambling rate than the eight studies in Table 1 by chance. Also, the rates of other problem behaviors (such as conduct disorder and daily marijuana use) in our sample are high relative to the rates found in the literature; and therefore, we did not obtain a sample low in problem behaviors, either by chance or by method bias. Some of the reasons suggested by Jacques and Ladouceur (2003) for overestimation of the rate of youthful problem gambling do not apply to the comparison between our survey and those in Table 1. All of these studies all used the same cutpoint—four or more endorsements. Question misinterpretation does not explain the difference, because the same questions were used. Wrong scoring is not likely with the SOGS-RA, which has a very straightforward scoring procedure. The most likely explanation is that the rate of problem gambling in the U.S. as a whole is lower than in many of the smaller jurisdictions in which surveys have been conducted.

Our results provide an opportunity to examine the influence of demographics and life transitions on gambling. Males were much higher than females on every measure of gambling. This was not the case in our 2000 adult survey, in which the "gender gap" in gambling involvement was much narrower (Welte et al. 2001). It seems likely that females' gambling involvement tends to emerge in adulthood, while male involvement can be high in adolescence. This point is underscored by Fig. 1, which shows graphically how male frequent gambling is increasing at an early age, whereas female frequent gambling is stable. While three of our four measures of gambling involvement increased significantly with age in the 14–21 range, that increase comes primarily from males.

Asians were the racial group that showed the lowest gambling involvement. This is an interesting result in view of the commonly accepted notion (e.g., Liu 2006) that Asians are heavy gamblers. While it is possible that Asian gambling involvement develops later in life, it is also possible that examination of a representative sample simply fails to uphold a stereotype. Blacks are the least likely to have gambled, but Black gamblers are among the highest in gambling involvement. This replicates the finding in our national adult survey (Welte et al. 2001), and also is similar to the findings in general population surveys with respect to alcohol, which invariably find Blacks with a high percentage of abstainers, but may also find relatively high rates of alcohol abuse among Blacks who are drinkers (Welte et al. 2001). We have a small sample of American Indians, so it is difficult to obtain a statistically significant contrast. However, their rate of frequent gambling is so much higher than the reference group (28% for American Indians as opposed to 9% for Whites)

that it is statistically significant. They are also relatively high on measures of problem gambling. We might speculate that there is a connection between this result and the rapid spread of legal gambling in Indian communities.

Low SES respondents are most likely to have abstained from gambling, just as many studies have shown them to be the most likely to have abstained from alcohol (Welte et al. 2001). However, among gamblers, our results show a clear tendency for gambling involvement and negative consequences to increase as SES declines. We have elsewhere hypothesized that lower SES persons are more prone to gamble excessively because they see gambling as a reasonable method to improve their financial status (Welte et al. 2004). Religion clearly influences the decision to gamble, with Mormons, Jews and Baptists less likely to have gambled than the reference group ("Other Protestants"). Catholics were the most likely to gamble, not surprising as they are practitioners of a religion that is generally tolerant of gambling. For the other gambling involvement variables, we see little in the way of significant religious differences, but here again we have a small group problem. Nevertheless, it may not be a coincidence that Mormons reported 1% frequent gamblers (average for the entire sample was 11%) and also reported 0% problem or at-risk gamblers, as they are practitioners of a religion that discourages gambling.

We also examined the relationship between four life transitions (marriage, employment, living independently and student status) and gambling involvement. Those who work full time are more likely to gamble, those who are not students are more likely to gamble frequently, and those who live independently are more likely to gamble and to be problem gamblers. All statistically significant results show that greater gambling involvement is associated with an adult status. In fact, those who work full time, are not students and live independently are higher than their counterparts on all four measure of gambling involvement. These results suggest that, in the minds of some, gambling may be associated with the transition to adulthood.

We compared the pathological and problem gambling rates in our adult and youth studies, using the same measure, the DIS for pathological gambling. This comparison showed lower rates of problem and pathological gambling among adolescents/young adults than among all adults. When also considering the relatively low rate of problem gambling that we found using the SOGS-RA, our results are not consistent with the common notion that problem gambling is more prevalent among adolescents than among adults. Our results do support those researchers, some of whom we cited earlier, who have questioned that notion.

While there have been numerous surveys of adolescent gambling conducted in U.S. states, there has been a lack of studies of this topic in the nation as a whole. In this article, we have presented results from the first national U.S. survey of gambling among adolescents and young adults. We have found that gambling is widespread among U.S. youths. We also found a problem gambling rate which projects to approximately three quarters of a million problem gamblers among U.S. residents aged 14–21. In a society where young people are increasingly exposed to gambling influences, this is a cause for concern.

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References

Adlaf, E. M., & Ialomiteanu, A. (2000). Prevalence of problem gambling in adolescents: Findings from the 1999 Ontario student drug use survey. *Canadian Journal of Psychiatry, 45*(8), 752–755.

Burge, A. N., Pietrzak, R. H., Molina, C. A., & Petry, N. M. (2004). Age of gambling initiation and severity of gambling and health problems among older adult problem gamblers. *Psychiatric Services, 55*, 1437–1439.

Carlson, M. J., & Moore, T. L. (1998). *Adolescent gambling in Oregon: A report to the Oregon gambling addiction treatment foundation*. Salem, Oregon: Funded by the Oregon Gambling Addiction Treatment Foundation.

Connecticut Council on Problem Gambling. (1998). *Gambling and problem gambling among Connecticut high school students*. Guildford, CT: Author.

Derevensky, J. L., Gupta, R., & Winters, K. (2003). Prevalence rates of youth gambling problems: Are the current rates inflated? *Journal of Gambling Studies, 19*(4), 405–425.

Fisher, S. (1999). A prevalence study of gambling and problem gambling in British adolescents. *Addiction Research, 7*(6), 509–538.

Hauser, R. M., & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology, 27*, 177–298.

Jacobs, D. F. (2004). Youth gambling in North America: Long-term trends, future prospects. In J. L. Deverensky & R. Gupta (Eds.), *Gambling problems in youth. Theoretical and applied perspectives* (pp. 1–24). New York: Kluwer Academic/Plenum Publishers.

Jacques, C., & Ladouceur, R. (2003). DSM-IV-J criteria: A scoring error that may be modifying the estimates of pathological gambling among youths. *Journal of Gambling Studies, 19*(4), 427–431.

Ladouceur, R., Bouchard, C., Rheaume, N., Jacques, C., Ferland, F., Leblond, J., & Walker, M. (2000). Is the SOGS an accurate measure of pathological gambling among children, adolescents and adults? *Journal of Gambling Studies, 16*, 1–24.

Langhinrichsen-Rohling, J., Rohling, M. L., Rohde, P., & Seeley, J. R. (2004). The SOGS-RA vs. the MAGS-7: Prevalence estimates and classification congruence. *Journal of Gambling Studies, 20*(3), 259–281.

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks gambling screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144*(9), 1184–1187.

Liu, L. (2006). *Casinos winning big by betting on Asians*. Washington Post: The Associated Press.

Moodie, C., & Finnigan, F. (2006). Prevalence and correlates of youth gambling in Scotland. *Addiction Research and Theory, 14*(4), 365–385.

National Opinion Research Center. (1999). *Gambling impact and behavior study*. Chicago: Author.

Olason, D. T., Sigurdardottir, K. J., & Smari, J. (2006). Prevalence estimates of gambling participation and problem gambling among 16–18-year-old students in Iceland: A comparison of the SOGS-RA and DSM-IV-MR-J. *Journal of Gambling Studies, 22*(1), 23–39.

Poulin, C. (2002). An assessment of the validity and reliability of the SOGS-RA. *Journal of Gambling Studies, 18*(1), 67–93.

Robins, L., Marcus, L., Reich, W., Cunningham, R., & Gallagher, T. (1996). *NIMH Diagnostic Interview Schedule—Version IV (DIS-IV)*. St. Louis: Department of Psychiatry, Washington University School of Medicine.

Shaffer, H. J., Hall, M. N., & Bilt, J. V. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canada: A meta-analysis*. Boston, MA: Harvard Medical School.

Stinchfield, R., Cassuto, N., Winters, K., & Latimer, W. (1997). Prevalence of gambling among Minnesota public school students in 1992 and 1995. *Journal of Gambling Studies, 13*(1), 25–48.

Volberg, R. A. (1993). Gambling and problem gambling among adolescents in Washington state. Report to the Washington State Lottery.

Volberg, R. A. (1998). *Gambling and problem gambling among adolescents in New York*. Albany, NY: NY Council on Problem Gambling.

Wallisch, L. S. (1993). *1992 Texas survey of adolescent gambling behavior*. Texas: Texas Commission on Alcohol and Drug Abuse.

Welte, J. W., Barnes, G. M., Wieczorek, W. F., Tidwell, M., & Parker, J. (2001). Alcohol and gambling pathology among U.S. adults: Prevalence, demographic patterns and co-morbidity. *Journal of Studies on Alcohol, 62*(5), 706–712.

Welte, J. W., Wieczorek, W. F., Barnes, G. M., Tidwell, M., & Hoffman, J. H. (2004). The relationship of ecological and geographic factors to gambling behavior and pathology. *Journal of Gambling Studies, 20*(4), 405–423.

Westphal, J. R., Rush, J. A., Stevens, L., & Johnson, L. J. (2000). Gambling behavior of Louisiana students in grade 6 through 12. *Psychiatric Services, 51*(1), 96–99.

Wiebe, J. M. D., Cox, B. J., & Mehmel, B. G. (2000). The South Oaks gambling screen revised for adolescents (SOGS-RA): Further psychometric findings from a community sample. *Journal of Gambling Studies, 16*(2/3), 275–288.

Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993). Toward the development of an adolescent gambling problem severity scale. *Journal of Gambling Studies, 9*(1), 63–84.

Winters, K. C., Stinchfield, R. D., & Kim, L. G. (1995). Monitoring adolescent gambling in Minnesota. *Journal of Gambling Studies, 11*(2), 165–183.

Mrs. BONO MACK. And Dr. Volberg, it is your 5 minutes.

STATEMENT OF RACHEL A. VOLBERG

Ms. VOLBERG. Good morning, Madam Chairman, Ranking Member Butterfield, and members of the subcommittee.

Mrs. BONO MACK. Can you please pull your microphone a little closer?

Ms. VOLBERG. OK, is that better?

Mrs. BONO MACK. Yes, thank you.

Ms. VOLBERG. My name is Rachel Volberg. I am a sociologist at NORC at the University of Chicago, and I have been doing research on gambling and problem gambling for 26 years.

The Internet gambling market is large and growing rapidly. Poker is the most popular form of online gambling, and accounts for 60 percent of online gambling activity but for only 23 percent of online gambling revenues. The majority of Internet poker players are young men with relatively high levels of education, and perhaps a few older men as well.

With regard to problem and pathological gambling, there is substantial research showing that prevalence rates are three to four times higher among Internet gamblers compared to non-Internet gamblers. Now, critics argue that Internet gambling does not cause problem gambling, but that instead problem gamblers are attracted to Internet gambling and add it to a repertoire of other gambling activities.

Results from a new longitudinal study in Canada show that while both of these things happen, the most common pathway is actually for Internet gamblers to develop problems subsequent to beginning to gamble on the Internet.

Now, most things that go up usually come down, and this is true in epidemiology as well. Research shows that problem gambling prevalence does eventually level out and decline, even if accessibility does continue to increase. Among the likely contributors to such declines are greater public awareness, decreased participation once the novelty has worn off of a new form of gambling, increased government and industry efforts to provide gambling more safely, expanding services for problem gamblers, the increased age of the population, and, unfortunately an outflow of problem gambling cases due to severe personal or financial crisis, criminal charges or, in extreme cases, suicide.

H.R. 2366 provides for Federal oversight of State and tribal agencies that will issue licenses for online poker, but leaves responsibility for setting consumer protection standards to the States and tribes. This arrangement virtually guarantees that programs to prevent and mitigate problem gambling will vary significantly across jurisdictions. And while the competition among online gambling providers will ensure a cost-efficient and appealing consumer product, a free market is likely to come at the cost of less player protection.

Beyond requiring licensees to establish self-exclusion programs, I believe some additional minimum requirements are needed. These include a requirement for players to set limits with regard to time and money, a 24-hour cooling off period before changes to

limits can be made, monthly financial statements, and self-assessment tests.

It would be best if these measures, as well as the self-exclusion program, were operated by a third-party independent organization. Such an approach offers many advantages. One significant one is that it would allow players who wish to self-exclude to visit a single site and exclude themselves from all of the domestic sites at one time, rather than having to go to each gambling site individually.

Finally, even these measures will be insufficient without a mechanism to adequately fund prevention, treatment, and research on problem gambling in the United States. I agree with the National Council on Problem Gambling that a minimum of $50 million in new Internet gambling revenue must be dedicated to these programs.

Unfortunately, the United States lags far behind other countries in this regard. State funding for problem gambling services per capita is approximately one-twentieth the level it is in countries such as Australia and Canada, and there has never been a Federal agency with primary responsibilities to address problem gambling. I therefore also urge you to support H.R. 2334, which designates SAMHSA as the lead Federal agency on problem gambling.

Online gambling is here to stay and will continue to evolve. The question is what governments can and will do to create a safety net for their citizens, to minimize the likely increase in the number of problem gamblers, to provide treatment for those afflicted, and to ensure that research is undertaken to understand the impacts of Internet gambling on society.

Thank you for the opportunity to testify, and I look forward to answering your questions.

Mrs. BONO MACK. Thank you, Dr. Volberg.

[The prepared statement of Ms. Volberg follows:]

Testimony of Rachel A. Volberg

Senior Research Scientist

NORC at the University of Chicago

Before the House Energy and Commerce Committee

Subcommittee on Commerce, Manufacturing, and Trade

Hearing on

"Internet Gaming: Regulating in an Online World"

Rayburn House Office Building, Washington, DC

November 18, 2011

Summary of Testimony

Internet gambling is a fluid and dynamic market characterized by significant inter-jurisdictional inconsistencies. As a result, policymakers, operators and other stakeholders face substantial ambiguities about the best approach to legalizing and regulating Internet gambling. My testimony today addresses three issues: (1) whether revenue projections for legalized Internet poker will be met; (2) whether there will be an increase in the number of problem gamblers as a result of legalizing Internet poker; and (3) what can be done from a regulatory perspective to prevent or mitigate likely increases in the prevalence of problem gambling in the wake of the introduction of Internet poker.

Good morning Chairwoman Bono Mack, Ranking Member Butterfield, and Members of the Subcommittee. Thank you for inviting me to testify this morning. My name is Rachel Volberg. I am a Senior Research Scientist at NORC at the University of Chicago, I live in Western Massachusetts, and I have specialized in population studies of gambling and problem gambling for 26 years.

The Current Situation: Inter-Jurisdictional Confusion and Competition

Online gambling has only existed since 1995 and, internationally, different countries are experimenting with a range of approaches to legalization. Some countries prohibit most or all forms of online gambling; at the other end of the spectrum are countries that permit nearly all forms of online gambling. In the middle are countries that have put in some legal restrictions, those that provide for a domestic online market with patronage restricted to their own citizens, those that also prohibit residents from accessing online gambling outside the country, and those that operate online gambling but prohibit their own residents from accessing the sites (Williams, Wood, & Parke, 2012 in press; Wood & Williams, 2009).

There are many arguments to be made in support of Internet gambling legalization. Proponents of legalization point out that:

- it is exceedingly difficult to effectively prohibit online gambling;
- over time, populations adapt to the presence of problematic products and develop some 'inoculation' from further harm; and
- legally regulated sites better ensure player protection and deter crimes.

There are also compelling arguments for prohibition, some in direct counterpoint to the arguments for legalization. The main arguments in defense of prohibition are:

- the purpose of laws is to codify societal values in an effort to shape, rather than conform to, people's behavior;
- legalization will likely increase rates of problem gambling; and
- player protection tools are likely to have only modest efficacy in preventing problem gambling.

While there are strong economic incentives for governments to legalize and regulate Internet gambling, there is, as yet, no satisfactory model proposed to regulate these activities.

Australia was one of the earliest countries to attempt to license and regulate Internet gambling. In 2001, the Australian Government passed the Interactive Gambling Act (IGA) which permits Australian states and territories to license and regulate online operators. The eight Australian states and territories have each created different gambling policies and regulations but inter-state competition has given rise to substantial discord; for example, around the flouting of advertising standards (Gainsbury & Wood, 2011). The lack of cohesive policies recently led the Australian Productivity Commission (2010) to recommend that Australia implement a national regulatory approach.

In Canada, most forms of gambling are regulated at the provincial level and provincial governments are generally the owners and operators of provincial gambling enterprises. There have been several forays into online gambling in Canada. These were led initially by Internet-based horse race wagering followed by the offer of lottery products and then other forms of gambling by provincial lotteries. In 2010, British Columbia and Quebec made Internet gambling available to their citizens and

the two provinces will soon permit their residents to compete against each other in online poker games. Ontario will begin offering Internet gambling to its citizens in 2012.[1]

In 2006, Congress passed the Unlawful Internet Gambling Enforcement Act (UIGEA) which made it illegal for financial transaction providers to transfer funds to online gambling sites. In the wake of this legislation, a significant number of online gambling sites stopped taking bets from U.S. citizens. UIGEA exempts online intra-state sales of lottery tickets, inter-state horse race betting and some types of intra-state online gambling. Despite the law, many U.S. players circumvent UIGEA by using non-U.S. financial transaction intermediaries to place bets. While overall participation in Internet gambling in the United States is quite low (estimates range from 0.3% to 3.0%) (Rasmussen Reports, 2006; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2002), a recent survey of international online gamblers found that 25% of the respondents were from the United States (Wood & Williams, 2009).

Will Revenues Meet Projections?

While revenues from Internet gambling can be difficult to determine, it is estimated that worldwide online gambling revenues rose from $600 million in 1998 to $16.6 billion in 2008. Poker is the most popular form of online gambling and accounts for approximately 60% of online gambling activity but for only 23% of the worldwide online gambling market, compared with 38% for sports/racebooks and 25% for online casinos (Global Betting and Gaming Consultants, 2008, cited in Wood & Williams, 2009). Extrapolating from these figures, it appears that online poker generates approximately $4 billion in annual revenues worldwide.

[1] Along with my colleague Rob Williams from the University of Lethbridge, I am just beginning a three-year project to study the impacts of online gambling legalization in Ontario. The study is funded by the Ontario Problem Gambling Research Centre.

As far as I have been able to determine, there are no published estimates of the revenues that would likely be generated by the legalization of online poker in the United States. However, the Joint Committee on Taxation has published an analysis of projected tax revenues if a broader Internet gambling regime were legalized. Estimated federal tax revenues under four different scenarios ranged from $10 billion to nearly $42 billion over a ten-year period (Barthold, 2009). A separate analysis by PricewaterhouseCoopers estimated that between $13 billion and $26 billion in tax revenues would be generated over ten years. If no states were permitted to opt out of the legislation, it was estimated that legalized Internet gambling would generate nearly $49 billion over ten years (PricewaterhouseCoopers, 2009).

An interesting feature of these analyses is that they apparently assume that, if U.S. companies are permitted to offer online gambling, then these companies will capture the entire worldwide online gambling market. Although Internet gambling is relatively young, this is a mature market with significant barriers for new online gambling companies. Legally sanctioned domestic sites will only be patronized to the extent that they offer a competitive advantage to the consumer. However, existing 'offshore' jurisdictions have a strong competitive advantage by virtue of their longer established presence. Furthermore, regardless of whether Internet gambling is legalized in the United States, there will always be many non-domestic sites available to online gamblers (Williams et al., 2012 in press).

In France, it is estimated that only 43% of the Internet gambling market is currently captured by legal domestic sites (MAG, 2011). In Britain, only 25% of the estimated £2.5 billion that British consumers spend annually on Internet gambling goes to operators licensed by the British Gambling Commission (Williams et al., 2012 in press). A more salient example comes from Sweden where the introduction of a legal domestic online poker site, in 2006, led to a significant increase in overall Internet gambling participation (Swedish National Institute of Public Health, 2010). However, in a separate

survey, only 28% of Swedish online poker players reported patronizing the domestic site exclusively while another 25% of players reported patronizing several poker sites including the domestic site (Jonsson, 2012 in press). If these figures are extrapolated to a legalized U.S. market, tax revenues from Internet gambling are more likely to be in the range of $3 billion to $12 billion over ten years.

Finally, it is possible that legalizing online gambling and providing domestic access may actually increase monetary outflow rather than retaining it. This is a lesson learned in the late 1980s and 1990s from the introduction of domestic-market casinos in North American states and provinces, intended to capture gambling dollars that were being spent in Nevada and Atlantic City. Nevada experienced an enormous growth in gambling revenues in this period because the creation of domestic casinos led to increases in casino gambling participation which led, in turn, to increased visits to major international gambling destinations (Williams, Belanger, & Arthur, 2011).

A Likely Increase in Problem and Pathological Gambling

Prevalence (or total stock) of a disorder is determined by incidence, or the inflow of new cases, duration, and the outflow of current cases through recovery, migration or death (Abbott, 2006). In the study of clinical disorders, pathological gambling is considered a chronic disorder. Chronic disorders strongly tend to recur once fully developed, constituting a lifelong vulnerability. This vulnerability to relapse may be effectively treated and kept in check. But a period in which the individual is relatively free of symptoms does not mean that the person is free of the disorder.

One reason that legalization of Internet gambling may lead to an increase in the rate of problem gambling is that legalization provides tacit governmental approval for these activities and leads citizens to assume that the products are safe. This in turn typically leads to an increase in overall participation,

as is also seen in the legalization/decriminalization of prostitution, abortion, and cannabis (Alan Guttmacher Institute, 2008; Jakobsson & Kotsadam, 2011; MacCoun, 2010; Wardle, Griffiths, Orford, Moody, & Volberg, 2011). Increases in overall participation tend to be reliably associated with increases, at least temporarily, in the prevalence of problem gambling (Grun & McKeigue, 2000; Lund, 2008; Rose, 1985; Williams, Volberg, & Stevens, 2011).

Another reason that legalization is likely to increase rates of problem gambling is because the nature of online gambling makes it inherently more problematic than most other forms of gambling. Greater convenience, easier access, the solitary nature of play, the ability to play when intoxicated, the lack of realistic cash markers, and the ability to play multiple sites and/or games simultaneously are all features that contribute to a diminution in players' ability to control their involvement. Another challenge is that Internet problem gamblers have a much more difficult time avoiding gambling venues which are available at the click of a mouse (Schull, 2005; Wood, Williams, & Lawton, 2007).

There is substantial research showing that the prevalence of problem gambling is three to four times higher among Internet gamblers compared to non-Internet gamblers (Griffiths & Barnes, 2008; Jonsson, 2012 in press; Ladd & Petry, 2002; Wood & Williams, 2007, 2009). In California in 2006, although only 2.1% of our respondents had ever gambled on the Internet, 11.3% of these individuals were classified as pathological gamblers and another 19.2% were classified as subclinical problem gamblers. In a logistic regression analysis that controlled for individual demographics and co-occurring behaviors and disorders, respondents who had gambled on the Internet in the past year were ten times more likely to be a problem or pathological gambler compared with those who had not gambled on the Internet (Volberg, Nysse-Carris, & Gerstein, 2006).

Most things that go up usually come down and this is as true in epidemiology as in other realms. Epidemiological research strongly suggests that problem gambling prevalence does eventually level out

and decline, even if accessibility continues to increase (Williams, Volberg et al., 2011). Greater public awareness, expanding services for problem gamblers and regulatory, industry and public health measures are among the likely contributors to such declines. What is not known is how quickly these and other factors can have a significant impact. It is also not known if these factors can prevent problem escalation even if introduced concurrently with increased access to gambling (Abbott, 2005; Abbott, Volberg, Bellringer, & Reith, 2004).

While longitudinal studies of gambling have only recently begun to yield results, one consistent and recurring theme emerging from these studies is that most gambling problems tend to resolve over time (Abbott & Clarke, 2007; LaPlante, Nelson, LaBrie, & Shaffer, 2008; Slutske, Jackson, & Sher, 2003). However, in the only study to date to examine problem gambling incidence, the researchers found that among adults who became problem gamblers over a 12-month period, approximately one-third were new cases without a previous history of problem gambling while two-thirds were classified as relapsing cases (Victoria Department of Justice, 2011).

While there are good theoretical grounds to believe that Internet gambling contributes to problem gambling, it is possible that problem gamblers simply add Internet gambling to their repertoire. Very recent longitudinal research in Ontario, Canada has found that both directional routes occur. However, Internet gambling leading to problem gambling tends to be the most common pathway (Wood, Williams, & Parke, 2012 in press). Although there is speculation about an 'inoculation effect,' such that gamblers eventually habituate and overcome difficulties related to their gambling, most of the financial, psychological, social, work/school and legal harms associated with problem gambling cannot be undone (Gainsbury & Wood, 2011; Williams et al., 2012 in press). Given this scenario, it is essential that regulatory policies take account of likely increases in problem gambling in the wake of the legalization of online poker in the United States.

The Proposed Regulatory Model Needs Improvement

In 1999, the National Gambling Impact Study Commission (1999) pointed out that, unlike other consumer businesses, legal gambling has largely been shaped by government decisions, at the federal, state and local levels. The Commission commented that "rivalry and competition for investment and resources" were the driving factors in government decision-making related to legalized gambling in America and noted that "even the states concede that only Washington has the potential to control gambling on the Internet" (1999, p. 1-5). The latest round of casino legalization in the Northeast of the United States suggests that the situation with regard to inter-state competition for gambling revenues has not changed in the intervening years.

H.R. 2366 provides for Federal oversight of state and tribal agencies that will issue licenses for online poker through a newly-established Office of Internet Poker Oversight within the Department of Commerce (Section 103). This office will have the responsibility to prescribe minimum standards for qualifying these state and tribal agencies but will have no role in settings standards or issuing licenses to operate online poker (Section 104). Instead, each state and tribal agency will be required to establish requirements for the development of a Compulsive Gaming, Responsible Gaming, and Self-Exclusion Program that each licensee will be required to implement as a condition of licensure (Section 106). A self-exclusion program represents the minimum standard required in H.R. 2366.

The provisions in H.R. 2366 virtually guarantee that requirements for programs to prevent and mitigate gambling-related problems will vary significantly across the states. There is already tremendous variability in existing efforts to address problem gambling in the United States, with per capita expenditures on problem gambling services, including prevention, treatment and research, ranging from $1.36 in Iowa to less than one cent in Maryland (Marotta, Moore, & Christensen, 2011).

With each state responsible for its own consumer protection and harm minimization requirements, and with states invariably competing with one another for players and revenues, some states will implement far less restrictive regimes than others and players, migrating to these less restrictive sites, will not benefit from the tools that are put in place to protect consumers and prevent gambling problems. While competition among online gambling providers ensures a cost-efficient and appealing consumer product, a free market is likely to come at the cost of less player protection (Williams, West, & Simpson, 2008).

Some countries have enacted legislation that requires gambling providers to effectively mitigate harm from the provision of gambling. For example, Germany has legislation that, among other things, requires all new gambling products to be reviewed by an advisory board of gambling addiction experts prior to their introduction (Meyer, Hayer, & Griffiths, 2009). In Sweden, the responsible gambling program implemented by Svenska Spel includes limits in marketing and advertising, a self-exclusion feature, and a mandatory requirement for all players to set limits with regard to time and money. The program also includes a self-assessment (GAM-TEST) where players can receive objective feedback on their gambling habits. A required independent evaluation of the program, called Playscan (http://www.playscan.com/), found that reasonable time and monetary limits were set by the majority of players and, for those who set reasonable limits, most abide by those limits (Jonsson, 2012 in press).

Beyond the requirement that licensees establish self-exclusion programs, additional minimum consumer protection and harm minimization requirements are needed in H.R. 2366. These should include an opt-out requirement for players to set daily, weekly and monthly limits with regard to time and money with changes only possible after a 24-hour cooling-off period, monthly financial statements, and self-assessment tests. All of these are measures supported strongly by Internet gamblers surveyed worldwide (Parke, Rigbye, Parke, & Williams, 2007). It would be best if these consumer protection

measures as well as the self-exclusion program were operated by a third-party, independent organization rather than by the online gaming operators or the licensing state and tribal agencies. In particular, this would allow players who wish to self-exclude to visit a single site where they can exclude from all of the domestic sites at one time rather than having to exclude themselves from each site individually.

While establishing and enforcing these minimum consumer protections will be helpful, these measures will not be adequate without a mechanism to adequately fund prevention, treatment and research on problem gambling in the United States. You heard last month from Keith Whyte of the National Council on Problem Gambling who requested your support for H.R. 2334, the Comprehensive Problem Gambling Act, which would set aside $50 million in gaming revenues to fund such programs. In my view, this is the bare minimum required. The United States lags far behind other countries in this regard: there has never been a Federal agency with primary responsibility to address problem gambling and state funding for problem gambling prevention, treatment and, most especially, research is approximately one-twentieth of the level in countries such as Australia and Canada (Volberg, 2009).

Conclusion

While online gambling offers better possibilities, compared to land-based forms of gambling, to implement player protection measures, there are unmistakable challenges in providing these tools and ensuring that the players most in need of protection actually use them. If Internet poker is legalized in the United States, it will be important to ensure that these tools are available to players on all licensed sites. It will also be important to establish an independent agency through which these tools are made available to players in order to overcome the reluctance demonstrated to date by the online gambling industry to implement cross-operator player protection tools (Dragicevic, 2011).

The pre-commitment constraints that most online sites presently allow players to impose tend to be voluntary and of relatively short duration. These types of constraints are of primary benefit to non-problem gamblers but are unlikely to have a significant impact on the out-of-control behavior of pathological gamblers (Griffiths, 2012 in press; Nower & Blaszczynski, 2010; Williams et al., 2008). This is why additional resources are needed to provide for adequate problem gambling prevention, treatment and research.

Online gambling is clearly here to stay and will continue to evolve with continual changes and competition among Internet gambling sites, with new demographic groups such as women and older adults entering the market, and with a growing number of jurisdictions legalizing and regulating these activities. The question is what governments can and will do to create a safety net for their citizens, to minimize the likely increase in the number of problem gamblers, to provide treatment for those afflicted, and to ensure that research is undertaken to understand the impacts of Internet gambling on society (Gainsbury & Wood, 2011).

Thank you again for the opportunity to testify. I look forward to answering your questions and to assisting the Subcommittee in its future deliberations.

References

Abbott, M. W. (2005). Disabling the public interest: Gambling strategies and policies for Britain: A comment on Orford 2005. *Addiction, 100*, 1233-1235.

Abbott, M. W. (2006). Do EGMs and problem gambling go together like a horse and carriage? *Gambling Research, 18*(1), 7-38.

Abbott, M. W., & Clarke, D. (2007). Prospective problem gambling research: Contribution and potential. *International Gambling Studies, 7*(1), 123-144.

Abbott, M. W., Volberg, R. A., Bellringer, M., & Reith, G. (2004). *A review of research an aspects of problem gambling*. London: Responsibility in Gambling Trust.

Alan Guttmacher Institute. (2008). *Facts on induced abortion in the United States*. New York, NY: Guttmacher Institute.

Barthold, T. A. (2009). *Letter to Honorable Jim McDermatt regarding revenue estimates of two bills to regulate and tax internet gambling*. Retrieved. from http://www.safeandsecureig.org/sites/default/files/InternetGamblingScore.pdf.

Dragicevic, S. (2011). Time for change: The industry's approach to self-exclusion. *World Online Gambling Law Report, 10*(7), 6-8.

Gainsbury, S., & Wood, R. (2011). Internet gambling policy in critical comparative perspective: The effectiveness of existing regulatory frameworks. *International Gambling Studies, online first*.

Global Betting and Gaming Consultants. (2008). *GBGC online gambling data report Q4*.

Griffiths, M. D. (2012 in press). Internet gambling, player protection and social responsibility. In R. J. Williams, R. T. Wood & J. Parke (Eds.), *Routledge International Handbook of Internet Gambling*. London: Routledge.

Griffiths, M. D., & Barnes, A. (2008). Internet gambling: An online empirical study among student gamblers. *International Journal of Mental Health and Addiction, 6*, 194-204.

Grun, L., & McKeigue, P. (2000). Prevalence of excessive gambling before and after introduction of a national lottery in the United Kingdom: Another example of the single distribution theory. *Addiction, 95*(6), 959-966.

Jakobsson, N., & Kotsadam, A. (2011). The law and economics of international sex slavery: Prostitution laws and trafficking for sexual exploitation. *European Journal of Law and Economics, online first*.

Jonsson, J. (2012 in press). Internet poker in Sweden in 2007. In R. J. Williams, R. T. Wood & J. Parke (Eds.), *Routledge International Handbook of Internet Gambling*. London: Routledge.

Ladd, G. T., & Petry, N. M. (2002). Disordered gambling among university-based medical and dental patients: A focus on Internet gambling. *Psychology of Addictive Behaviors, 16*(1), 76-79.

LaPlante, D. A., Nelson, S. E., LaBrie, R. A., & Shaffer, H. J. (2008). Stability and progression of disordered gambling: Lessons from longitudinal studies. *Canadian Journal of Psychiatry, 53*(1), 52-60.

Lund, I. (2008). The population mean and the proportion of frequent gamblers: Is the theory of total consumption valid for gambling? *Journal of Gambling Studies, 24*(2), 247-256.

MacCoun, R. J. (2010). *Estimating the non-price effects of legalization on cannabis consumption*. Santa Monica, CA: Rand Drug Policy Research Center.

MAG. (2011). *'Jeux en ligne' in the French market: Key features, strengths and weaknesses of the French legal gaming offer*.

Marotta, J. J., Moore, T. L., & Christensen, T. (2011). *2010 national survey of publicly funded problem gambling services*. Phoenix, AZ: Association of Problem Gambling Service Administrators.

Meyer, G., Hayer, T., & Griffiths, M. (Eds.). (2009). *Problem gambling in Europe: Challenges, prevention and interventions*. New York, NY: Springer.

National Gambling Impact Study Commission. (1999). *Final report*. Washington, DC: National Gambling Impact Study Commission.

Nower, L., & Blaszczynski, A. (2010). Gambling motivations, money-limiting strategies and precommitment preferences of problem and non-problem gamblers. *Journal of Gambling Studies, 26*(3), 361-372.

Parke, J., Rigbye, J., Parke, A., & Williams, L. V. (2007). *eCOGRA global online gambler report: An exploratory investigation into the attitudes and behaviours of Internet casino and poker players*. Nottingham: Nottingham Trent University.

PricewaterhouseCoopers. (2009). *Estimate of Federal revenue effect of proposal to regulate and tax online gambling: Executive summary*.

Productivity Commission. (2010). *Gambling*. Canberra: Productivity Commission.

Rasmussen Reports. (2006). *A virtual roll of the dice*.

Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology, 14*(1), 32-38.

Schull, N. D. (2005). Digital gambling: The coincidence of desire and design. *Annals of the American Academy of Political and Social Science, 597*(1), 65-81.

Slutske, W. S., Jackson, K. M., & Sher, K. J. (2003). The natural history of problem gambling from age 18 to 29. *Journal of Abnormal Psychology, 112*(2), 263-274.

Swedish National Institute of Public Health. (2010). *Summary of 2008/2009 results of SWELOGS*. Östersund: Statens folkhälsoinstitut.

Victoria Department of Justice. (2011). *The Victorian Gambling Study: A longitudinal study of gambling and public health - Wave Two findings*. Melbourne: Victoria Department of Justice.

Volberg, R. A. (2009). *Problem gambling research: What have we learned and what is needed for effective regulation?* Paper presented at the North American Gaming Regulators Association Conference.

Volberg, R. A., Nysse-Carris, K. L., & Gerstein, D. R. (2006). *2006 California problem gambling prevalence survey: Final report*. Sacramento, CA: Office of Problem and Pathological Gambling.

Wardle, H., Griffiths, M. D., Orford, J., Moody, A., & Volberg, R. A. (2011). Gambling in Britain: A time of change? Health implications from the British Gambling Prevalence Survey 2010. *International Journal of Mental Health and Addiction, online first*.

Welte, J. W., Barnes, G., Wieczorek, W., Tidwell, M.-C., & Parker, J. (2002). Gambling in the U.S.--Results from a national survey. *Journal of Gambling Studies, 18*(4), 313-337.

Williams, R. J., Belanger, Y. D., & Arthur, J. N. (2011). *Gambling in Alberta: History, current status, and socioeconomic impacts*. Edmonton: Alberta Gaming Research Institute.

Williams, R. J., Volberg, R. A., & Stevens, R. M. G. (2011). *The population prevalence of problem gambling: Methodological influences, standardized rates, jurisdictional differences, and worldwide trends*. Guelph: Ontario Problem Gambling Research Centre.

Williams, R. J., West, R., & Simpson, R. I. (2008). *Prevention of problem and pathological gambling: A comprehensive review of the evidence*. Guelph: Ontario Problem Gambling Research Centre.

Williams, R. J., Wood, R. T., & Parke, J. (2012 in press). Policy options for Internet gambling. In R. J. Williams, R. T. Wood & J. Parke (Eds.), *Routledge International Handbook of Internet Gambling*. London: Routledge.

Wood, R. T., & Williams, R. J. (2007). Internet gambling: Past, present, and future. In G. Smith, D. C. Hodgins & R. J. Williams (Eds.), *Research and Measurement Issues in Gambling Studies* (pp. 491-514). London: Elsevier.

Wood, R. T., & Williams, R. J. (2009). *Internet gambling: Prevalence, patterns, problems and policy options*. Guelph: Ontario Problem Gambling Research Centre.

Wood, R. T., Williams, R. J., & Lawton, P. K. (2007). Why do Internet gamblers prefer online versus land-based casinos? *Journal of Gambling Issues, 20*, 235-252.

Wood, R. T., Williams, R. J., & Parke, J. (2012 in press). The relationship between problem gambling and Internet gambling. In R. J. Williams, R. T. Wood & J. Parke (Eds.), *Routledge International Handbook of Internet Gambling*. London: Routledge.

Mrs. BONO MACK. And I thank the entire panel, and we will now turn to questioning, and I will recognize myself for 5 minutes.

And I would like to ask Mr. Fahrenkopf this question first. If Congress were to enable Internet gaming, do you support the right for States to opt-out of such a system and to limit any online gaming participation by their residents to entrust State online operations under that State's own control?

Mr. FAHRENKOPF. Absolutely. We are supporters, and always have been, that the Tenth Amendment States rights must be recognized. States should always have the right to determine what type of gaming they are going to allow in their State, how they are going to regulate it, how they are going to tax it. So we have no problem with States opting out if they don't want to participate.

Mrs. BONO MACK. And then once they're opted out again, just to be clear, that you can opt out and offer intrastate solely?

Mr. FAHRENKOPF. Well, some of the discussion, Mr. Campbell was saying that UIGEA was the purchase—the purpose of that was to outlaw Internet gambling. It really wasn't. The purpose of UIGEA, or UIGEA, as we call it, was to interfere with the financial transactions that went on. The bill clearly did not say what was legal or illegal.

But there is within UIGEA an intrastate exemptionfrom UIGEA. There would still be a determination, as you know. The Justice Department to this day says that Internet wagering of any sort is illegal under the 1961 Wire Act. I don't necessarily agree with them. It is hard for me to believe that anyone in this august body who was serving here in 1961 ever thought that there would be a worldwide Web, that there would be the intent. So clearly there is is an intrastate exemption from UIGEA for States to do intrastate activity, which would not violate that law. I am not going to pass judgment on what the Justice Department is going to say. I happen to disagree with their interpretation that that would be illegal.

Mrs. BONO MACK. Thank you. And much of what you are talking about, you are speaking to the ability to regulate, to have particular Web sites and those Web sites only. Yet in Congress we are often dealing with rogue Web sites that are selling, you know, bad prescriptions, bad pharmaceuticals. There are rogue Web sites that are selling pirated intellectual property.

How do you propose that you make sure that the consumer can truly know that this is a real Web site and a safe Web site, because we are are dealing with this in so many other areas right now?

Mr. FAHRENKOPF. Well, as I said in my remarks, I think that the way to go about this, in the wisdom of Congress, Internet poker should be legalized. We have got to back, reiterate the 1961 Wire Act, as well as adjust UIGEA to make sure that it can be used as the vehicle to keep track of what, you know, other Web sites there are. Now, I happen to believe that the free market will make a determination.

Mrs. BONO MACK. But the free market right now is suffering from rogue Web sites and from all of the bad prescription drugs again, and from rogue Web sites that are coming from offshore where the consumer has no concept whether it is a legitimate Web site or not.

So let me move on to Dr. Volberg, though, because time is so limited. All of you have expressed a desire to keep children and problem gamblers from gambling online. If Congress chooses to legalize any particular or all online gaming, how would you prevent problem gamblers or minors from continuing to go wherever they can place the wager, including the unregulated offshore operations I was just talking about? Wouldn't the dangers for these vulnerable segments still persist?

Ms. VOLBERG. Well, the dangers would persist, but there are ways to mitigate the dangers by placing sort of roadblocks in the way. Certainly I am not an expert on how to do age verification. You heard a speaker, or someone testified last time on that front.

The issue that I am most familiar with is the question of exclusion programs and pre-commitment programs. And the thing to do, or the step that we believe is most effective, is to get people before they begin to gamble, to set up the constraints in terms of how much money per day or per week or per month that they want to spend, how much time they want to spend on those particular Web sites, and to set that up ahead of time so that in the middle of sort of the excitement of the action, they are not sort of going to lose control and keep going longer than they wanted.

Mrs. BONO MACK. Mr. Lipparelli, I would like to change the subject a little tiny bit toward travel gaming. I believe you have some travel operations in Nevada.

Mr. LIPPARELLI. We do, in fact.

Mrs. BONO MACK. OK. Can you explain briefly how they are regulated?

Mr. LIPPARELLI. Each of the tribes, I believe there are two, have entered into State compacts where they have agreed to abide by the State regulatory structure, so they follow our State regulatory regime.

Mrs. BONO MACK. Thank you.

Mr. Fahrenkopf, back to you. Should online gaming sites be required to help pay for the services needed to treat problem gambling, or should the State use the revenue it receives to pay for the services, or both?

Mr. FAHRENKOPF. Well, most of the experience that we have had with land-based casinos as well as lotteries and the parimutuel industry, it varied State by State. In some States there is a—for example, in the States that have river boat gaming, you have to pay a fee to go on the boat, and a portion of that fee is set aside for responsible gaming work.

So it varies from State to State, but either way it could, you know, be effective if it was clearly drawn as a means to develop the revenue. I might say that there is some real question, however, of what adequate treatment is, and Rachel has been involved in this business, as others, for 20 or 30 years as to what the proper treatment must be.

For example, you have a State like Iowa that has had casino gaming since 1989, they have raised a tremendous amount of money, but in some cases they don't know how to effectively spend it. And that is why research is really the key where most of the money should go, at least in the immediate future, along with some of the programs that Rachel has talked about.

Mrs. BONO MACK. Thank you. And my time has actually expired a while ago, so I am happy to recognize Mr. Butterfield for his 5 minutes.

Mr. BUTTERFIELD. I thank the chairman. Both bills that we are talking about here today seek to prevent children from accessing gambling sites, and that is certainly a good thing and we can all agree on that. However, these two bills take different approaches toward achieving the goal.

Mr. Franks' bill and Mr. Campbell, 1174, gives the Treasury Secretary broad regulatory and enforcement authority to implement a licensing program for Internet gambling sites. This authority includes a requirement that the Secretary make sure that those licensees have various processes in place to prevent underage gambling.

Mr. Barton's bill, 2366, allows States to license gambling sites. The bill requires the relevant State agencies to, quote, ensure to a reasonable degree of certainty that the individual placing a bet or wager is not less than 21 years of age, end of quote.

Let me this time go to my right. Dr. Volberg, would you have any concerns with a State by State or even a tribe-by-tribe approach to preventing children from accessing gambling Web sites?

Ms. VOLBERG. Well, I think actually the issue of preventing children from gaining access to Internet gambling Web sites is an important one, because while the technology may exist on a State-to-State level to implement those steps—and this applies to problem gambling as well—there is not equal political will in every State to implement those measures.

And so what you will get, as I mentioned in my testimony, you will get variability across the States in terms of what they are willing to do, what they are able to do. And as a result, I think that some States will do a very good job, but other States are going to do a much less good job of protecting both underage gamblers and problem gamblers or people who are at risk.

I think another issue that I have great concern about because I have done a number of adolescent surveys, is the number of youth that access the Internet to gamble is extraordinarily high. In the survey that we did in Oregon, 30 percent of our adolescents had actually gambled on the Internet. But most of those had gambled for entertainment and not for money. And so when you are talking about sort of educating young people about gambling, part of it is occurring on the Internet, and I would like to see some prevention measures and some education that goes along with, you know, preventing them from actually gambling for money.

Mr. BUTTERFIELD. Do you think that this issue could be addressed through consistent across-the-board requirements at the Federal level? And if it should be at this level, would you have concerns if more than one agency provided oversight?

Ms. VOLBERG. I think when it comes to prevention and treatment, or certainly prevention and research, that we have not seen the States step up to the level that they have or that governments have in other countries around the world. So I would say that those two areas in particular do require a stronger Federal voice.

Mr. BUTTERFIELD. We are going to have to have oversight if this goes into law, I am just trying to find out what agencies should be involved and could it be multiple agencies?

Ms. VOLBERG. I absolutely think it should be multiple agencies. I think that—I have seen models internationally where that does happen very effectively, but it does require the legislation to actually say that you have to coordinate these—you know, these departments have to coordinate.

Mr. BUTTERFIELD. Should any proposal in this area include some additional minimum requirements to ensure that licensees don't target children? For example, should any legislation include standards for general advertising and marketing practices and online sites, the specific targeting of minors, the system used by the site to verify that the user is of legal age before they are allowed to sign up? Would you quickly speak to that in 30 seconds?

Ms. VOLBERG. Yes, I believe there is a need for that.

Mr. BUTTERFIELD. All right, thank you.

Mrs. BONO MACK. I thank the gentleman and recognize Mr. Barton for 5 minutes.

Mr. BARTON. Thank you, Chairwoman. I have a letter from Alfonse D'Amato that was written to you on November 7, 2011, and it is copied to all members of the subcommittee. I would like unanimous consent to put that in the record. It has been shared with the minority.

Mrs. BONO MACK. Without objection.

[The information follows:]

www.theppa.org

TO: CHAIRWOMAN MARY BONO MACK

FROM: ALFONSE D'AMATO, CHAIRMAN, POKER PLAYERS ALLIANCE

SUBJECT: 10/25 HEARING, "INTERNET GAMING: IS THERE A SAFE BET?"

DATE: NOVEMBER 7, 2011

CC: REPUBLICAN AND DEMOCRATIC SUBCOMMITTEE MEMBERS

Thank you for inviting me to testify before your subcommittee on the important topic of Internet gaming regulation. As a representative of more than 1.2 million poker enthusiasts, it was an honor to present information to the subcommittee and to explain the merits of U.S. licensed and regulated Internet poker. First and foremost, regulation must be about consumer protection. Today's non-U.S. regulated market leaves our citizens vulnerable and outsources consumer safeguards to other countries. Further, regulation of Internet poker is about restoring freedom; the freedom of adults to spend their own money in their own home over their own Internet connection competing in a time-honored game of skill. Finally, by protecting consumers and expanding freedom, the byproduct of this good public policy is job creation and revenue. In these economic times we should thoroughly examine every opportunity for fiscal stability.

The October 25th hearing was a good first examination of these issues. However, there are still several unanswered questions. I encourage the committee to hold a legislative hearing on H.R. 2366, the *Internet Gambling Prohibition, Poker Consumer Protection, and Strengthening UIGEA Act of 2011*. In this hearing the committee can more deeply examine the current best practices that are in use for Internet gaming regulation across the globe. Questions about age-verification, problem gambling, bot-play, and cheating have been routinely vetted by jurisdictions such as the United Kingdom, Italy and France that have allowed their citizens to play on Internet poker sites for several years. World renowned experts in all of these areas are able to discuss best practices with your committee. In fact, Washington, D.C.-based Aristotle, a leading provider of online identity verification systems, has testified before Congress on the efficacy of keeping underage persons off Internet gaming websites[1]. I also call your attention to a study conducted by Harvard University Professor Malcolm K. Sparrow entitled, "Can Internet Gambling Be Effectively Regulated? Managing the Risks."[2] This comprehensive study outlines technologies and policies that can be put in place to regulate online gaming. Professor Sparrow has also testified before Congress on the findings of his study, and Parry Aftab, who testified along with me before your subcommittee, mentioned this study as well.
In the meantime, I would like to address some of the unresolved issues raised in the October 25th hearing.

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[1] Testimony of Michael Colopy, Aristotle Inc., before the House Committee on Financial Services: http://archives.financialservices.house.gov/hearing110/0145_001.pdf

[2] *Can Internet Gambling Be Effectively Regulated? Managing the Risks*, Professor Malcolm K. Sparrow, John F. Kennedy School of Government, Harvard University: http://www.theppa.org/harvardstudy

Poker Bots

With respect to computer programs that impersonate humans in Internet poker games, often called "bots", this is an issue that the worldwide Internet poker industry has been dealing with for years. A significant amount of discussion was afforded this subject during the hearing based on testimony provided by Professor Kurt Eggert. While I respect Mr. Eggert's concerns, as he admitted during the hearing, he is not an expert in the area of poker bots, Internet security, or cheating in online poker. Thusly, his blanket statements about the prevalence of bot play and the inability to stop it should not be considered a settled matter for this committee. Admittedly, I am not an expert on this subject either, but I do have important facts to present.

Under existing U.S. law, it is not illegal (at least not expressly so) to use a bot on an Internet poker site (though it would violate the terms and conditions for most poker sites), nor is it illegal to develop and sell bots that target Internet poker, and there are companies that do so. H.R. 2366 would make it a federal crime to use a bot on an Internet poker site or to sell a bot program in interstate commerce. It would also require licensed operators to use "best of breed" technologies to detect bots and remove them from sites. However, even apart from regulation, Internet poker operators have a significant incentive to detect and remove bots from their sites in that the integrity of their sites is of primary importance in the competitive marketplace.

To be clear, as a general rule, poker bots are not good enough to make money in high-stakes games. Players in those games have a level of skill that current bot technology cannot match. It is true that some of the best software developers have developed programs that are competitive with high-end poker players, but players at that level generally know each other. A new or anonymous player at that level would be subject to a much higher level of scrutiny. Instead, the way bot operators seek to make money on Internet poker is by running a network of bots grinding out small amounts of money in relatively low-stakes games.

For that reason, the larger Internet poker companies all dedicate substantial resources to detecting and removing bot players. The first level of defense against bots involves monitoring the movement of the mouse and the cursor on the screen. There are unique traits to the way humans move the mouse that a bot cannot easily mimic. Once a player has been flagged as a probable bot, they can be subjected to a CAPTCHA challenge, (a bot detection technique used by many industries wherein a consumer is asked to re-type a series of distorted letters and numbers) or subjected to other secondary measures. Once a player is identified as a bot, most operators immediately seize that player's funds, ban them from the site, and flag their IP address and payment information to prevent the bot player from seeking to come back under a different identity.

Beyond monitoring mouse movements, sites can also successfully detect bots by introducing subtle changes to the player's screen. Each piece of bot software is typically matched to the pixel-specific graphics of a particular poker operator's software, so that it can recognize cards, chips, etc. Humans will continue playing normally when such changes are introduced, but bots will often be confused by the changes and will effectively freeze up. A player that freezes up in response to such changes is almost certainly a bot, and can be detected and removed.

There is another type of bot which does not play the game directly, but rather, monitors the game on the player's computer and directs the actions of the players. Obviously, such a bot (sometimes called "click here" bots) cannot be detected by the movements of the player's mouse, as the mouse is being

moved by a human. However, such bots must still be able to monitor and read the screen, and the subtle changes described above will frustrate such a bot.

Another line of defense for poker companies is to constantly monitor the marketplace to see what bot programs are being sold. For example, one can easily buy a poker bot program at www.texas-holdem-bot.com. However, the best sites have professionals constantly searching for online sites that sell bot programs. Those sites' client (the downloaded application that resides on the player's computer) will monitor what other programs the player is running; any player running a recognized bot program will be flagged and removed from the site. (Merely changing the name of the program will not hide it from the client.) In addition, the best sites monitor chat rooms, etc. which are frequented by bot operators and developers, where they share intelligence, etc.

Over tens of thousands of hands, any poker player will develop recognizable patterns of play -- folding, checking, or raising a particular percentage of the time in a particular situation. The best sites have algorithms that monitor the "virtual fingerprint" of particular players. As stated above, most bot operators seek to make money by running the same bot as multiple players at multiple tables on a particular site. When a site detects that many different players on its site have identical play patterns, it recognizes a high probability that those players are all the same bot, and those players will be subject to higher scrutiny. Similarly, when a particular player is discovered to be a bot, the operator will then quickly flag and remove all players with identical play patterns.

In closing, many e-commerce industries are fighting the problem of people who seek to use bots fraudulently; the issue is not unique to Internet poker, though Internet poker does present some unique challenges. Today, the technology exists to detect and remove nearly all bot players on Internet poker sites. As artificial intelligence technology improves, the bot threat will be greater, but Internet poker operators have a huge incentive to invest further in their R&D budgets in order to develop ever-better technology and practices to detect bots. H.R. 2366 would require an on-shore Internet poker industry to use the best available technology and practices to detect and remove bots, and would make it a crime to commercialize bot technology. Today, the best sites go to great lengths to detect and remove bot players, and the worst do not. In passing H.R. 2366, Congress would limit Americans to playing on sites that protect them against bots, and would provide greater protection for U.S. players.

Identification of Skill Levels

Mr. Eggert shared his thoughts regarding the perceived disadvantage unskilled players could have to highly skilled opponents with the subcommittee. Based on his testimony comparing online poker to slot machines, his vision for the game seems to be one with no winners. Rather, he seems to believe players should happily lose their money to the "rake" over time, much like people mindlessly pulling a lever of a slot machine. This idea is squarely at odds with the viewpoint of the poker community. Our membership (correctly) sees poker as a competitive game where skillful play is rewarded and encouraged, not sanctioned.

It is unfortunate that Mr. Eggert – an expert in consumer advocacy but not in poker – chose to categorize winning players as "predators." Players and the industry alike see the fact that poker can be beaten with skill as a defining, positive characteristic of the game. Winning players are an integral part of the game. They are not predators…they are skilled competitors.

Mr. Eggert is correct in stating that poker is a game of skill. One of the skills of the game of poker is in evaluating the abilities of the competition. Players can observe one another before making the decision to play a single hand. Additionally, as skillful players generally migrate to higher table stakes, all players have the option of choosing table stakes that can generally be expected to provide for an appropriate level of overall opponent skill. Finally, there are many instructional poker books available and many poker websites offering free poker training and strategy discussion. Every player will have a fair opportunity to acquire the skills needed to enjoy the game of poker.

In short, in my opinion a Congressionally-mandated player rating system would be a solution looking for a problem.

Internet Service Disruption

During the hearing Chairwoman Bono Mack asked what would happen if Internet service was disrupted while someone was playing online poker. In short, nearly every non-U.S. regulated Internet poker site has clearly stated policies and procedures in place to address this issue. The response varies depending on the type of poker game (cash game or tournament) the player was engaged in during the disconnection of service. In any scenario, the affected player hand will be folded if he or she is unable to reconnect after an interval of extended time, as defined by the site's policies, has expired. If multiple players were engaged in the hand the play would continue as normal. If only two players were in the hand then the non-affected player would be awarded the pot if the player who has lost service cannot reconnect in the allowed timeframe. Best practices in this area can be found by reading the Frequently Asked Questions and Tournament Rules[3] from PokerStars.com, the world's largest online poker room that is licensed and regulated in multiple jurisdictions.

We would encourage that U.S. regulation require that operators make clear to their customers what happens during a disruption of service.

Comparison of Regulated Internet Poker to Legalization of Drugs

A comparison was made during the hearing that arguments for regulation of Internet poker are akin to arguments for the legalization of drugs. Let me be clear, there is no comparison whatsoever. Poker is a *legal* activity in nearly every state and has been played *legally* in people's homes for almost two centuries. This cannot be said for the use of illicit drugs. Further, state and local governments are the largest providers of gaming services, whether directly through the lotteries or indirectly through regulation of pari-mutuel dog/horse racing, card rooms and other commercial gaming. Today, 48 of 50 states authorize some form of gambling. It seems unconscionable that an activity that is legal offline would be prohibited simply because it is offered over the Internet. This attitude is akin to outlawing the sale of shoes over the Internet because the same service is offered in a brick and mortar establishment. We believe that Internet poker should be appropriately regulated and available to adult consumers in a safe and accountable marketplace just as it is currently available to them offline.

Again, thank you for inviting me to testify and for the opportunity to present this additional information. Should you or your staff have further questions, please do not hesitate to contact me or the PPA's Executive Director, John Pappas.

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[3] A sample disconnect policy can be found at the PPA website: http://theppa.org/sampledisconnectpolicy

Mr. BARTON. I want to ask my first question to Professor Volberg. You kind of just alluded in passing that your study of people that play poker on the Internet, they often tend to be young men with high educational levels; and then you looked directly at me and said, "and a few older men."

And I want the record to show that I am 62.

Mrs. BONO MACK. With objection.

Mr. BARTON. That classifies as old, I guess, but I have never played online for money. I play online for play money, but not for money. But I respect those that do play for money, and a number of young men in my district play professionally and make a living.

Could you comment a little bit more on the demographics of the average online poker player?

Ms. VOLBERG. Well, I will be happy to do that. I would just would like to say that I said older, rather than—I did not mean any disrespect.

In terms of the characteristics of online gamblers, this is not actually a study that I have done, it is a study that—a number of studies that have looked at online gamblers and online poker players as a subclass of online gamblers. And the E. Koeger study is the specific one that I was referring to here, where they found that—they looked at the demographic differences between online poker players and online casino gamblers. And what they found, that while the online poker players tended to mostly be, or the majority of them were young men between the ages of 18 and 24 with relatively high levels of education and income, in contrast the online casino gamblers were primarily or a majority were older women with relatively lower levels of income and education.

Mr. BARTON. But on the poker player demographic online, my experience is that they tend to be very sharp. They all know the probabilities, they all know the permutations. Most of them excel in math.

If you watch the World Series of Poker, which is not online, but if you watch the World Series of Poker on ESPN, they all appear to be MIT engineering people. I mean, they are not people, though, that you would tend to say could be taken advantage of, that don't know what they are doing, that need to be protected. I mean, they are folks that are fully aware and feel that they have the ability to have a competitive edge. Wouldn't you agree with that?

Ms. VOLBERG. I think that that is certainly characteristic of the individuals that you described as professional poker players, people who make a living.

I think there are lots and lots of young men out there and some young women who also are very smart and also are very well educated.

The issue is not so much the folks who, you know, know the odds and know what they are doing, it is people who are coming into an activity where they sort of think that they have gotten pretty good because they have been playing on a free play site, and then they decide to do it for money and they go in and their expectations are a little unrealistic because the free play sites are set up differently.

Mr. BARTON. I have only got about a minute left. I want to ask the chairman of the Nevada Gaming Commission, in your opinion

would online poker, would it hurt or help mainline brick-and-mortar casinos?

Mr. LIPPARELLI. I think it is been our experience that if there is an impact, it is already reflected in operations. Clearly there is a lot of online gaming happening now. It has exploded in the last 7 years, so if there has been a direct impact, it is probably already being felt.

I think the industry participants that we talk to frequently see an opportunity there, but they see it as a compliment rather than something that would impact their businesses directly.

Mr. BARTON. OK. And my last question to Mr. Fahrenkopf. There obviously are some very delicate issues in terms of sovereignty of the Indian tribes and their casino operations and their regulatory approach versus for-profit casinos.

Do you feel that those issues can be handled in a fair fashion so that the Indian tribes concerns, because of their status, can be addressed in a fair way?

Mr. FAHRENKOPF. We totally respect the sovereignty of the tribes, and that is why, as I indicated in my initial remarks, I have been doing this for 17 years, and for 17 years I have been saying that no law should treat any type of legal gaming different than the others. So no one should get a leg up or be hurt between whether you are talking about our industry, whether you are talking about Native American gaming, whether you are talking about the parimutuel industry, or whether you are talking about the lottery business.

Mr. BARTON. OK. Thank you, Madam Chairwoman.

Mrs. BONO MACK. Thank you Mr. Barton. The chair recognizes Mr. Towns for 5 minutes.

Mr. TOWNS. Thank you very much, Madam Chair. And of course I want to thank you and Mr. Butterfield for having this hearing in terms of bringing the very stakeholders together to have a discussion to determine whether, you know, whether we move forward or not, and if we do move forward to make certain that we are doing it in a very effective manner.

Let me begin with you, Mr. McIntyre. I want to make certain I understood your testimony. You appear to be concerned about the loss of State revenue, you know, being diverted from the lottery play to online casino play. Wouldn't ensuring that the share of tax revenue from online poker make up the difference?

Mr. MCINTYRE. One of the difficulties is, Mr. Congressman, is there is no State tax in New Hampshire, so there is that issue. There is no State income tax and there is no gaming tax in New Hampshire.

But one of the difficulties we have is our research suggests that 32 percent of our players—strike that—30 percent of the New Hampshire citizens visit a casino once a year, 45 percent of our players have visited within the last year, and 53 percent of our regular players have visited one or more times a year. So I firmly believe they draw from the same wealth.

I don't think it would have an impact directly, immediately. I think it would be over the long term, given the statistics suggested, in terms of the demographic that it is a younger player. Lottery lives and breathes in the demographic of 35 to 60 years old, and

that is not where even a poker player is now. It is where the folks who are in Internet poker will be in 20 years.

So it is not for me that I make this case. It is for my successor or my successive successors in terms of the impact on lottery revenues, Congressman.

Mr. TOWNS. Thank you very much. Let me go to you, Mr. Lipparelli.

Given the longstanding role of States authorizing and regulating gaming within their own borders and the fact that New York State, which I come from, has a very sophisticated regulatory structure for gaming, are the States best positioned to handle this new formal wagering?

Mr. LIPPARELLI. I think it has been our consistent position since this topic came up that we actually support a national model that gives the States some degree of framework to regulation. Given that this is an activity that crosses State borders, it is important to have some amount harmonization among those States. I think there can be particular levels of additional scrutiny that any State might want to impose, that there ought to be some ability to try to harmonize what would be a national business. Today, as you might know, there are 48-some different regulatory structures. And from a private industry perspective, many of which operate in our State, it is become increasingly problematic and increasingly expensive to be responsible, to be answerable to 48 different regulatory regimes. So our position from the State of Nevada is that we clearly support some kind of national solution.

Mr. TOWNS. To you, Mr. Fahrenkopf. Again, a little over a minute left. Has the ban on online gambling prevented Americans from gambling online? Has there been any——

Mr. FAHRENKOPF. No. I think, Congressman, as the testimony from actually all three of them, your fellow Members of the House who were here on the earlier panel, Internet wagering has just exploded. It actually started back early around 2003 and -4. The passage of UIGEA, which was with all good purpose trying to put a dent in that, we have seen has really not been as effective as it should be. And that is why we believe that has to be amended to make very clear what is legal and not legal. And regulation, taxation, is the best way to protect those people who might be vulnerable to the things that Dr. Volberg is talking about and what Congressman Wolf is concerned about.

Mr. TOWNS. Let me announce I am not a poker player, but how would I know, if I am playing, that I am not playing against a machine?

Mr. FAHRENKOPF. We submitted some additional testimony to the panel after the last hearing that got into that question, because there was some discussions of the use of bots and other types of mechanical, if you will, players, rather than regular players.

And the technology that we have seen from those jurisdictions primarily in Europe, they have developed software which can—and Mr. Lipparelli probably knows more about this than I do—software that can monitor the way bets are being placed—actually, believe it or not, where the mouse is and where it is being pushed on a certain period of time to determine whether or not there is a problem.

But interestingly enough, most of the bots that have been discovered have been discovered because other players, human players, have realized that something id not right with the way the game is going and report it.

But maybe Mr. Lipparelli can tell you a little more about how the bots can be handled.

Mr. LIPPARELLI. Mr. Towns, I spent a better part of 2–1/2 years looking at the various technologies that exist, and one thing that is becoming abundantly clear to me is that you can probably get away with trying to cheat a system or trying to play as an underage gambler or trying to utilize the services of the bot, but you will be uncovered fairly quickly. The analytical tools that are now being deployed as part of these systems have become very robust, so you might be able to get away with it once, but you are going to leave big fingerprints behind.

Mr. TOWNS. Thank you, Madam Chair.

Mrs. BONO MACK. Thank you, Mr. Towns, I appreciate it. And recognize Mr. Bass for 5 minutes.

Mr. BASS. Thank you, Madam Chairman, this is a quick follow-up to Mr. Towns' question. Are bots illegal?

Mr. LIPPARELLI. Well, I think the only way I could answer that is depending on what that it is. You would have to define it. There are many people that will use the player's aid on another computer to give them basic strategy play. That would probably not be illegal in most people's mind. The use of some kind of an electronic device to gain an advantage, which is how we define cheating a game in Nevada, would probably be illegal.

Mr. BASS. But the bill wouldn't address that, would it? Or does it?

Mr. LIPPARELLI. I am not sure whether it does or doesn't.

Mr. BASS. I have a general question for all the witnesses. I believe that Mr. Barton's bill limits licensees to gaming facilities, I don't know what the definition is, casinos and so forth.

Mr. McIntyre is here today from the New Hampshire Lottery. Lotteries, as he testified, have been around a long time. They have their own infrastructures and so forth that guard against cheating and fraud and corruption and so forth. Why shouldn't they be able to run online poker if they chose to do so? I am directing that to any member of the panel.

Mr. FAHRENKOPF. As I said, any piece of legislation must treat all the legal gaming entities the same, lotteries as well as land-based casinos, Native American tribes and the parimutuel industry. So if the State wants to have their lottery offer online poker, I have no objection with that. I don't think that that would violate the rule.

Mr. BASS. Others?

Mr. MCINTYRE. Congressman Bass, certainly I thank you for your comments and I certainly believe that we would be able to handle that function similar to our neighbors to the north, the two Canadian lotteries that run this now, the Atlantic Lottery Corporation, representing our neighbor directly to the north, as well as the British Columbia Lottery, which runs that function very well.

Mr. BASS. Mr. Lipparelli.

Mr. LIPPARELLI. Yes, I share the views of the panelists, that I as a regulator—we abide by what our State law says. So in our case we would obviously follow that.

The only comment that I would add to the question posed by Mr. Towns and McIntyre, there are several foreign markets that are experiencing the impact of a failure to regulate on existing money-raising kinds of organizations. There are several lotteries and other kinds of organizations that in large measure rely on the proceeds of gaming activity and have highlighted the fact that illegal gaming activities are starting to have a real negative impact on their revenue flows. So given, you know, the kinds of organizations that are out there that benefit from gaming, it is a huge question to them as to why not regulate.

Mr. BASS. So, in conclusion, none of you have any objection to amending the bill to expand the scope to allow or to give the opportunity for State lotteries to participate on an equal level and not have the 2-year hold-harmless period before they could be involved in the same online poker activities as the casinos would be allowed to do upon enactment of the bill?

Mr. FAHRENKOPF. Well, I am not here representing anyone supporting either of the pieces of legislation. We have not made a determination—I would say, however, that one of the—anyone who knows anything about online poker knows that for it to be successful there must be liquidity, which means you have to have a lot of players.

And whether or not a State as small as Nevada or New Hampshire or other States could generate the liquidity with an intra-State online poker operation to really make it worth their while is a real question that is out there. Now maybe States as California, Florida, some of the bigger States, you would have that liquidity. But again, as I say, I have no opinion on either of the pieces of legislation that are now being considered.

Mr. BASS. Well, any other comments?

Mr. MCINTYRE. Certainly if the legislature of New Hampshire authorizes us to do so, we would welcome it. And liquidity is a matter to be determined based on the players of New Hampshire. But about 5 percent of our players and 5 percent of the State play now online currently, so it is about 60,000 people. So I imagine, based off of our brand recognition, which is 72 percent favorable amongst the citizens of New Hampshire and 85 percent favorable rating amongst our players, I would imagine that would increase.

Mr. BASS. Thank you, Madam Chairman.

Mrs. BONO MACK. Thank you, Mr. Bass. Mr. Harper, you are recognized now for 5 minutes.

Mr. HARPER. Thank you, Madam Chairman. And I appreciate the witnesses being here and taking their time to enlighten us.

And if I may start with you, Mr. McIntyre, I believe you said earlier that the State of New Hampshire received, I believe, $1.5 billion towards education since the lottery began; is that correct?

Mr. FAHRENKOPF. That is correct, sir.

Mr. HARPER. OK. And how much money has been sold or received for the sale of the lottery tickets, the total amount spent?

Mr. MCINTYRE. Within State?

Mr. HARPER. Out of the 1.5 billion that went to education, what was the total amount bought or spent on lottery tickets during that time?

Mr. MCINTYRE. It is difficult to characterize because the amount of prizes going back to the players has varied over 50 years. But currently, of a dollar spent, 67 cents goes back to the players in terms of prizes. We keep about 25 cents on the dollar in terms of profit.

Mr. HARPER. Just a curiosity. Do you have to physically go to a vendor to purchase the lottery ticket, or is that done online?

Mr. MCINTYRE. It is done through a computer system that communicates through multiple methods, and you purchase it at a convenience store, supermarket, and the rest.

Mr. BASS. Will the gentleman yield?

Mr. HARPER. Certainly, I will yield to the gentleman from New Hampshire.

Mr. BASS. Mr. McIntyre defines online as being on a telephone line. You are talking about the Internet. Internet sales are not——

Mr. HARPER. I will certainly clarify my question. Are there Internet sales, or does an individual buying a lottery ticket in New Hampshire have to go to a store vendor to buy it?

Mr. MCINTYRE. 99.6 percent of our sales are through a store. A very, very, small portion of our sales, what we call subscription sales, which are done through the Internet, and it represents less than half of 1 percent of our overall sales.

Mr. HARPER. Thank you. You know, one of the concerns, as we look at this, is, for instance, in my district we have the Mississippi Band Chocktaw Indians, who have land-based casino gambling. And it is hard for me to envision how opening this up, which would require more players, would require folks to do that for it to be a profitable venture, how that will not have a negative impact upon destination gambling. And I would like to hear a response on that from whoever would care to answer?

Mr. FAHRENKOPF. Congressman, some years ago we at the American Gaming Association, which is most of the land-based casinos in the country in the commercial area, looked very closely at this. The question is cannibalization. If, in fact, Internet poker was allowed, would it cannibalize the business of the brick-and-mortar companies?

We looked at, for a very, very long time, we came to the conclusion that it would not; or if it did, it would be very marginal because we are only talking about poker. Our position is it should only be poker.

We are more in line with the Barton bill's approach than we are with the Frank-Campbell bill's approach.

Mr. HARPER. OK. Well, let me stop you for just a moment. If we are looking over all at a broader bill, more than just poker, would that not expand or increase the probability that it is going to hurt destination gambling?

Mr. FAHRENKOPF. It could, although the demographics of the people who play online, as Dr. Volberg has talked about, particularly young men who are between the ages of 18 and 24, higher education, they tend to not be the same people who go to land-based casinos.

Mr. HARPER. OK.

Mr. FAHRENKOPF. So our position was that the end result would be it would be a new profit center rather be very much of a deterioration in the business of land based.

Mr. HARPER. All right. One of the arguments that has been used to support Internet gambling in the U.S., legal, is that we have these offshore sites that can't be controlled.

Well, if we do this, how—are we still in the situation of not controlling what is that problem? How are we controlling that? Why shouldn't we first look towards coming out with a way to perhaps block all payments to them before we look at expanding it here, because I don't see how we are going to do that. And Dr. Volberg, I believe, has had some, maybe in your written testimony, is you are going to have a higher cost for the regulated version versus the offshore unregulated version, and what is to keep players from still going offshore?

Mr. FAHRENKOPF. I would answer that in two ways. As I attempted to answer earlier to the chairperson's question, the market will take care of some of that, not all that. In other words, people who are going to gamble online, whether or not they would rather gamble with the brands they know, U.S. companies that they know, rather than going offshore to some outfit that is located in the Caribbean island or somewhere. So the marketplace will take care of some of that.

The other step will be going back and strengthening UIGEA. The original purpose of UIGEA was exactly what you pointed out: how to block these transfers offshore. We have to go back and strengthen that act by making clear what is legal and what is illegal to give guidance to American banks and financial institutions so they can effectively block those.

Mr. HARPER. Shouldn't we do that first before we proceed with anything else?

Mr. FAHRENKOPF. Well, I am not sure which should be first. I think you can both do it at the same time.

Mr. HARPER. Thank you, I yield back.

Mrs. BONO MACK. Thank you Mr. Harper. Mr. Lance, you are recognized for 5 minutes.

Mr. LANCE. Thank you very much and good morning to you all. This is very interesting to me, and I want to thank the director from New Hampshire regarding his remarks concerning New Jersey. And New Jersey certainly has learned a great deal from New Hampshire.

And to Director McIntyre, it is my understanding that regulatory bodies here in this country and also abroad often rely on the independent testing laboratories for confirming that equipment used in gaming is fair for consumers. I am also told that some foreign jurisdictions that currently allow Internet gaming have similar testing requirements, not only for fairness issues but also for verification and location matters.

My question to you, and perhaps to others on the panel as well, is to what extent, if at all, do you think that statutory change here should include such requirements?

Mr. MCINTYRE. I mean, certainly—Congressman, thank you for your comments and you have a wonderful lottery. One of the con-

cerns we have is integrity, and we test and retest and retest, and we use outside testing firms. We use outside testing firms to test the testing firms for that very reason, sir.

So I think in terms of an outside firm like Gaming Laboratories or the rest that offer the services and the protocols to test systems, I think that is actually an excellent idea.

Mr. LANCE. Yes, thank you. And would others on the panel have a opinion, the director in Nevada?

Mr. LIPPARELLI. Certainly, Mr. Lance. I spent 20 years in the industry, 18 of which was submitting products to testing labs around the country. And I have some colleagues that operate in other jurisdictions that don't see as much value in pretesting. I see incredibly high value in that, and I don't think there would be any regime that we would consider that would allow someone to deploy gaming technology that is not subjected to high assurance and pretesting.

Mr. LANCE. Thank you. That was my view as well, and I would hope it might be included in the legislation or at least in some provision that would permit that based upon rule and regulation.

On another area, on cannibalization, I am concerned to some extent whether this would be competition, not only for various aspects of the regime but also, for example, for State lotteries.

And to the two gentlemen who are certainly involved in this, do you think that there might be only a certain gaming amount, a pie, and would this lead to cannibalization of lotteries, obviously an issue of importance to those of us in New Jersey who rely on our State lottery?

Mr. LIPPARELLI. Well, I guess it is more my personal views than my role as a State regulator, but as a State regulator we do have the economic health of our industry to consider. I think what is ironic about the circumstances that exist today, the legitimate licensed operator who cares for their patrons and establishes policies, is that this distinct disadvantage to those who are really under no penalty of prosecution for playing in this field today.

So we have got this incredible imbalance, people we enjoy great relationships with, people who take lots of time and energy and money to keep their operations aboveboard, competing against those that have no view of that. And so I think to the extent that there is, again, an erosion of market share, that is occurring today without abatement.

Mr. LANCE. Thank you. Mr. McIntyre, Director McIntyre.

Mr. MCINTYRE. Yes, Congressman. I certainly use the example frequently related to the gambling pie and suggest that Nevada, in its own decisions, has no State lottery. And they have avowed repeatedly that it is because they don't want to compete. So I certainly believe that in terms of there being a finite number of dollars, I believe that to be true.

Mr. LANCE. Thank you. And Chairman Fahrenkopf?

Mr. FAHRENKOPF. Congressman, if a State is concerned about cannibalization of the lottery, its State legislature and Governor can make a determination to opt out and therefore their lottery will not be in danger.

Mr. LANCE. Yes, thank you. That would be my view as well. And regarding pies, to all of you, a happy Thanksgiving.

Thank you very much, Madam Chair. I yield back the balance of my time.

Mrs. BONO MACK. I thank my sentimental colleague and recognize Mr. Guthrie for 5 minutes.

Mr. GUTHRIE. Thank you, Madam Chairman. I was kind of interested, and I have looked through the testimony written, and Mr. Fahrenkopf and Dr. Volberg, both of you cite credible studies, looks like the people who did the studies have good curriculum vitae, but you come to different conclusions about expanded online gambling and expanded access for problematic gamblers or people who are addicted to gambling.

Could you gentleman explain, you both had studies that showed completely two different results. Do you want to explain your study, and then your study, Dr. Volberg——

Mr. FAHRENKOPF. Well, I think the important words that I said with regard to online gamblers, they are not more likely to be pathological gamblers.

If you take into consideration what I call the allowances that are made for participation in other gambling activities, and that is one of the problems with some of the studies that have been done and have been cited by Dr. Volberg.

I also realize that her studies, one of her studies had 139 people or 135 gamblers, another had 179, and that is why I used the Harvard studies, 40,000 gamblers online in Europe who have been examined. And I just think the weight of the evidence goes that way.

But Dr. Volberg herself admits that you have got to be careful with your sample to make sure that you don't oversample with young men who are more likely to be those individuals included. And I am not sure whether in those surveys that she cited in her written documents——

Mr. GUTHRIE. The 40,000 Harvard study had the same percentage of psychological gamblers; is what you are saying they had the same percentage? So there was not an evidence of an appreciable different percentage of problem gamblers online as it is in a casino.

Mr. FAHRENKOPF. I think the numbers were very different with regard to the conclusion as to whether or not just Internet gaming itself is going to create more problem gamblers or whether or not, as Dr. Volberg has quoted in a number of her studies, it is just another element that a problem gambler is going to play; in other words, they are going to——

Mr. GUTHRIE. Dr. Volberg, do you want respond?

Ms. VOLBERG. With all due respect to Mr. Fahrenkopf, the very small sample that he cited there, it looks like those results are from the Nevada survey that we did in 2002.

Mr. FAHRENKOPF. No, it was a California study, 135 Internet gamblers.

Ms. VOLBERG. One hundred thirty-five Internet gamblers out of a total sample of 7,121.

The part that, you know—it is very difficult in a forum like this to get down into the nitty-gritty of research studies, and I would invite all of you to come to the National Council's annual conference and listen to these things be debated.

I think that in my mind, there is very clear evidence that problem gambling rates amongst Internet gamblers are extremely high.

They are three to four times higher than they are amongst people who do not gamble on the Internet but do other forms of gambling.

The issue is that most people who gamble on the Internet also do other types of gambling. They are casino players, they play the lottery, many of them are horse betters, and so on and so forth. And so when you do an analysis it is very important to control for those things.

In the California survey that Mr. Fahrenkopf has just referenced, we found that only that very small number or very small proportion of about 2 percent of our sample had gambled on the Internet, but 11 percent of them scored as pathological gamblers and an additional 20 percent of them or 19 percent of them scored as subclinical problem gamblers.

And when you did a statistical analysis that controlled for the demographics for co-morbid disorders, for other types of gambling, the Internet gamblers were actually 10 times more likely to have a gambling problem than the people who were not gambling on the Internet.

Mr. GUTHRIE. Wouldn't you say that because you can do that anonymously, because some people do things on the Internet they don't do in public—I mean, that is what we—is it because they can do it anonymously? Is that why you see it at higher rates or access, because nobody sees you walking into the casino and gambling, see you are on the Internet, and other forms of behavior people have done on the Internet you can't believe they have done. We have had a problem in Kentucky State Government where people are doing stuff on the computer that is just unbelievable. And is it because of the anonymity of it all that you don't think somebody can find you?

Ms. VOLBERG. I think it is the anonymity. It is also the ease of access. It is the fact that, you know, there are no external controls in terms of, you know, being socially visible to other people. I think that there is a number of different features of the Internet gambling that are of great concern to people who are concerned about the issue of problem gambling.

Mr. GUTHRIE. Thank you. I see my time has expired. I yield back.

Mrs. BONO MACK. Thank you. Dr. Cassidy, you are recognized for 5 minutes.

Mr. CASSIDY. Again, this has been a very informative panel. I think at least a couple of you must have read some of the questions I had last time. If not, you are incredibly intuitive, in which case I want to gamble with you on your side, not against you.

On the other hand, Dr. Volberg, you and Mr. Fahrenkopf actually pose some different conclusions. I think I read in your testimony that worldwide there is about 4 billion played on Internet gambling, and Mr. Fahrenkopf estimates that there would be 2 billion in tax revenue generated. Now, those numbers seem incompatible unless you are imagining, Mr. Fahrenkopf, that there would be a dramatic escalation in the amount of online gambling, or if you disagree with Dr. Volberg's statement that there is 4 billion only.

Mr. FAHRENKOPF. One of the problems with anyone guesstimating what the tax revenue that is going to be generated is, is we are dealing with an unregulated industry. So what we are doing, any of us who are trying to estimate it, would be we are

dealing with offshore companies that are trying to give us estimates.

For example, there was a PriceWaterhouseCoopers report that was actually filed in the Financial Services Committee in the last cycle that said there would be $49 billion in revenues. Well, there were a lot of assumptions you had to make. It was that every State would opt in. I mean that it would include sports wagering. I mean, you have got to look at it carefully.

I tend to go on the low side because I just don't feel there has been sufficient evidence out there of exactly what the bottom line would be, plus we don't know what the tax structure would be if legislation would be passed.

Mr. CASSIDY. But if it were taxed too much, it would drive people to the illegal offshore sites. So, that is——

Mr. FAHRENKOPF. That is the problem they are have right now right now, Congressman, for example, in Great Britain. In Great Britain, they put in place such a high level of taxation on Internet gaming companies that most of the companies have left and have gone to the Isle of Man, have gone to Gibraltar, have gone to other places to locate because——

Mr. CASSIDY. Now, that is a nice segue, just because I am out of time, and I am going to be out of time.

Dr. Volberg, your testimony also points out that in places like France and in Britain, 25 to 33 percent of the people still are offshore, if you will, at illegal sites.

Ms. VOLBERG. It is actually the opposite way around. It is only about 25 to 40 percent of domestic players in those markets who play exclusively with the domestically provided and regulated sites, and it is the remainder of the market, as I understand it, or the remainder of the players who actually continue to play either on out-of-jurisdiction sites or use a mix of domestic and nondomestic.

Mr. CASSIDY. So we really shouldn't view this as a cash cow for State treasuries because if we tax it too much we will just drive people offshore. That is a fair statement?

Mr. FAHRENKOPF. Well, I think—that is why I say we have to tighten up UIGEA and give the banking facilities in this country the guidance that they will need to stop financial transactions with those offshore operations. That will stop it.

Mr. CASSIDY. Although going back to what Mr. Frank said, if people wish to do so in this age, it is hard to imagine you can somehow keep them—although I enjoyed some of your testimony about the online protections you could create, and thank you for adding those.

There is also a little discrepancy. Dr. Volberg, you mentioned, one of the things—I don't have my glasses on, I am sorry, I can't see. Fahrenkopf?

Mr. FAHRENKOPF. Yes, it is.

Mr. CASSIDY. I apologize. Mr. Fahrenkopf, you mentioned that in one of your references that only 2.5 percent of college students play online Internet. But Dr. Volberg, I thought maybe you or someone else I saw referenced said 30 percent of high school—of college males are online. Do I have my numbers totally confused?

Ms. VOLBERG. I think there might be some confusion about the numbers because——

Mr. CASSIDY. What is the prevalence of Internet gambling amongst college males?

Ms. VOLBERG. I wish I could answer that because we do not have any recent surveys that tell us what Internet gambling participation rates are in the U.S. population.

I would estimate, based on what we have seen in some of the recent State-level studies, like the California study that came up earlier, is that probably while about 2 percent of the general population gambles on the Internet, amongst college-age males it is probably going to be closer to 8 to 10, possibly up to 15 percent.

Mr. CASSIDY. OK. It is different from the 2.5 percent of all students, even if it is 50 percent female/male.

Mr. FAHRENKOPF. There has been a recent study of 10,000 college students.

Mr. CASSIDY. That is the one I am quoting.

Mr. FAHRENKOPF. Yes, they found that almost 2.5 percent had gambled on the Internet and only six-tenths of a percent did so monthly or more frequently. That is from LaBrie.

Mr. CASSIDY. Now that prevalence is far lower. That is why it seemed odd.

Ms. VOLBERG. No, that is 2003 that it was published.

Mr. FAHRENKOPF. 2003. That is right.

Mr. CASSIDY. I see. That is dated data, if you will.

Mr. FAHRENKOPF. Yes.

Mr. CASSIDY. Well, I have other questions, but I am out of time. I yield back.

Mrs. BONO MACK. Thank you, Dr. Cassidy. And the chair recognizes Mr. Olson for 5 minutes.

Mr. OLSON. I thank the chairwoman for hold this hearing and also thank the witnesses for your testimony, your time, and your expertise. It is almost over.

I would like to limit my comments this morning as to what is going on in my home State of Texas in regards to legalizing gambling, issues with UIGEA, and one question, as my colleagues have touched on most of my questions previously.

In March of this year the Texas House Committee on Licensing and Administrative Procedures held a hearing on nine bills which propose a variety of options for legalizing gaming in Texas.

Currently, gambling in Texas is limited to State lottery, three federally recognized Native American tribes, and gambling at horse and Greyhound racetracks. Supporters of gambling in Texas point to legalizing poker, casinos, and slots as a way to help with State's budget issues in the form of nontax revenue, as you allude to up there, the success you have had in New Hampshire.

Many folks in Texas also talk about the potential for thousands of new jobs that could be created. Others argue that gambling preys upon the poorest Texans and creates bigger social problems. This is an important debate that my State is having, and I also appreciate our committee is exploring this issue of interstate online gaming and the current issues with UIGEA.

Mr. OLSON. [Continuing.] I have heard from a very, very vocal and savvy group of Twitter and Facebook constituents in the 22nd District who are very much in favor of legalizing online poker. I would like to read one email from one of these constituents. This

is from Valerie in Houston, Texas. And she said, Dear Representative Olson, the UIGEA slaps the Internet with unnecessary government regulation and oversight that limits innovation and growth. The act may have been intended to stop unlawful Internet gambling, but because it never actually spelled out what that meant, UIGEA ushered in unintended consequences that put the government in the role of Big Brother. In particular, the act has the effect of turning online payment transaction companies into informants and enforcers for the Federal Government, raising privacy concerns as well as cost to consumers. Sincerely, Valerie, from Houston, Texas.

Many people believe that if you are going to play Internet poker you should not follow the Federal Government's model of managing your budget.You should do it with money you have earned and not money that you expect to earn or hope to earn. As you know, legislation has been introduced in the House which would prohibit the use of credit cards from making deposits in Internet gaming accounts.

My question is for you, Mr. Fahrenkopf and any of the witnesses who wants to get involved, do you think most companies would be willing to limit themselves to debit cards and electronic checks?

Mr. FAHRENKOPF. I mean we haven't taken a position on the whole question of credit cards. It was a major issue in the Frank bill in previous legislative sessions. The original bill did provide for the use of credit cards. However, when the bill was being voted out of committee, that was removed. At this point in time, we don't have a position one way or the other on that from the standpoint of the American Gaming Association.

Mr. OLSON. Anyone else want to comment? Mr. Lipparelli.

Mr. LIPPARELLI. In the State of Nevada the use of credit cards is illegal for gaming.

Mr. OLSON. Mr. Fahrenkopf, any comments?

Mr. FAHRENKOPF. I already did.

Mr. OLSON. I apologize. Mr. McIntyre.

Mr. MCINTYRE. Certainly I am under the direction of the New Hampshire legislature and the governor's office, so whatever they would say to do I would do heartily.

Mr. OLSON. Sounds like my marriage, yes, sir. And Dr. Volberg.

Ms. VOLBERG. I think that there would be a lot of arguments in favor of prohibiting the use of credit cards for Internet gaming. So I would be in favor of that.

Mr. OLSON. Thank you very much. That is all my questions. I yield back.

Mrs. BONO MACK. I thank the gentlemen, and the chair now recognizes Mr. Butterfield for the purposes of a unanimous consent request.

Mr. BUTTERFIELD. Thank you very much. I am going to ask unanimous consent to have this letter dated November 18th, 2011, included in the record. The letter simply reiterates the necessity to hear from Federal agencies who will be impacted by any bill we pass relating to the legalization of Internet gaming.

Thank you.

[The information follows:]

FRED UPTON, MICHIGAN
CHAIRMAN

HENRY A. WAXMAN, CALIFORNIA
RANKING MEMBER

ONE HUNDRED TWELFTH CONGRESS

Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–6115

Majority (202) 225–2927
Minority (202) 225–3641

November 18, 2011

The Honorable Mary Bono Mack
Chairman
Subcommittee on Commerce,
Manufacturing, and Trade
U.S. House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Bono Mack:

Today, the Subcommittee on Commerce, Manufacturing, and Trade convened its second hearing this session on Internet gambling. As Ranking Member, I want to thank you for scheduling time for us to consider this complex topic and evaluate proposed legislation. At the first hearing, I spoke to the importance of proceeding in a cautious and deliberate fashion and the need to hear from federal entities charged with implementation and oversight of Internet gambling. However, I am concerned that the Subcommittee has not yet received testimony from the very entities that would oversee and implement key regulations governing a potential new system of legalized online gambling. These entities include, among others, the Departments of Justice, the Treasury, and Commerce, and the Federal Trade Commission.

At the Subcommittee hearing on October 25, 2011, you indicated that an essential goal of the hearing was to determine the proper role for federal regulators. You asked, "Can online gambling be regulated effectively? And what role should the federal government play to protect American consumers from 'sharks?'"[1] I strongly agree that both questions are central to our oversight of this topic. But we cannot obtain informed answers about the effectiveness of gambling regulation or consumer protection if we fail to invite key federal government agencies to testify as witnesses.

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[1] House Committee on Energy and Commerce, *Hearing on Internet Gaming: Is There a Safe Bet?*, 112th Cong. (Oct. 25, 2011).

Legalizing Internet gambling nationwide would involve several federal entities, each with different roles to play. Currently, the Department of Justice enforces the Wire Act,[2] and has used that statute to treat online gambling as illegal. The Department of Justice also enforces the Unlawful Internet Gambling Enforcement Act (UIGEA),[3] which bans gambling enterprises from accepting checks, credit card charges, electronic transfers, and other payments connected to unlawful online bets or wagers. For its part, the Department of the Treasury was required under UIGEA to prescribe regulations requiring financial transaction providers to establish policies and procedures to "identify and block or otherwise prevent or prohibit restricted transactions."[4] Under H.R. 1174, introduced by Representatives John Campbell and Barney Frank, Treasury would implement a licensing program for Internet gambling sites. Under H.R. 2366, introduced by Chairman Emeritus Joe Barton, the Department of Commerce would oversee the state or tribal licensure of online poker vendors. Finally, although it has been left out of current proposals, the Federal Trade Commission enforces fair business and marketing practices and possesses the appropriate e-commerce expertise to protect online gamblers' personal data and privacy.

It should be no mystery why strong oversight of online gambling would be required. In addition to monitoring industry practices, preventing fraud, and providing protections for individuals with gambling problems, regulators must ensure that children and teens are completely excluded from gambling activities.

The involvement of minors in gambling is particularly problematic – and already happens all too often. An October 2010 study by the Annenberg Public Policy Center found that 6.2% of boys age 14 to 17 (roughly 530,000 teenage boys) had used an Internet gambling site in the previous month – and while participation rates by girls were lower, they were increasing.[5] Moreover, in the past month, the *Pittsburgh Tribune-Review* and *USA Today* both reported that offshore betting sites are profiting from wagers on televised high school football games.[6] The

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[2] 18 U.S.C. § 1084.

[3] 31 U.S.C. § 5361-5367.

[4] 31 U.S.C. § 5364(a).

[5] Annenberg Public Policy Center, *Internet Gambling Grows Among Male Youth Ages 18 to 22; Gambling Also Increases in High School Age Female Youth, According to National Annenberg Survey of Youth* (Oct. 14, 2010) (online at www.annenbergpublicpolicycenter.org/NewsDetails.aspx?myId=395).

[6] Jason Cato, *High School Football Betting Rankles Pennsylvania Athletic Officials*, Pittsburgh Tribune-Review (Oct. 30, 2011) (online at www.pittsburghlive.com/x/pittsburghtrib/sports/highschool/s_764594.html); Jim Halley and Nicole Auerbach, *Offshore Sites Setting Betting Lines on High School Football*, USA Today (Nov. 4, 2011) (online at www.usatoday.com/sports/preps/football/story/2011-11-02/high-school-football-betting/51065482/1).

founder of one such site was quoted as saying, "[t]he customers who bet the games don't have a problem with morality. If the customers are happy, I am happy." Commenting on the scope of the problem in countries where gambling is legal, he said, "Walk to any street corner in the United Kingdom. You can bet on under 16-year-old soccer events, boys or girls. Any match, just about any amount."[7] This practice represents the type of enforcement challenges federal regulators will face if online gambling is made legal.

If the Subcommittee is to proceed with the federal legalization and regulation of Internet gambling, it must do so with careful consideration and thought. I respectfully request that our Subcommittee seek formal testimony from federal entities that would be tasked with any oversight of legalized gambling.

Thank you very much.

Very truly yours,

G. K. Butterfield
Ranking Member
Subcommittee on Commerce,
Manufacturing, and Trade

[7] Cato, *High School Football Betting Rankles Pennsylvania Athletic Officials.*

Mrs. BONO MACK. Without objection, and I, too, have received written testimony from Mr. Robert Martin, Chairman of the Morongo Band of Mission Indians, that has been shared with minority counsel. I understand they have no objection to including it in the record of today's hearing. Therefore, I ask unanimous consent that it be included in the record of this hearing.

[The information follows:]

TESTIMONY OF ROBERT MARTIN, CHAIRMAN, MORONGO BAND OF MISSION INDIANS

HOUSE ENERGY & COMMERCE COMMITTEE
SUBCOMMITTEE ON COMMERCE, MANUFACTURING & TRADE

"Internet Gaming: Regulating in an Online World"
NOVEMBER 18, 2011

Summary

Despite the far-reaching ramifications that online gaming legislation will have on tribal gaming enterprises, tribal governments have not been adequately consulted in the development of various federal online gaming legislative proposals. Such legislation should ensure that tribes are given fair and equal access to the online gaming market in a timely and forthright manner and that those activities become subject to the regulatory oversight by the tribe that authorizes the gaming to exist and when appropriate, the National Indian Gaming Commission. Tribes are important stakeholders in the current gaming market and must be afforded the same opportunities as all other operators. To be sure, 100 percent of the Tribes would face new competition with the authorization of online gaming, while only few will likely have the financial strength to compete with those who are granted new online gaming franchises. With that understanding, the passage of any legislation authorizing the use of the Internet, including a bill that addresses all of the concerns raised by tribes, remains troubling.

Written Testimony

My name is Robert Martin and I am the tribal chairman of the Morongo Band of Mission Indians. Our reservation is located just east of Palm Springs in Southern California. I appreciate the chance to provide testimony on this important issue.

When it comes to gaming, Morongo has a proud history of leadership. I was serving on the Tribal Council when Morongo and the Cabazon Band of Mission Indians won the landmark 1987 Supreme Court case that confirmed the sovereignty of all Indian tribes and allowed Indian Country to establish gaming operations. That decision proved to be a watershed moment for

Indian Country that helped transform the lives of thousands of Native Americans by allowing tribes to establish gaming enterprises.

Tribal gaming has allowed Indian Country to overcome decades of poverty, intolerance and neglect to provide for our people and to become self-reliant. Gaming has empowered tribes across the nation including Morongo to assist other non-gaming tribes by providing support for tribal education and economic development projects that help put others on the road to self-determination. As a result, tribes have been able to provide 628,000 jobs and $11.8 billion in federal, state and local revenue from gaming and non-gaming enterprises in 2009 alone. This revenue, combined with the billions in economic activity related to tribal gaming, has helped fuel the economies of our counties and states.

But, as we all know, the nature of gaming is changing. Just as it has with so many other industries, the Internet is revolutionizing the gaming industry. The Spectrum Gaming Group, a well-respected international authority on gaming, reported in 2010 that online gaming is growing at a rate of 10.6% annually – five times more than the growth rate of brick and mortar casinos.

The Internet is the new frontier in gaming. With the right legislation, Internet poker can be a fantastic opportunity for Indian Country to continue along the road of self-reliance. But the wrong federal legislation would be disastrous if it created a playing field that did not allow all operators, including tribes, from competing fairly. By having access to online poker, Indian Country will be able to continue providing for our people by creating and cultivating new opportunities to adapt and meet the demands of customers as technology changes.

So far, we have not seen any federal online gaming bill that puts tribes on equal footing with other potential online poker operators. In the last 18 months, there have been seven attempts at federal Internet gaming legislation. These bills have promoted some form of exclusivity for certain types of operators, typically casino entities based of out Nevada, including HR 2366.

When discussing the authorization of Internet gaming, I believe there are five critical issues that must be addressed.

First, is the issue of access. Tribes must have the chance to participate fairly in the online gaming market. As gaming operators, we must have the same rights as all other casino operators to offer

online gaming in a fair and equitable manner. Restricting the rights of tribes to participate in online gaming – such as limiting the ability of tribes of offer Internet poker players off of reservation lands –would severely and unfairly inhibit our ability to compete, and will jeopardize our financial standing. Such restrictions would fly in the face of the very purpose and capabilities of the Internet, which is about breaking down borders and providing a vehicle for communication and commerce. What good is the Internet if it can't be used to extend beyond the borders of our reservations?

The second issue is timing and entry into the marketplace. It is important that tribes have the opportunity to enter the online gaming market at the same time as any other potential operators. This ensures that tribes are afforded the same chance to compete fairly for the all-important market share.

The third issue revolves around eligibility of Internet poker operators and efforts to limit tribal participation. Any federal legislation should not impose size restrictions that place unnecessary burdens on smaller tribes looking to participate in online poker while favoring large Nevada casinos. HR 2366 would limit the pool of potential online poker operators only to large casinos that have 500 or more slot machines or 250 or more poker tables for five years or more. This deals an unfair hand to smaller tribes who do not meet this arbitrary and exclusionary size standard that brazenly seeks to favor Nevada casinos. And under HR 2366, those who do not meet these standards would be ineligible to become an authorized Internet poker operator for at least two years, giving Nevada casinos an unfair monopoly.

Furthermore, we believe online poker is an appropriate place to begin when discussing online gaming legislation, which brings me to our fourth issue. This is the ideal game with which to enter government-sanctioned operations. Poker is a well-defined game in terms of operation, regulation and popularity. Other forms of games are less defined and including them in any online gaming legislation will undoubtedly spawn a host of legal challenges and regulatory hurdles that would delay the launch of online poker and the revenues it would generate. By only legislating on this single game-type, we are ensuring that operators can quickly launch their online poker sites and begin generating economic activity, jobs and government revenue.

This brings me to our fifth issue and the topic of this hearing: regulation. Any legislation authorizing online gaming should not compromise existing state-Tribal compacts that generate millions in state and local revenues. Additionally, the question arises as to who would serve as regulators? HR 2366 seeks to award regulatory oversight and authority for online poker with the Commerce Department, which is both concerning and confusing. When IGRA was approved in 1988, it established the primary federal regulatory authority for Indian gaming as the National Indian Gaming Commission (NIGC) within the Department of the Interior. The experts at NIGC and Interior have had the primary responsibility for regulating tribal gaming for more than two decades with a proven track record of capable and professional oversight of tribal gaming.

As National Indian Gaming Association Chairman Ernie Stevens Jr. has testified, the 184 members of NIGA unanimously approved a set of principles in October 2010 that any online gaming legislation must satisfy to receive Indian Country's support. Designed to preserve the sovereign rights of tribes, those principles include:

- Indian tribes are sovereign governments with a right to operate, regulate, tax, and license Internet gaming, and those rights must not be subordinated to any nonfederal authority;
- Internet gaming authorized by Indian tribes must be available to customers in any locale where Internet gaming is not criminally prohibited
- Consistent with long held federal law and policy, tribal revenues must not be subject to tax
- Existing tribal government rights under tribal-state compacts and IGRA must be respected
- The legislation must not open up the Indian Gaming Regulatory Act (IGRA) for amendments

Some have questioned the NIGA principles, particularly the long held federal law and policy that tribal revenues must not be subject to tax. But they are not acknowledging how tribes have provided billions in state and federal revenues, from payroll taxes to Tribal-State compacts through which tribes have provided billions in state revenues.

The discussion of Internet poker is not new to me. I have been an outspoken advocate for Internet poker for several years. But despite being on the forefront of this issue, I am distressed to report that I have not been contacted by any of the federal bill authors seeking my comment. For that matter, the authors of the seven federal proposals over the past 18 months have not adequately communicated or dialogued with Indian Country in any meaningful manner during the drafting of the aforementioned federal legislation. Nevertheless, tribes have taken steps to be heard on the issue.

To date, there hasn't been a federal legislative proposal that meets NIGA's principles or that protects the rights of Indian Country. Indian Country should not be left out of the discussion. We should have a voice at the table just as so many others have.

Tribes that want to participate in online gaming markets must have the ability to do so – equitably and fairly in an open and competitive market.

Mrs. BONO MACK. With that, I am happy to thank my colleagues for their participation today. I thank the panel very much for your help in shedding light on what is clearly a very complicated issue. I look forward to our work together if this moves forward.

As we conclude our hearing today and prepare to depart to the four corners of our great Nation to celebrate Thanksgiving, please permit me to say what a blessing and an honor it has been to work with all of you this year on so many issues which are so important to so many people. Travel safely and I hope everyone enjoys our unique American holiday.

I remind members that they have 10 business days to submit questions for the record, and I ask the witnesses to please respond promptly to any questions you might receive. And with that, the meeting is now adjourned. Thank you.

[Whereupon, at 11:09 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

NHLottery
Over $1 billion to education

January 5, 2012

The Honorable Edolphus Towns
Member
Subcommittee on Commerce, Manufacturing and Trade
2125 Rayburn House Office Building
Washington, DC 20515-6115

Dear Representative Towns:

Please find attached answers to the questions posed which relate to the lottery industry and revenues. I certainly appreciate your courtesy during this hearing. If I can be of further assistance, please do not hesitate to contact me.

Warm regards,

Charles R. McIntyre
Executive Director

CRM/dc

The Honorable Edolphus Towns
Member
Subcommittee on Commerce, Manufacturing and Trade

1. Since the advent of illegal online poker, have lotteries seen a loss of revenue?

The advent of illegal poker is a hard date to pinpoint, but they have certainly become more prevalent starting in or around 2000. Since that time, we have seen a dramatic increase in the number of websites offering these services, and an exponential revenue amount estimated to be wagered through the sites.

Similarly, it is hard to state that lottery revenues are a constant, for two significant reasons: 1) new lotteries have come to be since 2000, creating entirely new player-bases and retail outlets (Tennessee, North Carolina, Arkansas); and 2) many of the lotteries have introduced entirely new games or products to increase revenues. For example, New York introduced Video Lottery terminals at a number of facilities throughout the state during that time, and has seen a significant increase in revenues.

To make an accurate comparison of revenues we can use my home state, New Hampshire, which has not made any substantive changes to its gambling profile since prior to 2000, and is considered a mature lottery. Our net revenues peaked during FY2006 and have been in steady decline ever since. In FY 2006 the NH lottery transferred approximately eighty million dollars for education; in FY 2011, our profit had dropped to a little over sixty-two million. Certainly, not all the decline is attributable to internet poker, but during the time when internet poker revenues were surging, the NH Lottery revenues were declining in corresponding fashion.

2. Was there any increase in lottery sales following the recent shutdown of several online poker sites?

During the first quarter of FY 2012, of forty-three reporting lotteries, thirty-five were positive in year over year gross revenue growth, four were flat and four were negative. Of the thirty-five that showed positive growth, nineteen were by 5% or greater (including New Hampshire).

Through the years, when either the state or federal government has taken a stance against unregulated, illegal gambling lottery proceeds have typically risen. As both a state prosecutor handling illegal gambling cases, and as a lottery executive in both Massachusetts and New Hampshire, I have witnessed this firsthand. While the correlation has not been carefully documented, there is ample evidence to suggest that where authorities moved to eliminate illegal gambling, lottery revenues have generally risen.

Response of Rachel A. Volberg

Senior Research Scientist

NORC at the University of Chicago

The Honorable G. K. Butterfield, Ranking Member

House Energy and Commerce Committee

Subcommittee on Commerce, Manufacturing, and Trade

Additional Questions for the Record

Hearing on

"Internet Gaming: Regulating in an Online World"

Rayburn House Office Building, Washington, DC

January 17, 2012

1. **Adolescents are considered by the National Council on Problem Gambling to be at a higher risk of a gambling disorder. More than two-thirds of states restrict in-person casino gambling to those age 21 and older or completely ban it. All others limit such activity to those 18 and older.**

   But young men and teenage boys are nonetheless managing to gamble through the Internet. An October 2010 study by the Annenberg Adolescent Communication Institute found that 16% of young men age 18 to 22 (or roughly 1.7 million individuals) had used an Internet gambling site in the previous month. This was almost a fourfold increase from the same survey's findings in 2008. The 2010 study also found that 6.2% of boys age 14 to 17 (or roughly 530,000 individuals) had used an Internet gambling site in the previous month.

   I understand that Annenberg's findings represent a "snapshot" of Internet gambling prevalence and that its survey occurred at a time prior to the April 15, 2011, seizure by the U.S. Department of Justice of the three largest poker websites operating in the United States. Nevertheless, it concerns me greatly that this and other recent studies suggest that online gambling by high school- and college-age youth has become more prevalent in recent years.

   a. **Please discuss the differences in maintaining age controls in brick-and-mortar casinos and in the Internet environment.**

   Age restrictions apply to virtually all forms of legalized gambling although such restrictions vary by type of gambling as well as by jurisdiction. The chief rationale for age restrictions has been that children and adolescents are more likely to become problem gamblers if they begin gambling at a young age.

   The key difference in maintaining age controls in the online environment compared with brick-and-mortar casinos is the absence of the ability to verify an individual's age through visual cues and body language. The ability to effectively prevent underage gambling has evolved over time within specific sectors of the gambling industry. For example, early studies of adolescents in states where casino gambling was legalized found that significant numbers of underage youth were able to participate in this highly age-restricted form of gambling. A survey of high school students carried out in the wake of the introduction of casino gambling in Atlantic City found that 64% of the respondents had gambled at the casinos (Arcuri, Lester, & Smith, 1985). In contrast, a more recent survey of adolescents aged 13 to 18 in Nevada, the most mature gambling market in North America, found that only 1% of the respondents had gambled at a casino in the past year (Volberg, 2002). In a similar vein, a study of adolescents in Oregon found that underage participation in lottery games declined from 39% in 1998 to 8% in 2007—a change at least partly due to efforts by the State of Oregon to educate youth, their parents and their teachers about the risks of adolescent gambling (Volberg, Hedberg, & Moore, 2008).

   Ten years ago, the Federal Trade Commission (2002) issued a consumer alert about children and online gambling. The FTC noted the ease with which underage individuals can access online gambling sites using credit or debit cards. The FTC found that nearly all gambling sites had inadequate or hard-to-find warnings about underage gambling prohibitions and few sites had any effective mechanisms to block minors from entering. The FTC also called attention to the numerous advertisements for gambling sites that appeared on popular non-gambling and game-playing sites.

   Much has been made of a 2004 British study, where a 16-year-old girl attempted to access 37 gambling websites using her debit card, lying about her age but being otherwise truthful. Only seven sites (19%) prevented her from registering (Smeaton, Poole, Chevis, & Carr, 2004). A more

recent study completed in 2009, after Britain began regulating online gambling, showed quite different results. A "mystery shopping" exercise intended to test the effectiveness of barriers to underage gambling found that 51% of the 37 online operators licensed by the UK Gambling Commission and representing 95% of all active customer accounts had measures in place to prevent underage players from gambling and from withdrawing any winnings if they were able to gamble (Gambling Commission, 2009).

In a report commissioned by FairPlay USA, Sparrow (2009) notes that a set of regulatory methods and technologies already exist to prevent underage access to online gambling sites. He points to a number of technologies routinely used in other industries, including a variety of data-matching techniques, electronic or other submission of documentary evidence of age, and the possible application of biometric identification systems. The strongest form of age control would require positive matching of a player at the time of registration against existing databases of known adults as well as identity-verification prior to initiating any session of play. Site operators could also be required to provide child-protective software to parents to help prevent minors from accessing gambling sites. Alternatively, a separate governmental or nonprofit entity could provide such software. Given the existence of such measures, Sparrow concludes that online gambling can effectively exclude minors by combining cutting-edge technology with a strong regulatory regime.

b. I understand that your research team found in Oregon that even when adolescents do not gamble with real money online, many still play the free version of popular online gambling games. What is known about the effects of "free play" and the practices of site operators that offer it? Are there any recent developments regarding "free play" that concern you?

Playing on Internet gambling sites without money is indeed common, particularly among boys and young men. In the survey that I and colleagues carried out among adolescents aged 12 to 17 in Oregon, playing gambling-type games on the Internet for free was the most popular gambling activity (Volberg et al., 2008). One-third of these adolescents (32%) had played free gambling games on the Internet at some time with 18% having done so in the past year. Boys were significantly more likely than girls to have gambled for free on the Internet (24% vs. 13%). Less than 1% of the respondents in the survey had gambled on the Internet for money. Similarly, in a survey of Canadian youth, Derevensky (2009) found that 49% of the underage respondents had gambled on the Internet without money in the past 12 months (including 34% of the respondents classified as non-gamblers) but that only 8% had gambled on the Internet with money.

Very little is known about the effects of "free play" on underage persons. However, researchers have noted the importance of preventing underage gamblers from playing for free on online websites due to their presumed vulnerability to the development of gambling-related problems (Valentine, 2008; Wiebe & Falkowski-Ham, 2003). Other researchers have identified a tendency among college age gamblers to make bigger and riskier bets in online games compared with offline games, particularly in the presence of other players (Cole, Barrett, & Griffiths, 2011). This is a particular concern in relation to underage youth, many of whom gamble primarily for social reasons rather than strictly for monetary gain.

There is some evidence that Internet gambling operators offer different odds and payout ratios during "free play" and "demo" sessions compared to when gamblers are playing for money. In 2004, a listserv called *GamblingIssuesInternational* (whose members are primarily health professionals and researchers) complained to MGA Entertainment about a slot machine application that the company's Japanese licensee had placed prominently on the Bratz Dolls website. The

listserv members pointed out that the slot machine application invariably returned a large win within five spins (early large wins are a known contributor to later gambling problems) and allowed players to "stop" the reels, thereby contributing to an illusion of control, another known contributor to problem gambling (Don, 2004). Sévigny and colleagues (2005) identified significant differences in payouts on Internet slot machines in "demo" and "for money" modalities. While companies argue that demo sessions are an opportunity for players to practice their skills before playing for money, 39% of the 117 Internet slot machine sites examined in this study provided a payout over 100% after 100 trials in their "demo" games and half of these sites maintained the inflated payout rate over an additional 400 trials. None of the websites provided payout rates over 100% in sessions where real money was gambled.

There are recent developments in relation to "free play" that are a concern. For example, many Internet gambling sites incorporate popular videogame technologies that appeal particularly to youth (Derevensky, 2009). An even greater concern relates to non-monetary gambling games, including poker, that are now offered on social media sites such as Facebook regardless of members' age. While these "virtual" games are currently only offered for points that cannot be exchanged for cash, there are indications that Apple, Facebook and Google are interested in eventually offering the games for real money (Domjen, 2012; Gladdis, 2011; Winkler, 2012a, 2012b).

King and colleagues (2010) identify several reasons for concern about the convergence of gambling and digital media. They suggest that new gambling technologies make gambling more accessible and attractive to young people, promote factually incorrect information about the games, provide an easy escape from real world problems such as depression and social isolation, and create a gambling environment that facilitates peer pressures to gamble.

c. Please briefly address whether you believe there is a role government authorities can play to ensure children and teens have a full understanding of gambling, including its risks.

Beyond the regulatory question of how to effectively prevent children and teens from accessing legal but age-restricted forms of gambling, I do believe there is a role that government authorities can play to ensure children and teens have a full understanding of gambling, including its risks. Given the strong evidence that gambling and other risky behaviors (e.g., tobacco, alcohol and drug use, poor school performance, truancy) are "fellow travelers" among adolescents (Jacobs, 2000; Romer, 2003), education and health departments at the state and federal level should be strongly encouraged to include materials on gambling in youth addiction prevention and education programs as well as in broader information and awareness campaigns for risky behaviors.

Another concern relates to advertisements for gambling which often target audiences along age, gender and ethnic lines and use persuasive techniques to promote the view that gambling is solely an entertainment experience. Given the likely ongoing convergence of gambling and digital media, there is a need for effective restrictions on online gambling advertisements directed towards young people (McMullan & Miller, 2008).

Finally, efforts are needed to increase recognition of youth gambling and its associated risks among parents, teachers, counselors and others working with youth. Work is needed to increase understanding of associations between youth gambling and other risk behaviors. Parents who gamble need to be educated about the increased risk of gambling problems for their children. Once youth are gambling, peer influences should be addressed in school-based curricula. Strategies are needed that combine programs across family, school and community, include a range of activities

(e.g., information, improving skills, offering alternative activities, providing problem identification and referral), are adaptable over time as conditions change and are rigorously evaluated to identify the most effective approaches (Volberg, 2009a).

2. **The self-exclusion list is the most widely adopted protection mechanism for problem gamblers. If individuals have a gambling problem and choose to enroll in a program that bars them from entering any casino in a given state, then gambling operators and regulators owe it to these individuals to provide a system that works. Such a system should encompass as many establishments as possible, ensure the confidentiality of individuals on the list, and function reliably to help problem gamblers avoid "slips." The same ought to be the case for individuals who wish to exclude themselves from online gambling establishments, if they are legalized here in the United States.**

   However, you indicated at the Subcommittee's hearing that the self-exclusion list is not the only mechanism available – or even the minimum necessary – for effective player protection. You testified: "Beyond requiring licensees to establish self-exclusion programs, I believe some additional minimum requirements are needed. These include a requirement for players to set limits with regard to time and money, a 24-hour cooling off period before changes to limits can be made, monthly financial statements, and self-assessment tests."

   a. **Can you please more fully discuss these requirements and why you believe each is important to helping individuals limit their gambling?**

   While self-exclusion has been widely adopted as a consumer protection mechanism, surprisingly little research that has been done to evaluate the effectiveness of such programs or identify what works best (Volberg, 2009c). The most thorough study, carried out by the Responsible Gambling Council of Ontario (2008), found that the self-exclusion process is increasingly viewed as a means to provide assistance to individuals rather than as a punitive measure, that compulsory lifetime bans are giving way to bans of varying length, and that better links are developing between gambling venues and specialist treatment programs to improve the likelihood that gamblers who so desire will be able to access the help they need. The Council noted, however, that there was considerable room for improvement in self-exclusion programs worldwide. There is a need to promote these programs more aggressively; there is also a need for much better regulatory oversight of these programs and for better coordination between operators within jurisdictions.

   Given the lack of research on exclusion programs, it should be no surprise that there is, as yet, little empirical evidence for the additional measures that I recommended in my testimony. I based my support for measures such as limit setting, cooling-off periods, monthly financial statements and self-assessment tests on a theoretical understanding of how gambling problems develop and on the limited research that is beginning to emerge about the effectiveness of some of these measures.

   The most comprehensive review of pre-commitment strategies—as these measures are termed internationally—was carried out recently by the Australian Productivity Commission (2010; see Chapter 10). The Productivity Commission noted that the ability for players to make choices and place limits on their gambling involvement prior to actually gambling is important because these activities are intentionally designed to overwhelm individual decisions about when, how long and how much to gamble. Players may experience faulty cognitions, find it hard to stop playing, fail to appreciate the risks associated with these activities, have their judgment impaired by alcohol, or suffer from emotional or mental health problems. All of these factors serve as obstacles to

genuinely informed choice and reduce the capacity for self-control (Dickerson, Haw, & Shepherd, 2003).

b. What have you observed as governments or other gambling authorities have begun to implement these requirements?

Serious efforts at consumer protection first emerged in relation to slot machines and have evolved furthest in Australia and Canada where slot machines are widespread and often located in previously non-gambling establishments. Consumer protection measures around slot machines include employee problem gambling awareness training as well as automated interventions with "high frequency" gamblers. Other consumer protection measures relate to modifying slot machine parameters (e.g., game speed, number of near misses, number of play lines, removal of bill acceptors, limits on bet size and maximum wins, mandatory cash-outs, etc.), setting loss limits, restricting access to cash and credit, and restricting advertising and promotional activities (Williams, West, & Simpson, 2008). Several researchers have pointed out that monitoring of player behavior is increasingly popular with Internet gambling operators targeting heavy spending players and have called for the use of behavioral analysis to identify players who are likely to be eligible for protective and helpful interventions (Dragicevic, Tsogas, & Kudic, 2011; Griffiths, 2008; Peller, LaPlante, & Shaffer, 2008).

Implementation of consumer protection measures in the Internet gambling environment began in the Nordic countries and has spread to other jurisdictions internationally. When Loto-Quebec introduced online gambling in 2010, players were limited to losses of under $10,000 per week and required to set weekly spending limits with a seven-day cooling off period set before limits could be increased. A government-appointed committee is monitoring the venture and will report its findings in 2013 (Moore, 2010). When the New Zealand Lottery introduced online access to games, players were required to set spending limits under $300 per week before they could access an online account. If players reach their spending limit over four consecutive months, they are contacted by the Lottery to inquire whether they wish to reduce their spending limits (New Zealand Lotteries, 2009).

The most promising and well-developed online gambling player protection package is Playscan (www.playscan.com), a corporate social responsibility product developed by an independent subsidiary of Svenska Spel, the Swedish state-owned gambling operator. Playscan offers players a range of tools, including personalized budgets, self-diagnostic tests of gambling habits, and self-exclusion options. A recent survey of Svenska Spel players found that 26% had used Playscan with over half of these users setting spending limits, 40% taking the self-diagnostic test and 17% using the self-exclusion feature (Griffiths, Wood, & Parke, 2009). Playscan is presently available to gamblers on the Swedish, French and Finnish government gambling operators' websites with plans for further expansion in Europe and Asia.

At a recent workshop that I attended in Stockholm, several Swedish colleagues presented the results of a study of Playscan's self-diagnostic test with more than 20,000 players from seven Nordic gaming companies. The test provides individualized feedback to players about how their gambling compares to other players and to their own history of play and appears to be an effective early warning tool providing feedback and support tailored to individuals' own gambling and risk behaviors (Munck, Jonsson, & Nilsson, 2011). Another recent intriguing study analyzed chatroom correspondence with customer service employees of three European online gambling operators and found indicators in these exchanges that predicting subsequent self-exclusion (Haefeli, Lischer, &

Schwarz, 2011). This study is a further indication of the importance of early detection as a building block for the effective prevention of gambling-related problems among Internet gamblers.

Internationally, we are seeing the emergence of a range of third-party certification efforts in support of consumer protection. Organizations such as eCOGRA (e-Commerce and Online Gaming Regulation and Assurance), the World Lottery Association and G4 (Global Gambling Guidance Group) have all developed accreditation programs to assure minimum standards in corporate social responsibility and player protection. While not all the members of these groups have sought accreditation, the existence of these programs points to growing acceptance of the importance of consumer protection in the gaming industry (Volberg, 2011).

What we do know about consumer protection measures in general is that not many people will use these tools unless their use becomes normative, that there is reasonable evidence that players will use these tools if they are made available, that higher-risk users find these tools most useful, that if players want to circumvent these systems, they probably will and that system design plays a critical role in the effectiveness of these systems (Hare, 2010).

While much more development and research work is needed, the fact that Internet gambling is conducted in a networked, data-intensive environment offers opportunities for regulatory oversight and consumer protection that are impossible in the brick-and-mortar environment. Since every detail of every gambling transaction can be recorded and potentially analyzed in the Internet gambling environment, players exhibiting behaviors indicative of problematic gambling can be flagged and their betting habits further analyzed (Sinclair & Volberg, 2000). As I noted in my written testimony, requirements for players to set limits with regard to time and money, monthly financial statements and self-assessment tests are all measures supported strongly by Internet gamblers surveyed worldwide (Parke, Rigbye, Parke, & Williams, 2007). While stronger empirical support is needed for many of these measures, I concur with Sparrow (2009) who notes that, in a well-regulated online environment, gamblers should have opportunities and technologies easily available to help reduce and prevent problematic gambling behaviors.

c. At the hearing, you suggested that it would be best if player protection programs were "operated by a third-party independent organization." Please explain why you believe this.

I noted in my testimony that one important advantage to establishing a single, separate agency to operate player protection programs would be to allow players who wished to set limits on their time or money or to self-exclude to visit a single site where these services could be implemented across the full range of gambling sites at one time. This has been a challenge for many of the self-exclusion programs operated by brick-and-mortar gaming operators.

Another important reason for operating player protection programs through a third-party independent organization is that both gambling operators and governments are constrained by the profit motive in their willingness and ability to prevent problem gambling. Governments, in particular, face conflicting incentives in relation to gambling legalization and the extent to which best practices will be adopted can be influenced by pressures from politicians, senior officials, industry lobby groups and other advocates. Having an independent agency or organization operate player protection programs would ensure that these efforts are not, and are not perceived to be, affected by the need to generate revenues.

A third reason to have player protection programs operated by an independent organization is that this approach is more likely to result in the fielding of measures that are independently evaluated,

publicly accountable and transparent to consumers, operators and other interested parties. In its most recent report, the Australian Productivity Commission identified independence as an important "best practice" in the regulation of all forms of legal, commercial gambling (Productivity Commission, 2010; see Chapter 17).

3. **At the hearing, you contended that funding in the United States for prevention, treatment, and research on problem gambling is currently inadequate. You testified that "[s]tate funding for problem gambling services per capita is approximately one-twentieth the level it is in countries such as Australia and Canada."**

   What steps do you believe Congress should take to address this current funding shortfall, and what do you believe Congress should do to ensure the long-term budgetary health of such programs if this body considers a bill legalizing online gambling?

   In the most recent national survey of publicly funded problem gambling services, the average adult per-capita allocation for the 37 states with such funding was 34 cents with approximately half of those funds (17 cents) directed toward treatment services (Marotta, Moore, & Christensen, 2011). Within the United States, it is helpful to compare this level of spending with national spending on substance abuse treatment. In 2005, the most recent year available, spending on substance abuse treatment was $22 billion which equates to in $102 in adult per-capita spending (Substance Abuse and Mental Health Services Administration, 2010; U.S. Census Bureau, 2005).

   Internationally, some countries spend far greater amounts on publicly funded problem gambling services. In my testimony, I was comparing per-capita funding for problem gambling services in the U.S. in 2004 with per-capita funding for these services in several other countries, including Canada, Australia, New Zealand and South Africa (Volberg, 2009b). Since 2004, spending on problem gambling services in Canada has grown from $44 million (USD) to $80 million (USD) (Canadian Partnership for Responsible Gambling, 2011) while the new government in the Australian state of Victoria has pledged to spend $31 million (USD) annually over the next five years on problem gambling services, up from $10 million (USD) in 2004 (Victorian Liberal Nationals Coalition, 2010). While spending on problem gambling services in the United States has risen since 2004, from approximately $25 million to $58 million, this increase in funding is primarily due to the growing number of states that have legalized casino gambling and are now providing publicly funded problem gambling services (Marotta et al., 2011).

   Regarding immediate steps that Congress could take to address this funding shortfall, I believe that an important first step would be to establish clear responsibility for overseeing problem gambling services within a single federal agency along with a mandate to coordinate efforts with other federal agencies, including the Departments of Education, Health and Justice. Leadership at the federal level might influence states to do a better job appropriating funds for problem gambling services from the revenue streams that many receive from legalized gambling. Furthermore, such leadership could result in the identification of best practices in problem gambling prevention, treatment and research and prompt states to adopt such practices.

   The experiences of rapid liberalization of lotteries in the 1970s and of casinos in the 1990s in the United States provides salutary lessons about the willingness of state governments to provide help for vulnerable populations, including young people and problem gamblers. In general, funding for services for problem gamblers has become available only when a new form of gambling is legalized. Furthermore, such funding tends to be highly vulnerable to changes in government and in economic

circumstances, as recent decisions by several states to reduce or eliminate existing funding for problem gambling services demonstrate (Berzon, 2011).

To ensure the long-term budgetary health of such programs, language is needed within any bill legalizing online gambling in the United States to assure that a reasonable level of funding for problem gambling services is made available and preserved over time and to also assure that research will be undertaken to keep the federal government informed about new developments and emerging best practices in preventing and treating problem gambling.

References

Arcuri, A. F., Lester, D., & Smith, F. O. (1985). Shaping adolescent gambling behavior. *Adolescence, 20*, 935-938.

Berzon, A. (2011, April 30, 2011). Cash off table for gambling addicts. *Wall Street Journal*, from http://online.wsj.com/article/SB10001424052748704473104576293381628985642.html

Canadian Partnership for Responsible Gambling. (2011). *Canadian gambling digest 2009-2010*. Toronto: Canadian Partnership for Responsible Gambling.

Cole, T., Barrett, D. J. K., & Griffiths, M. D. (2011). Social facilitation in online and offline gambling: A pilot study. *International Journal of Mental Health and Addiction, 9*(3), 240-247.

Derevensky, J. L. (2009). *Internet gambling among youth: Cause for concern!* Paper presented at the Singapore Problem Gambling Conference: Understanding and addressing youth gambling.

Dickerson, M. G., Haw, J., & Shepherd, L. (2003). *The psychological causes of problem gambling: A longitudinal study of at risk recreational EGM players*. Sydney: University of Western Sydney, School of Psychology.

Domjen, B. (2012, January 7, 2012). Senator Nick Xenophon in bid to ban Facebook gambling. *Daily Telegraph*, from http://www.dailytelegraph.com.au/news/senator-nick-xenophon-in-bid-to-ban-facebook-gambling/story-e6freuy9-1226238984343

Don, K. (2004). Follow-up on Bratz dolls. In *GamblingIssuesInternational* (September, 2004).

Dragicevic, S., Tsogas, G., & Kudic, A. (2011). Analysis of casino online gambling data in relation to behavioural risk markers for high-risk gambling and player protection. *International Gambling Studies, 11*(3), 377-391.

Federal Trade Commission. (2002). *FTC consumer alert: Online gambling and kids.* Retrieved from http://www.ftc.gov/bcp/edu/pubs/consumer/alerts/alt116.shtm.

Gambling Commission. (2009). *Online mystery shopping programme, Information note*. Birmingham: UK Gambling Commission.

Gladdis, K. (2011, December 2, 2011). Fear over plan for Facebook 'casinos' that could lure children into online gambling. *Daily Mail*, from http://www.dailymail.co.uk/news/article-2069361/Fear-plan-Facebook-casinos-lure-children-online-gambling.html?ito=feeds-newsxml

Griffiths, M. D. (2008). Responsible online gambling and best practice. *World Online Gambling Law Report, 7*(1), 3-4.

Griffiths, M. D., Wood, R. T. A., & Parke, J. (2009). Social responsibility tools in online gambling: A survey of attitudes and behavior among Internet gamblers. *Cyberpsychology and Behavior, 12*(4), 413-421.

Haefeli, J., Lischer, S., & Schwarz, J. (2011). Early detection items and responsible gambling features for online gambling. *International Gambling Studies, 11*(3), 273-288.

Hare, S. (2010). *Program and outcome evaluation of the first South Australian player tracking and pre-commitment trial*. Paper presented at the Annual Conference of the National Association for Gambling Studies.

Jacobs, D. F. (2000). Juvenile gambling in North America: An analysis of long-term trends and future prospects. *Journal of Gambling Studies, 16*(2/3), 119-152.

King, D., Delfabbro, P., & Griffiths, M. (2010). The convergence of gambling and digital media: Implications for gambling in young people. *Journal of Gambling Studies, 26*(2), 175-187.

Marotta, J. J., Moore, T. L., & Christensen, T. (2011). *2010 national survey of publicly funded problem gambling services*. Phoenix, AZ: Association of Problem Gambling Service Administrators.

McMullan, J. L., & Miller, D. (2008). All in! The commercial advertising of offshore gambling on television. *Journal of Gambling Issues*(22), 230-251.

Moore, L. (2010, November 20, 2010). Loto-Quebec boards online gambling bandwagon. Adults can bet up to $9,999 a week. Operation is expected to generate $50 million in new revenue in 2012. *Montreol Gazette*, from http://www.montrealgazette.com/news/todays-paper/Loto+Quebec+boards+online+gambling+bandwagon/3859401/story.html

Munck, I. M., Jonsson, J., & Nilsson, T. (2011). *The GamTest at Spelinstitutet - Outline of a workshop for further development*. Stockholm: Spelinstitutet.

New Zealand Lotteries. (2009). How to change my details: Spending limits. Retrieved February 2, 2010, http://mylotto.co.nz/wps/wcm/myconnect/lotteries2/nzlotteries/Primary/HowToPlayOnline/MyDetails/

Parke, J., Rigbye, J., Parke, A., & Williams, L. V. (2007). *eCOGRA global online gambler report: An exploratory investigation into the attitudes and behaviours of Internet casino and poker players*. Nottingham: Nottingham Trent University.

Peller, A. J., LaPlante, D. A., & Shaffer, H. J. (2008). Parameters for safer gambling behavior: Examining the empirical research. *Journal of Gambling Studies, 24*(4), 519-534.

Productivity Commission. (2010). *Gambling*. Canberra: Productivity Commission.

Responsible Gambling Council. (2008). *From enforcement to assistonce: Evolving best practices in self-exclusion*. Toronto, Ontario: Responsible Gambling Council.

Romer, D. (Ed.). (2003). *Reducing adolescent risk: Toward an integrated approach*. Thousand Oaks, CA: Sage Publications.

Sévigny, S., Cloutier, M., Pelletier, M., & Ladouceur, R. (2005). Internet gambling: Misleading payout rates during the "demo" period. *Computers in Human Behavior, 21*(1), 153-158.

Sinclair, S., & Volberg, R. A. (2000). *Submission to the Gambling Review Body on Internet gambling*. New York, NY: Christiansen Capital Advisers & Gemini Research.

Smeaton, K., Poole, A., Chevis, A., & Carr, J. (2004). *Underage internet gambling: Study report*. London: GamCare.

Sparrow, M. K. (2009). *Can Internet gambling be effectively regulated? Managing the risks*. Cambridge, MA: John F. Kennedy School of Government, Harvard University.

Substance Abuse and Mental Health Services Administration. (2010). *National expenditures for mental health services and substance abuse treatment, 1986 - 2005*. Rockville, MD: Center for Mental Health Services and Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration.

U.S. Census Bureau. (2005). *Population and housing narrative profile: 2005*. Retrieved. from http://factfinder.census.gov/servlet/NPTable?_bm=y&-qr_name=ACS_2005_EST_G00_NP01&-geo_id=01000US&-ds_name.

Valentine, G. (2008). *Literature review of children and young people's gambling*. Birmingham: Gambling Commission.

Victorian Liberal Nationals Coalition. (2010). *The Victorian Liberal Nationals Coalition plan far gaming*. Melbourne: Victorian Liberal Nationals Coalition.

Volberg, R. A. (2002). *Gambling and problem gambling among adolescents in Nevada*. Carson City, NV: Department of Human Resources.

Volberg, R. A. (2009a). *Attitudes towards youth gambling among parents: Implications for public education and prevention*. Paper presented at the Singapore Problem Gambling Conference: Understanding and Addressing Youth Gambling.

Volberg, R. A. (2009b). *Problem gambling research: What have we learned and what is needed for effective regulation?* Paper presented at the North American Gaming Regulators Association Conference.

Volberg, R. A. (2009c). Self-exclusion blog on Nudge. Retrieved from www.nudge.org

Volberg, R. A. (2011). *What constitutes a robust responsible gambling program?* Paper presented at the AGRI 10th Annual Conference: Engaging the Big Questions in Gambling Studies.

Volberg, R. A., Hedberg, E. C., & Moore, T. L. (2008). *Oregon youth and their parents: Gambling and problem gambling prevalence and attitudes*. Salem: Oregon Department of Human Services.

Wiebe, J., & Falkowski-Ham, A. (2003). *Understanding the audience: The key to preventing youth gambling problems*. Guelph: Ontario Problem Gambling Research Centre.

Williams, R. J., West, R., & Simpson, R. I. (2008). *Prevention of problem and pathological gambling: A comprehensive review of the evidence*. Guelph: Ontario Problem Gambling Research Centre.

Winkler, R. (2012a, January 3, 2012). Online profits from gambling in the cards. *Wall Street Journal*, from http://online.wsj.com/article/SB10001424052970203899504577130961317275678.html

Winkler, R. (2012b, January 14, 2012). Zynga dealt strong hand in gambling. *Wall Street Journal*, from http://online.wsj.com/article/SB10001424052970203721704577158711402746548.html