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editorial

Submission results for 2005

Scientific journals increasingly make yearly reports to their readers on the numbers of papers submitted, rejected, and accepted. We last offered these statistics in the *Journal of Gambling Issues* (*JGI*) for 2003–2004
(see http://www.camh.net/egambling/issue13/jgi_13_intro.html, with an explanation of how the peer-review process functions at the *JGI*), and we offer them again for 2005. They provide a benchmark against which we will judge our future publications.

You may wonder why we are not publishing statistics for 2006. This is because the peer-review process usually takes longer than 6 months, so many papers submitted at the end of last year are still in review.

In summary, in 2005, 25 papers were submitted for peer review to the *JGI*. Of these, 16% (4 papers) were rejected by the editor upon submission (for lack of scientific value or poor research design, and for copying already-published graphics without permission). Another 16% (4 papers) were rejected by the reviewers, while 12% (3 papers) of papers were not rewritten after peer review, another 12% were withdrawn by the author (the author felt that the peer-review process was unfair, or decided to publish elsewhere, or felt that other published work had rendered the paper redundant), and 44% (11 papers) were accepted for publication. The latter statistic compares with an acceptance rate of 39% for 2003–2004. We see two factors reflected here. One is that we now receive more papers of higher quality and so more are accepted. The other is that authors are more willing to write revised versions, for in 2003–2004 about one third of authors did not respond with a second version after peer review—a figure that dropped to 12% for 2005.

We hope that what you find in the *JGI* is of value to you in understanding the place of gambling in our world.

We welcome your comments.

Reference

Lange, P. (2005). The peer review process at the *Journal of Gambling Issues*. *Journal of Gambling Issues, 13.* Retrieved May 17, 2006 from
http://www.camh.net/egambling/issue13/jgi_13_intro.html

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About us

Statement of purpose

The *Journal of Gambling Issues* offers an Internet-based forum for developments in gambling-related research, policy and treatment as well as personal accounts about gambling and gambling behaviour. Through publishing peer-reviewed articles about gambling as a social phenomenon and the prevention and treatment of gambling problems, it is our aim is to help make sense of how gambling affects us all.

It is published by the Centre for Addiction and Mental Health and is fully funded by the Ontario Substance Abuse Bureau of the Ministry of Health and Long-Term Care. We welcome manuscripts submitted by researchers and clinicians, people involved in gambling as players, and family and friends of gamblers.

Disclaimer: The opinions expressed in this journal do not necessarily reflect those of the Centre for Addiction and Mental Health.

Ethics and accountability

The *Journal of Gambling Issues* is a member of the International Society of Addiction Journal Editors and supports the Farmington Consensus statement on ethical standards in publishing: http://www-users.york.ac.uk/~sjp22/isaje/farmington.htm

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Images of gambling in film

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Abstract

This article examines the depiction of gambling in recent films. Often gambling is portrayed either very positively or very negatively. The authors found eight overlapping themes represented in these movies: (1) pathological gambling, (2) the magical skill of the professional gambler, (3) miraculous wins as happy endings, (4) gamblers are suckers, (5) gamblers cheat, (6) gambling is run by organized crime, (7) the casino heist, and (8) gambling as a symbolic backdrop to the story. These themes suggest that the portrayal of gambling in movies has a number of interesting distortions. The discussion centres on how these distortions have an impact on efforts to accurately disseminate information about gambling to the general public.
Keywords: distorted images of gambling in films, movies about gamblers, exaggerated skill, misinformation

Introduction

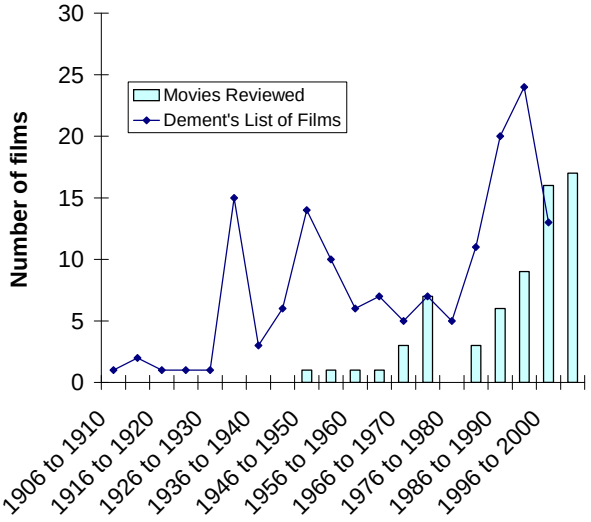
Gambling is the act of risking the loss of something of value (usually money) on an uncertain outcome in the hope of winning something of greater value (usually money). Gambling has often been a popular topic for myths, operas, books, songs, and in recent years, motion pictures. The current article examines images of gambling in motion pictures. The portrayal of gambling in movies is complex and shaped by social, historical, and cultural events and processes. While not all films that include images of gambling are 'about' gambling, many include characters that engage in some form of gambling activity.

Most people gamble as a means of entertainment. However, according to Shaffer, Hall, and Vander Bilt, (1999), between 1.35% and 1.85% of the population in North America develop a clinically significant gambling pathology. Pathological gambling (PG) is an addiction-like disorder. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association, 2000), lists PG as an impulse control disorder that is characterized by persistent and maladaptive gambling behaviours that have disruptive consequences on familial, occupational, and social pursuits. The availability of gambling has varied over time from unrestricted gambling to prohibition and back again (see Asbury, 1938; Rose, 1986). Over the past 20 years there has been a

tremendous increase in the availability of gambling opportunities around the world (Room, Turner, & Ialomiteanu, 1999; Shaffer, Hall, & Vander Bilt, 1999).

According to Dement (1999), the number of films that depict gambling has also varied over time. As shown in Figure 1, between 1908 and 1930 only six films about gambling were produced. However, during the depression and again after the end of World War II, gambling became a popular subject in movies. In the past 10 years there appears to have been an increase in the number of gambling-related movies.

Figure 1. Release dates for the movies reviewed in this article and for movies listed in Dement (1999)



Dement's (1999) book, *Going for Broke* is a thorough examination of movies that depict pathological gambling. He examined a number of films in terms of the extent to which the portrayals delivered accurate and appropriate messages about problem gambling. Although some movies accurately portray the nature of pathological gambling at least during some segments, Dement found that many movies about pathological gambling had irresponsibly happy endings. Film images in some cases reflected societal views on gambling. However, images in films may also alter societal views of gambling (Dement, 1999). According to social theory theory (Bandura, 1977), people learn by observing the behaviour of other people and the outcomes of those behaviours. For example, it is commonly believed that images of smoking in films may have encouraged people to smoke (Sargent, Dalton, Beach, Mott, Tickle, Aherns, & Heatherton, 2002).

Social learning theory (Bandura, 1977) would suggest that this might also apply to media images of gambling (see also Tremblay, Hoffman, & Drabman, 1998). For example, irresponsibly happy endings in movies about pathological gambling could encourage

problematic gambling. It is therefore important to examine the images of gambling presented in films to determine what distortions are present in recent movies.

Dement focused only on movies that were about problem and pathological gambling. Many films that depict gambling or have images of gambling that are not about pathological gambling per se. In this article we will extend Dement's work by looking more broadly at films about gambling. The purpose of this article is to examine gambling images in motion pictures and to find general themes that are common across a number of movies. We examine how gambling has been depicted in recent films, and explore the messages about gambling in these films. One key topic will be the exploration of misinformation about gambling.

Gambling is a well-established recreational activity and it is not surprising that it makes its way into movies. The first and second authors are recreational gamblers who play poker and enjoy watching movies about gambling. For balance, the third author is a non-gambler for political, psychological, and personal reasons. In examining these films we are not trying to raise an alarm about the encroachment of gambling into our society, nor are we encouraging gambling in movies. Rather, it is our hope that understanding the depiction of gambling in films will assist us in mapping out the obstacles and opportunities that might be present along the road towards greater public awareness of the potential negative side effects of gambling.

Method

Sample

Several hundred films were considered in the process of conducting this study. Sixty-five films were viewed and discussed in this article. The authors conducted a purposive sampling of films that had a focus on gambling. The purpose was to allow us to construct a complete understanding of gambling as seen in recent films. Most of the films listed here are relatively recent films produced within the past 20 years, but we have also listed a few older films that we felt were excellent exemplars of themes. The chart in Figure 1 summarizes the release dates of the films reviewed in this article.

The first two authors are both avid enthusiasts of movies about gambling. Many of the films we discuss are personal favourites that we have watched several times (e.g., *Rounders, The Hustler, Vegas Vacation, The Godfather*). Some of the films reviewed in this article have been also discussed by Gluss and Smith (2001), Dement (1999), and Hayano (1982). Some films were included because they were found listed as gambling films in film catalogues or by Web searches for "gambling movies" (e.g., *Get Shorty*). Other films were suggested to us by recovering pathological gamblers, counsellors specializing in problem gambling, recreational gamblers, video rental store employees, and postings to the bulletin board of Gambling Issues International (a listserve for

gambling treatment professionals). Our examination of movies was restricted to movies released in cinemas (i.e., not television), and filmed in English (with one exception, *Pig's Law*).

Procedure

The authors conducted a purely exploratory study of gambling in movies. The only starting point in our exploration was Dement's (1999) discovery of irresponsible endings in films about pathological gambling. We started with this view, but wanted to look at gambling broadly defined, not just pathological gambling.

In all cases, either the first or second author viewed each film. In some cases both authors viewed the same film separately. The authors then discussed the themes that they thought were depicted in the film. The authors then collected the descriptions of movies and organized them into general themes.

Results

Dement (1999) primarily focused his examination on the irresponsible messages in many films about pathological gambling. We took a different approach and instead extracted from these films several different themes. Following along from Dement's work, we first identified movies about pathological gambling. However, we also identified several other movies that focused more on the skill of the professional gambler. As a result we collected these together into a separate category of movies about professional or skilled gamblers. As we worked our way through this list of films, we uncovered two other themes: miraculous wins and negative stereotypes of gambling. Each time we added a movie to our list, we searched for additional themes that were emerging.

As the number of films increased, we realized that negative images of gambling could be further divided into themes of "cheating," "suckers," and "crime." As more films were added, the crime theme was sub-divided into movies about crimes committed against a casino, and movies about criminals who run gambling operations. These seven categories thus completed our venture into the themes of gambling films.

However, we had an additional collection of titles that did not fit into these categories. These films made reference to gambling, but were not about gambling. We collected this last assortment of movies into an eighth theme: movies in which a gambling venue or gambling activity has a symbolic function in the story. These eight themes are not distinct but overlap. Several movies were related to more than one theme. Some of the films that we examined did not fit into any of the categories discussed in the article (e.g., *The Odd Couple*, *Guys and Dolls*). The rest of the Results section is made up of a list of themes with a description of the movies that illustrate each theme and detailed discussion of these themes.

Theme one: Pathological/problematic gambling

Dement (1999) identified numerous films that depicted a pathological gambler. Many of these films included accurate portrayals of problematic gambling. However this accuracy was often undermined by irresponsibly happy endings.

- *Fever Pitch* (Fields & Brooks, 1985) is an accurate portrayal of pathological gambling, but the movie is severely undermined by a Hollywood happy ending.
- *The Gambler* (Chartoff, Winkler, & Reisz, 1974) is about a college professor and gambler who is so egotistical that he believes he can change reality by force of will. He is forced to fix a basketball game to pay off a gambling debt.
- *The Great Sinner* (Reinhardt & Siodmak, 1949) portrays a man who becomes addicted to gambling after his first spin of a roulette wheel.
- In *Let It Ride* (Giler & Pytka, 1989), the main character is a pathological gambler who experiences an amazing winning streak.
- In *Lost in America* (Katz & Brooks, 1985) a couple hits the road to "find themselves," but the wife loses the family's nest egg of over $100,000 at their first stop —Las Vegas.
- *Owning Mahowny* (Camon, Hamori, McLean, & Kwietniowski, 2003) is the true story of a Toronto banker who embezzles millions of dollars to support a gambling spree. At the end of the film, he is apprehended and goes to prison.
- *Pig's Law* (Bonin, Veillet, & Canuel, 2001) is the story of a young woman who steals drugs to pay her gambling debts. She is murdered as a result.
- *The Flintstones in Viva Rock Vegas* (Spielberg, Cohen, & Levant, 2000) where Fred Flintstone becomes hooked on gambling and nearly loses everything—including Wilma.
- In *California Split* (Altman & Walsh, 1974), two gamblers go on a gambling spree and drinking binge.
- In *Vegas Vacation* (Weintraub & Kessler, 1997) a man sits down at a blackjack table and obsessively gambles away his life savings.
- *The Hustler* (Rossen, 1961) is about a showdown between two highly skilled pool players.
- *White Men Can't Jump* (Lester, Miller, Rappaport, & Shelton, 1992) is about men who try to make a living gambling and playing basketball. The main character is a skilled player, but addicted to gambling.
- *Two for the Money* (Cohen, Robinson, & Caruso, 2005) depicts the inner workings of a sport advice service. The owner appears to be addicted to everything that one can be addicted to including gambling.

Several movies have included characters who have a problem or who develop a gambling problem during the movie. However, few explore the reasons for the problem. *The Flintstones in Viva Rock Vegas, Vegas Vacation*, and *Lost in America* show gambling problems developing rapidly. In most cases, no explanation of the development of the problem is given whatsoever. In *Owning Mahowny*, we see the experiences, temptations,

and thoughts that explain Dan Mahowny's (Philip Hoffman's) gradual slide into greater and greater levels of embezzlement. However, the origin of Mahowny's gambling problem itself is completely unexplored. Similarly, *The Gambler* includes a few scenes in which Axel Freed (James Caan) justifies his irrational behaviour as a conscious exercise of free will and power. However, the development of the disorder per se is not explored.

The Flintstones in Viva Rock Vegas is one of the few movies that explore the motivations for problematic gambling. Fred Flintstone feels he needs to impress Wilma because of her family's wealth. This is followed by a casino-manipulated series of wins (see Turner, 2001, for a full review). The combination of emotional need and a series of wins (intermittent reinforcement) are a reasonably accurate explanation of problematic gambling. However, both Fred's addiction and his subsequent escape from gambling occur too easily.

Dement (1999) describes several films about gambling problem as irresponsible because they tack on a happy ending that leaves the viewer with the impression that the gambler can win it all back. *Fever Pitch, Let It Ride, Two for the Money,* and *Vegas Vacation* are particularly apt examples of films with irresponsible happy endings. *Owning Mahowny, The Gambler,* and *The Hustler* are probably the most "responsible" movies about problem gambling that we have seen.

Very few of these films ever show the gambler getting any help. In *The Gambler* and *Dinner Rush* (DiGiaimo, Greaney & Giraldi, 2000), another character encourages the pathological gambler to seek treatment, but nothing more. *Fever Pitch* (1985) shows a gambler attending a Gamblers Anonymous (GA) meeting. However, after the GA meeting, the main character goes back to gambling, has a lucky streak, and wins back just enough to pay off his $89,000 debt. *Two for the Money* (Cohen, Robinson, & Caruso, 2005) has a brief episode in which the two main characters attend a GA meeting, but then try to drum up business for their sports advice service. *Owning Mahowny* (2003) shows Mahowny at the beginning and end of the movie talking to a therapist about how he will live without gambling. The movie does not show very much about the process of treatment, but the use of a treatment session to resolve the plot is a vast improvement compared to most movies in this group.

The Hustler and *White Men Can't Jump* are of interest because they explore problematic gambling in games of skill. Both illustrate how a highly skilled player can be a pathological gambler if he lacks emotional control. In *The Hustler* a contrast is drawn between Fast Eddie (Paul Newman) and Minnesota Fats (Jackie Gleason). Fast Eddie loses their first tournament together because of his over confidence and his drinking. He is emotionally crushed by the defeat. In contrast, when Minnesota Fats is defeated near the end of the movie, he graciously accepts defeat, shakes Fast Eddy's hand and goes on with his life. But Fast Eddy gets into a fight over the table fees and is barred from the games room.

Theme two: The almost magical skill of the professional gambler

However, not all movies about gambling are about problem or pathological gamblers. The second theme to emerge during our exploration of movies was the depiction of the almost magical skill of the gambler. This theme is most often related to skill games but the role of skill in these games is often exaggerated.

- In *The Cincinnati Kid*, (Ransohoff & Jewison, 1965) a young and highly skilled poker player (Steve McQueen) tries to prove to everyone that he is now the master of the game.
- *Maverick* (Davey & Donner, 1994) is about an extremely skilled gambler trying to get into a Winner Take All poker tournament.
- *Rounders* (Stillerman, Demme, & Dahl, 1998), is about a skilled poker player who has a nearly magical ability to figure out his opponents hand.
- In *Rain Man* (Johnson & Levinson, 1988) a man with autism is also mathematically gifted and is able to count cards flawlessly.
- James Bond films such as *Never Say Never Again* (Schwartzman, & Kershner 1983), *Diamonds are Forever* (Broccoli, Saltzman, & Hamilton, 1971), and *Thunderball* (McClory & Young, 1965), often have at least one episode where James Bond demonstrates a magical ability to win gambling games.
- *The Hustler* (1961) is a story about a pool hustler player who makes his living getting people to bet against his ability to sink impossible shots.
- *White Men Can't Jump* is a story about basketball hustlers. One of them is extraordinarily good at sinking 3-point shots, but cannot dunk.
- *Two for the Money* (Cohen, Robinson, & Caruso, 2005) depicts the career of a sport tout who is extraordinarily good at picking winners for the first half of the movie.

In a skill-oriented game such as poker, pool, basketball, horse racing, or sports betting, long-term success is theoretically possible. With the exception of some of the James Bond movies, these films illustrate play in skill games. However, the level of expertise is often highly exaggerated. In one scene in *Rounders*, Mike (Matt Damon) watches a group of professors playing poker for a few seconds, and then tells each of them exactly what they are holding. The main characters in *The Cincinnati Kid* and *Maverick* also show a magical ability to read their opponents' hands. In *Rain Man*, the autistic savant Raymond's (Dustin Hoffman) mathematical skill makes a blackjack game a sure victory. Card counting is indeed possible, but it only allows a card counter an edge of 1% or 2% over the house. *The Hustler* and *White Men Can't Jump* illustrate a magical ability to make impossible shots. Similarly, no matter what game James Bond plays, he is always able to win and prove that he deserves the designation of being lucky agent 007. He can even win games that he has never played before or games of pure chance such as craps (*Diamonds are Forever*). Bond films have been added to this category because these wins are portrayed as part of his overall secret agent skill. These movies glamorize professional gamblers and make skilled play seem like a sure thing.

Theme three: Miraculous wins as happy endings

The wins discussed above were the result of skill. However, many movies end with a miraculous win. Dement (1999) calls these sorts of films irresponsible because they encourage gamblers to hope to win.

- *Fever Pitch* (1985) is the story of a pathological gambler who goes on a spree and wins back the money he lost.
- In *Vegas Vacation* (1997), Clark Griswold (Chevy Chase) loses all of his family's money, but then is given a winning keno ticket from a dying man.
- In *Let It Ride* (1989) a chronic loser, Jay Trotter, (Richard Dreyfuss) has an incredible winning streak at the races. For one race, he picks a horse for the sole reason that none of his racetrack friends have picked it.
- In *Rounders* (1998), Mike wins the big showdown at the end of the movie and goes off to Las Vegas to live as professional player.
- In *Stealing Harvard* (Cavan & McCulloch, 2002), a young man needs money to pay for his niece's education. He unsuccessfully tries to steal the money, gives up, and instead wins the money he needs at a racetrack.
- In *The Good Thief* (Seaward, McLean, Wells, Woolley, & Jordan, 2003), Bob the gambler (Nick Nolte) manages to quit heroin, find love, pull off a major theft of a casino, and has an incredible lucky windfall at the casino.
- *The Cooler* (Furst, Pierce, & Kramer, 2003) tells the story of a person with chronic bad luck who works in a casino to "cool" the luck of winning players. His luck changes when he falls in love.
- In *Two for the Money*, after a disastrous losing streak, Brandon Lang (Matthew McConaughey) makes one last pick by flipping a coin. It wins.

The miraculous wins in these movies are often simply the usual Hollywood happy ending. People often go to movies for entertainment and escape so it is not surprising that they want a happy ending. The movie *Vegas Vacation*, for example, was a comedy and so the writers likely felt that they could not leave the Griswold family destitute. Additional irresponsible comedy was added by the contrast between the father (Chevy Chase) who lost virtually every time he played and his underage son (Ethan Embry) who won every time he played. Many comedies that have nothing to do with gambling have financially happy endings. *Stealing Harvard* is interesting in this respect because until the final scene the movie has nothing to do with gambling. Gambling is merely used as the means towards a happy ending.

However, the down side of the happy ending in films about gambling is that it may encourage distorted expectations about winning. Some viewers may take the magical ending seriously and be encouraged to chasing losses while gambling.

The main character in *The Cooler* (2003) suffers from contagious bad luck. The movie informs us that at one time he suffered from a gambling problem that resulted in a massive debt. The mob boss/casino owner had his legs damaged to punish him, but then employed him to kill the luck of other players. He walks around the casino touching tables or merely walking by slots and bad luck happens to the players. However, this all changes when he becomes involved in a mutual love relationship and the opposite starts to happen—he develops a case of infectious good luck. At the end of the movie, he walks out of the casino with a huge sum of money. *The Cooler* is filled from end to end with superstition and erroneous beliefs. The movie gives the viewer the impression that without the cooler on staff, the casino would lose money.

The reification of luck is not unique to gambling movies. In the recent movie *Holes* (Blank, Davis, Medavoy, Tucker-Davies, & Davis, 2003), the main character Stanley Yelnats is cursed with bad luck because his great-grandfather forgot to honour a promise to a fortune teller. The main character unknowingly fulfills the promise to the fortune teller's great-grandchild, thereby lifting the curse and bringing on a streak of amazing good luck.

Theme four: Gamblers are suckers

There are a number of movies that portray highly negative images of gamblers.

- In *Casino* (De Fina & Scorsese, 1995), the casino's customers are shown as suckers, criminals, or degenerates.
- In *Croupier* (Cavendish, De Mardt, Olen, Ruppert, & Hodges, 2000), the main character and narrator seems to view all gamblers as addicts or cheats.
- *Mafia* (Badalato & Abrahams, 1998) is a parody of movies about organized crime such as *Casino.*
- In *Two for the Money* we are told that all the people who call the sports advice service are "hooked." The character Brandon is told to "reel them in."

Films in this category exhibit a negative attitude towards the ordinary gambler, often viewing all players as addicts. For example, in *Croupier*, the main character and narrator calls the casino the "house of addiction" and tells his girlfriend that gambling is about "not facing reality" and "ignoring the odds." Later the narrator goes on to conclude that the gambler is not self-destructive, but rather wants "to destroy everyone else." Similarly, in *Two for the Money*, Walter (Al Pacino) tells us that all of the customers of the sports advice service are addicts. This attitude is also echoed in an interview with the real person on whom the character Brandon is based. (This interview is provided on the DVD version of the film.)

In *Casino*, the key scenes that reveal the movie's attitude towards the players are those narrated by Sam "Ace" Rothstein (DeNiro), in which he describes the operation of the casino or the counting room. During these scenes, he makes a number of comments about the suckers who come to Las Vegas. He tells us that the casinos are "the only winners,"

the players "don't stand a chance." Later on, gamblers are described as dropping "junior's college fund into the poker slots."

Mafia is a parody of *Casino*. It takes the negative view of gamblers one step further by explicitly making fun of the players. The slot machines come with names such as "Kiss your Money Good-bye," "Last Red Cent," and "Big Loser." There is also a table game called "You Absolutely Can't Win" where the customers put their money on the table and the dealer takes the money, stuffs it in a hole and says "thank you for playing." Another dealer uses a vacuum cleaner to remove bets from the table. The narrator goes on to say that "smart ones" just send the casino the money and save "the plane fare."

Theme five: Gamblers cheat

Several movies show people cheating in order to win. In some movies the casino is also shown cheating, but more often it is the player.

- In *Rounders* (1998), Mike's friend Worm seems to be a pathological liar. No matter how often Mike tells him not to cheat, Worm keeps cheating.
- In *Cincinnati Kid* (1965), the dealer tries to help the main character by stacking the deck. The Cincinnati Kid refused to allow any cheating.
- In *House of Games* (Hausman & Mamet, 1987), a poker player talks a psychiatrist into helping him cheat.
- *The Sting* (Bill, Phillips, Phillips, Phillips & Hill, 1973) is centred around using a fake off-track betting parlour to lure a Mafia leader into a major con.
- In *Maverick* (1994), in the final hand at a poker table, the cards are stacked to draw all the players into the showdown for a huge pot of money.
- In *Lucky Numbers* (Daniel, Ephron, Krane, Lazar, & Ephron Resnick, 2000), three friends conspire to rig the lottery.
- *Eight Men Out* (Pillsbury, Sanford, & Sayles, 1988) focuses on the alleged fix of the 1919 World Series by gamblers.
- In *The Flintstones in Viva Rock Vegas* (2000), Fred Flintstone is treated to an unusually long winning streak and then the casino owner throws a switch and Fred loses everything.
- In *Austin Powers: International Man of Mystery* (Moore, Myers, Todd, Todd, & Roach, 1997), one of Dr. Evil's henchmen, Number Two, is playing blackjack with X-ray glasses so that he can read the next card in the deck.
- In *Waking Ned Devine* (Holmes, Murray, & Jones, 1998), two men discover the dead body of a friend who appears to have died of a heart attack upon winning a major lottery. They try to claim the prize.
- *The Cooler* (2003) shows a player, the main character's son, cheating at craps.
- *Shade* (Hammond, Hartley, Schnepp, & Niemanm, 2003) is about a gang of poker hustlers who are anxious to prove that they are better at cheating than The Dean (Sylvester Stallone).

- *Croupier* (Cavendish, De Mardt, Olen, Ruppert, & Hodges, 1998) has several scenes of players or dealers cheating.
- In *Tombstone* (Jacks, Daniel, Misiorowski, & Cosmatos, 1993), Wyatt Earp moves a stack of chips, turns a card, and declares it a winner as an apparent bribe.
- In *Finder's Fee* (Arragon, Wallin, Williamson, & Probst, 2001), a man discovers a wallet containing a winning lottery ticket.
- *Rat Race* (Daniel, Zucker, & Zucker, 2001) depicts a race staged by a casino owner to give his high rollers something unique to bet on.
- In *The Grifters* (Scorsese, Harris, Painter & Frears, 1990), a con artist works for a bookie, placing bets to change the odds at the track.

According to these movies gamblers are dishonest people. *Finder's Fee*, for example, suggests that even honest nice people will cheat when the prize is large enough. *Rat Race* suggests that people will do anything whatsoever to win a prize. In *Austin Powers, The Sting,* and *Waking Ned Devine* the cheaters are successful and keep their wins. However, in *Rounders, Casino*, and *The Cooler* the cheaters are caught and dealt with rather harshly. In *Croupier*, cheaters were dealt with in a more legal manner being either barred from the casino or arrested. However, in *The Cincinnati Kid* and *Rounders* the main character refuses to win by cheating.

The casino also cheats in some movies. In four movies—*Viva Rock Vegas, The Sting, Croupier*, and *Tombstone*— the dealer cheats by letting someone win. In *The Sting, Viva Rock Vegas, Shade,* and *Maverick,* a win is used as a set up for a larger loss. In *The Cooler,* the casino employs a person with incredibly bad luck as a "cooler" to kill the luck of the tables. If such a thing as infectious bad luck actually existed then it would be cheating to employ a "cooler." In *Viva Rock Vegas*, the casino owner flips a switch to cause Fred Flintstone to lose. Both of these movies use a gimmick to explain why players lose, when in reality all the casino actually needs to do is wait for the long-term house edge to come into play.

Theme six: Organized crime runs the game

The management of the casino is also portrayed in a negative light. Several movies draw a strong link between organized crime and casinos. While organized crime has definitely been involved in gambling in the past, this stereotype appears to be persisting.

- In *The Dinner Rush* (DiGiaimo, Greaney, & Giraldi, 2000), the owner of a restaurant is threatened by the Mafia over his son's gambling debts.
- *Casino* (1995) depicts gangster involvement in Las Vegas casinos. Casino operators are portrayed as criminals and degenerates.
- In *The Godfather* (Ruddy & Coppola, 1972) and *The Godfather II* (Coppola, 1974), the Mafia Corleone family runs casinos in Las Vegas and Cuba.
- In *The Flintstones in Viva Rock Vegas* (2000), a rich criminal runs the casino.

- In *The Mask* (Engelman & Russell, 1994), gangsters run Edge City's hottest nightspot and casino, the Coco Bongo nightclub.
- *Mafia* (1998) is a spoof on Mafia movies such as *The Godfather* and *Casino*.
- *Get Shorty* (1995) is centred on a loveable "Shylock" played by John Travolta, in search of a gambler who owes him $15,000.
- In *The Cooler* (2003) the casino is run according to the "old school" which means gangster style.
- *Bugsy* (Beatty, Johnson, & Levinson, 1991) is about the life of Benjamin "Bugsy" Siegel, who in the 1940s set up the Flamingo, the first major destination casino on the Las Vegas Strip.
- In *Walking Tall* (Briskin, & Karlson, 1973; Burke, Schiff, Foster, Amritraj, Hoberman, & Bray, 2004) a man returns home and finds that a corrupt casino owner controls his town. The casino uses loaded dice to cheat the players.

Gambling produces a lot of money and criminal involvement is not surprising. Movies such as *Casino, Bugsy*, and *The Godfather* series are based in part on actual events and are reasonably accurate portrayals of the historical link between gambling and organized crime (Asbury, 1938; de Champlain, 2004). However, in our view modern Las Vegas defines itself in terms of a model of corporate greed rather than criminal greed. *Casino* is actually about the events that led up to the end of golden age of criminal greed. However, more recent movies about gambling such as *Shade* (2003), *Viva Rock Vegas* (2000), *The Cooler* (2003), *Walking Tall* (2004), and *Get Shorty* (1995) still draw a strong link between gambling and organized crime.

The link between gambling and criminals is also hinted at in many other films discussed in this article including James Bond movies, *The Hustler, The Cincinnati Kid, Rounders, Owning Mahowny, Shade,* and *Ocean's Eleven*. Curiously, the original version of *Ocean's Eleven* (Milestone, 1960), filmed in the heyday of mob-run gambling, did not depict the casino owners as criminals. But in the recent remake of *Ocean's Eleven* (Weintraub & Soderbergh, 2001) and its sequel, *Ocean's Twelve* (Weintraub & Soderbergh, 2004), the casino boss is portrayed as a ruthless gangster.

Theme seven: Stealing from a casino

Another popular genre of gambling-related film is the casino heist movie. This theme is closely linked to the "gamblers as cheaters" theme, but instead of stealing by cheating, the characters try to steal the casino's money directly. There have been several recent examples of films in this genre. These films often make the thieves seem glamorous and their theft seems justified.

- Both versions of *Ocean's Eleven* (Weintraub & Soderbergh, 2001; Milestone, 1960) are about a casino heist. The robbers are likeable and funny.
- *3000 Miles to Graceland* (Lichtenstein, Manes, Samaha, Spero, & Stevens, 2001) is about a casino heist by Elvis Presley impersonators.

- In *Croupier* (2000), the main character, who works in a casino, becomes involved in a plot to rob his own casino.
- *The Mask* (1994) contains all the stereotypes of crime and gambling. Dorian's gang of thieves robs a casino and attempts to blow it up with people still inside.
- *Lady Killers* (Ashley, Greenspun, & Preisler, 2004) follows the exploits of an eccentric group of criminals who successfully rob a riverboat casino.
- *Reindeer Games* (Moore, Weinstein, Katz, & Frankenheimer, 2000) is one of the few films set in a seedy casino. The casino owner is heavily armed.
- In *The Good Thief* (2003), a thief addicted to drugs and gambling successfully robs a Monte Carlo casino.

Movies that depict people trying to rob casinos do not seem to have any difficulty showing the thieves as heroes. It is as if the audience is being invited to feel some sort of satisfaction of vengeance against the casino. In *Ocean's Eleven* (2002), there is a strong hint that the casino operator is a criminal, so in trying to rob the casino the heroes are merely taking money back from the underworld. In *The Good Thief* the casino management is shown as being snobbish. In *The Good Thief* and in *Ocean's Eleven*, the crime does pay and the thieves are successful. The idea that casinos deserve to be robbed is most clearly stated in *Lady Killers* when Professor G.H. Dorr (Tom Hanks), tells his landlady that that there is no crime in robbing the casino because her "gains are ill gotten."

The thieves in these films are not always heroic. *The Mask* depicts the thieves who plan to steal the "Orphan fund" as evil. In *3000 Miles to Graceland* Thomas J. Murphy (Kevin Costner) is a psychotic killer. However, another thief, Michael Zane (Kurt Russell) is heroic and manages to end up with love, a family, a boat, and a lot of money.

Theme eight: Gambling as a symbolic backdrop to the story in the film

This theme is different because it does not actually involve gambling per se, but the incidental appearance of gambling or gambling-related places in movies. Even movies directed towards children may have scenes of Las Vegas.

- *Looney Tunes Back in Action* (Abbate, DeFaria, Goldmann, Simon, Weinstein, & Dante, 2003) is an adventure involving Daffy Duck, a security guard, and a plot for world domination. The characters have to go to Las Vegas to obtain some special spy card from a nightclub performer.
- *Mars Attacks* (Franco & Burton, 1996). This movie is a comedic retelling of the *War of the Worlds*. Some scenes are set in Las Vegas.
- *Leaving Las Vegas* (Cazès, Stewart, & Figgis, 1995) is a movie set in Las Vegas, but gambling plays almost no role in the story. Rather the movie is about a man with alcoholism who is drinking himself to death.

- *Pay It Forward* (Abrams, Levy, Reuther, & Leder, 2000) is a movie about a boy who tries to make the world a better place with random acts of kindness. The boy's mother works in a casino as a waitress.
- In *Stealing Harvard* (2002), the financial salvation of the story comes from gambling.
- *Four Dogs Playing Poker* (Hoffman, Salinger, & Rachman, 1999) is a violent movie about art theft that uses poker as a metaphor for the intrigues of the plot.
- *Fear and Loathing in Las Vegas* (Cassavetti, Nabulsi, Nemeth, & Gilliam, 1998) is about two men on a self-destructive program of drug intoxication.
- *Snake Eyes* (De Palma, 1998) is a dramatic movie about a politically oriented crime. The movie is set in a casino in Atlantic City.
- *Shark Tale* (Damaschke, Healy, Segan, Bergeron, Jenson, & Letterman, 2004) Oscar owes $5000 to his boss. His girlfriend gives him $5000, but he bets it on a sea horse. This crisis leads Oscar into his role as (fake) shark killer.

The cameos of Las Vegas in movies are not particularly surprising given the city's claim of being the entertainment capital of the world, but what we find surprising is that even children's films such as *Looney Tunes Back in Action* (2003) would include Las Vegas. In the movies in this theme, gambling often serves a symbolic purpose. For example, in the *Looney Tunes* movie, Las Vegas is used as an allusion to the glamorous life of the international spy as depicted in James Bond films. In many of these films, the image of gambling is used to glamorize the film. The patrons are shown as well-dressed, affluent, and having fun. Poor or unhappy people are rarely seen in these movies.

Leaving Las Vegas and *Fear and Loathing in Las Vegas* depict the seedy side of Las Vegas. These two movies use "sin city" as a symbolic image of disappointed dreams and a hopeless future. In *Leaving Las Vegas* the selfish pursuit of pleasure has degenerated into a selfish pursuit of self-destruction. The end of *Fear and Loathing* is more of a realization of the futility of the dreams of the 60s counter culture.

Snake Eyes and *Four Dogs Playing Poker* use gambling as a metaphor for the high-risk games that the various characters are playing. Other films use gambling as a plot device to create a crisis (*Shark Tales, Viva Rock Vegas*), or a solution (*Stealing Harvard). Shark Tales* (2004) also uses Oscar's disastrous foray into gambling as a metaphor for his short-sighted dreams of grandeur during which he ignores the fish that really loves him. *Pay it Forward* uses the randomness of gambling as a backdrop to Trevor McKinney's (Haley Joel Osment) attempt to make the world a better place through random acts of kindness. The symbolic meaning of gambling as used in these films varies from glamour to decadence, and from hope to hopelessness. What binds this assortment of films together into a theme is the use of gambling in a symbolic manner.

A taxonomy of themes

As discussed above, we identified these themes by reviewing numerous films and summarizing their content. We have organized these themes into a general taxonomy of films that is presented in Figure 2. First these films can be divided into two categories: films in which gambling is a central focus of the film, and others where gambling is a relatively minor topic but serves a symbolic role in the film. The films that are about gambling can be further divided into those that present generally negative views of gambling (e.g., pathology, crime, cheating) and those that present a generally positive image of gambling (e.g., magical skills and miraculous wins). The positive image is mainly related to the ability of the player to win (by skill or by miracle), but some of these films also add additional positive images by hinting at a glamorous and exciting lifestyle (*The Good Thief*, James Bond films, *Rounders*). Negative images of gambling are more common than positive images of gambling. Negative images were further divided into pathological gambling, suckers, cheaters, organized crime, and robbing casinos.

Release dates and trends in themes

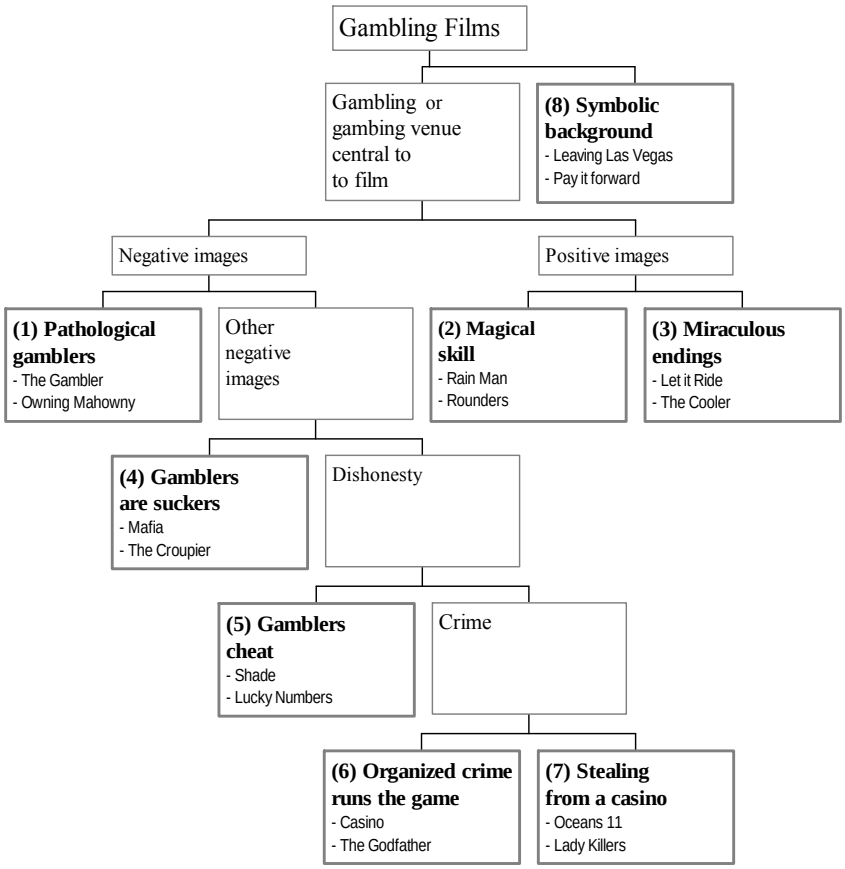
As a final analysis we also looked at the release dates to see if we could detect any trends in relative frequency of themes. Table 1 summarizes the release dates of the films by thematic category. Overall, the two most common themes were cheating and organized crime. Movies about pathological gambling appear to be the most stable category of film, occurring at a steady rate throughout the past 40 years. The theme of magical skill appears to have declined. Out of the 17 movies released between 2001 and 2005, only one, *Two for the Money* (2005) could be said to show magical skill. In contrast, films with lucky endings have been quite common in recent years. Movies specifically about gambling and organized crime (e.g., *The Godfather* series) have declined somewhat in recent years (see exemplars in the section on Organized Crime). However, when we added to this list the number of movies that hint at organized crime (e.g., *Ocean's Eleven, The Flintstones in Viva Rock Vegas, Shade, Owning Mahowny*) then the numbers in this category show no sign of decreasing. The most noticeable trend is the number of recent films about a casino heist. The movies in this study were not sampled randomly nor were they sampled consistently across time. As a result we cannot draw any firm conclusion about trends over time in themes. Table 1 is offered here only as a guide to future research.

Discussion

As stated in the introduction, the purpose of this article is to examine the images of gambling found in motion pictures. It is our hope that an understanding the depiction of gambling in films will assist us in mapping out the obstacles and opportunities that might be present along the road towards greater public awareness of the potential negative side

effects of gambling. In this article, we identified and described eight overlapping themes represented in movies about gambling. In summary these themes are as follows: (1) pathological gambling, (2) the magical skill of the professional gambler, (3) miraculous wins as happy endings, (4) gamblers are suckers, (5) gamblers cheat, (6) gambling is run by organized crime, (7) the casino heist, and (8) gambling as a symbolic backdrop to the story in the film. Figure 2 organizes these themes into a taxonomy of film themes.

Figure 2. Taxonomy of films about gambling with exemplars for terminal categories. Note: Bold titles indicate terminal categories with exemplars.



Throughout the history of movies, gambling-related stories have been present. Movies about gambling are most often inhabited by problem gamblers (e.g., *The Gambler)*, cheats (e.g., *Shade*), criminals (e.g., *The Godfather, Ocean's Eleven*), spies (e.g., *Diamonds are Forever*), people with incredible luck (e.g., *Stealing Harvard*), and professional gamblers (e.g., *Rounders, The Hustler*). With the exception of *The Odd Couple* (1968), we have come across few movies that show ordinary people gambling in a non-problematic manner.

Table 1
Themes and release dates of movies

Theme	1946 to 1970	1971 to 1975	1976 to 1980	1981 to 1985	1986 to 1990	1991 to 1995	1996 to 2000	2001 to 2005	Totals
Pathological gamblers	1	2	---	2	1	1	2	3	12
Magical skills	3	1	---	1	1	2	1	1	10
Miraculous endings	---	---	---	1	1	1	2	4	9
Gamblers are suckers	---	---	---	---	---	1	2	1	4
Gamblers cheat	1	1	---	---	3	2	6	4	17
Organized crime	3	3	---	---	---	4	4	5	19
Stealing from a casino	1	---	---	---	---	1	2	4	8
Symbolic background	---	---	---	---	---	1	5	3	9

Note that several movies appear in more than one category.

Hayano (1982) noted that movies set in the old west were often neutral about gambling (e.g., *Tombstone, Maverick*). The games were shown as part of ordinary life. In contrast he found that films set in cities included negative depictions of gambling, including a strong link with crime. Negative images of gambling still persist, but today, these are mixed in with images of incredible luck. It seems that when movie producers turn their attention to gambling, they insist on illustrating extremes. This is likely due to the pragmatics of telling an exciting story, but it leaves the audience with false stereotypes and erroneous images of gambling.

There appears to be ambivalence towards gambling in many of these films. On the one hand, gambling venues are shown as exciting and glamorous places where men dress in suits and women dress in evening gowns (*Ocean's Eleven, Rounders, The Good Thief)*, and spies prove that they can beat the odds (*Diamonds are Forever, Austin Powers, Loony Tunes Back in Action*). On the other hand, many films suggest that casinos are run by criminals (*The Godfather, The Cooler*) or deserve to be robbed (*Ocean's Eleven, The Good Thief, 3000 Miles to Graceland, The Lady Killers*). As another example, in *The Godfather,* Vito Corleone (Marlon Brando) tells us that gambling is just a "harmless vice" that people want, whereas drugs are a "dirty business." However, when Michael Corleone (Al Pacino) launches his new career as a legitimate businessman—a casino owner—he does so by organizing the simultaneous murder of all of his enemies.

Some movies provide important insights into the nature of pathological gambling (e.g., *The Gambler, Owning Mahowny, The Hustler*). However, others make light of the disorder or indulge in the wishful thinking common with pathological gamblers (e.g., *Let It Ride, The Cooler, Fever Pitch, The Good Thief*). In some movies people develop a problem too quickly (*Viva Rock Vegas, Lost in America*). Some films take the view that all gamblers are addicted (*Croupier, Two for the Money*). In *Guys and Dolls*, only one character, (Big Julie from Chicago, B.S. Pulley) seems to be a problem gambler. He risks a lot of money, chases his losses, gets angry over losses, cheats, and uses a gun to turn the game in his favour. However, the film depicts all of the gamblers as being in need of salvation. Most films about pathological gambling depict a narrow segment of the problem gambling population focusing on the male "action" gambler (see also Griffiths, 2004). Most pathological gamblers simply do not embezzle millions of dollars as in *Owning Mahowny* or take stupid risks just for the thrill of it as in *The Gambler*. Films rarely show gamblers hooked on slot machines or other electronic gambling machines even though such machines, where they are available, now account for a majority of problem gamblers in treatment (Dorion & Nicki, 2001; Rush, Moxam Shaw, & Urbanoski, 2002; Smith & Wynne, 2004).

We have also found a number of errors in the depiction of games in these films. For example, in the film *Tombstone* there were several errors in the layout of the faro tables shown in the film and the manner in which the game was conducted (see Howard, 2004). Similarly the cheating by the casino in *Walking Tall* (1973, 2004) made no sense given the rules of craps. Because the players roll the dice and can bet on many possible outcomes, loaded dice would be an advantage to the player, not the house. In *Two for the Money*, the sports touts place an extraordinary emphasis on the outcome of single games. Real handicapping is a process of finding a small advantage across numerous games and playing the odds. Another error is the exaggeration of the power of skill in leading to a win. In *Rain Man*, for example, a man with autism is somehow able to learn to count cards in blackjack so well that he can predict virtually every hand. Finally, *Shade* was completely out of touch with the modern reality of high-stakes poker.

Some movies appear to be confused about the concepts of luck and skill. James Bond films frequently show Bond playing games of chance (baccarat and craps) as if they were games of skill. Whatever the game, Bond always has the skill to outplay his opponents. In contrast, *Let It Ride* portrays horse racing as if it was a game of pure random chance.

Many movies portray a distorted reality in which fantastic wins (e.g., *Let It Ride, The Cooler, Fever Pitch*) or magical skills (*The Hustler, Rain Man, Rounders, Diamonds are Forever*) lead to success. Other films present a distorted image of how the casino makes money (*The Flintstones in Viva Rock Vegas, The Cooler, Walking Tall*). Fred Flintstone loses because the casino owner pulls a switch that sets the games from "win" to "lose."

Similarly *The Cooler* suggests that the casino can only make it if it employs someone with bad luck to protect its profits. In many cases these distortions coincide with erroneous beliefs about beating the odds held by many pathological gamblers (see Ladouceur, & Walker, 1996; Wagenaar, 1988). Bandura (1977; 1986) has argued that people learn through the imitation of models. In this respect films with happy endings due to wins such as *Fever Pitch, The Cooler,* and *Vegas Vacation* might be teaching potentially harmful lessons about gambling. *Vegas Vacation* is particularly distributing because it shows a youth obtaining a fake identification card and then winning on every game he plays. Any message that one might gain by watching the father's (Chevy Chase) disastrous gambling is undermined by the success of his son (Ethan Embry).

Gupta and Derevensky (1997) have shown that children's attitudes towards gambling are shaped by parental modeling of gambling. They found that children often learn how to gamble from their families. However, little research has been conducted on youths to determine how they are influenced by movies about gambling. Kearny and Drabman (1992) studied how modeling affects the persistence of gambling behaviour in pre-school children. Children in their study who saw a model win took more risks in playing the game than those children who had observed a model lose. However, another similar study (Tremblay, Huffman, & Drabman, 1998) found that modeling of winning had no effect on persistence at a game. Research is needed on both youth and adult populations to determine how images of miraculous wins in movies affect people's expectations about gambling.

Summary

Movies present the audience with very distorted images of gambling. In addition they often fail to provide the audience with portrayals of responsible gambling. The film images of incredible luck are more likely to encourage irresponsible gambling. It could be argued that the purpose of a movie is to provide fantasy, rather than education. In addition, as works of art films have no obligation to be accurate. However, it is important to consider to what extent the producers and distributors of a film should be responsible for its content. It is likely that a film that encouraged excessive drug use or showed true happiness stemming from an addiction would at the very least come with a warning about its content. The U.S. rating for *Stealing Harvard* was PG-13 for crude and sexual humour, language, and drug references. There is no mention of the use of a miraculous win to resolve the plot.

This discussion of films has a number of limitations. The films discussed were neither a random sample, nor a comprehensive sample. We cannot generalize in terms of the relative frequency of the themes discussed. We have also limited ourselves for the most part to films shown in English, although Web searches identified several films that were not in English. In addition we have only superficially looked at the timeline of the movies we examined to see if there are trends in the themes or the number of films changing over time. A future direction of research would be to examine movies about gambling across

time in a more comprehensive manner to see if there are indeed shifting trends in the themes in these movies.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders*. Washington, DC: Author.

Asbury, H. (1938). *Sucker's progress: An informal history of gambling in America.* New York: Thunder Mouth Press.

Bandura, A. (1977) *Social learning theory*. Englewood Cliffs, N.J.: Prentice Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, N.J.: Prentice-Hall.

de Champlain, P., (2004). *Mobsters, gangsters and men of honour: Cracking the Mafia code*. Toronto: HarperCollins.

Dement, J.W. (1999) *Going for broke: The depiction of compulsive gambling in film.* Lanham, MD: The Scarecrow Press, Inc.

.

Dorion, J.P., & Nicki, R.M. (2001). Epidemiology of problem gambling in Prince Edward Island: A Canadian microcosm. *Canadian Journal of Psychiatry, 46*, 413–417.

Gluss, H.M. & Smith, S.E., (2002). *Reel people: Finding ourselves in the movies*. Keylight: Los Angeles.

Griffiths, M. D. (2004). An empirical analysis of the film, "The Gambler." *eCOMMUNITY: International Journal of Mental Health & Addiction*, *1(2).* Accessed May 1, 2007 from http://www.ijma-journal.com/issues/issue/1/2

Gupta, R., & Derevensky, J. (1997). Familial and social influences on juvenile gambling behavior. *Journal of Gambling Studies*, *13(3)*, 179-192.

Hayano, D. (1982). *Poker faces: The life and work of professional players*. Berkeley, CA: University of California Press.

Howard, M. (2004). *Bucking the Tiger – The Traditional Game of Faro*. Available at http://www.bcvc.net/faro/

Kearney, C.A. & Drabman, R.S. (1992). Risk taking/gambling like behavior in preschool children. *Journal of Gambling Studies,8*, 287-297.

Ladouceur, R., & Walker, M., (1996). A cognitive perspective on gambling. In P.M. Salkovskis (Ed.), *Trends in cognitive and behavioural therapies* (pp. 89-120). Chichester, NY: John Wiley & Sons Ltd.

Room, R. Turner, N.E., & Ialomiteanu, A. (1999) Community effects of the opening of the Niagara Casino: A first report. *Addiction*, 94, 1449-1466.

Rose, I.N. (1986). *Gambling and the law*. Los Angeles: Gambling Times.

Rush, B., Moxam Shaw, R., & Urbanoski, K. (2002). Characteristics of people seeking help from specialized programs for the treatment of problem gambling in Ontario. *Electronic Journal of Gambling Issues: eGambling:, 6,* 32–54 [Online]. Accessed April 30, 2006: http://www.camh.net/egambling/issue6/research/index.html

Sargent, J., Dalton, M. Beach, M.L., Mott, L. Tickle, J., Aherns, J.M.B., Heatherton, T.D. (2002). Viewing tobacco use in movies: Does it shape attitudes that mediate adolescent smoking. *American Journal of Preventive Medicine, 22(3),* 137-145.

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.

Smith, G.J., & Wynne, H.J. (2004). VLT gambling in Alberta: A preliminary analysis. Alberta Gambling Research Institute. Available at: http://www.abgaminginstitute.ualberta.ca/documents/research/VLT_Gambling_Alberta.pdf

Tremblay, G.C., Hoffman, L., & Drabman, R. (1998). The effects of modeling and experience in young children's persistence at a gambling game. *Journal of Gambling Studies, 14 (2),* 193-210.

Turner, N.E. (2001). The Flintstones in Viva Rock Vegas: A review. *Electronic Journal of Gambling Issues: eGambling, 3.* Accessed April 30, 2006: http://www.camh.net/egambling/issue3/review/index.html#flintstones

Twain, M. (2004). The professor's yarn. An excerpt from *Life on the Mississippi,* 1882. Reprinted in J. Stravinsky (Ed.), *Read 'em and weep: A bedside poker companion* (pp 209- 215) New York: Harper Collins.

Wagenaar, W.A. (1988). *Paradoxes of gambling behavior.* London: Lawrence Erlbaum Associates.

Films reviewed

Abbate, A., Goldmann, B., Weinstein, P., deFaria, C., Doyle, L., Simon, J. (Producers), & Dante, J. (Director). (2003). *Looney tunes: Back in action* [Motion picture]. United States: Warner Bros.

Abrams, P., Levy, R.L., Reuther, S. (Producers), & Leder, M. (Director). (2000). *Pay it forward* [Motion picture]. United States: Warner Bros.

Altman, R. (Director & producer), & Walsh, J. (Producer). (1974). *California split* [Motion picture]. United States: Columbia Pictures.

Arragon, B.V., Wallin K., Williamson S. (Producers), & Probst, J. (Director). (2001). *Finder's fee* [Motion picture]. United States: Lions Gate.

Ashley, D., Greenspun, A. (Producer), & Preisler, G. (Producer & Director). (2004). *Lady killers* [Motion picture]. United States: Touchstone.

Badalato, B., (Producer), & Abrahams, J. (Director). (1998). *Mafia* [Motion pictures].United States: Buena Vista Pictures.

Beatty, W., Johnson, M. (Producer), & Levinson, B. (Producer & Director). (1991). *Bugsy* [Motion picture]. United States: Columbia TriStar Films.

Bill, T., Phillips, J., Phillips, M., Phillips, M.S., (Producers), & Hill, G.R. (Director). (1973). *The sting* [Motion picture]. United States: Universal Pictures.

Blank, L.D., Davis, A., Medavoy, M., & Tucker-Davies, T. (Producers), & Davis, A. (Director). (2003). *Holes* [Motion pictures]. United States: Buena Vista Pictures.

Bonin, J., Veillet, C. (Producers), & Canuel, E. (Director). (2001). *Pig's law* [Motion picture]. Canada: Alliance Atlantis.

Broccoli, A.R, Saltzman, H. (Producer), & Hamilton, G. (Director). (1971). *Diamonds are forever* [Motion picture]. USA: MGM.

Burke, J, Schiff, P., Foster, L., Amritraj, A., Hoberman, D. (Producers), & Bray, K.(Director) (2004). *Walking tall.* [Motion picture].United States: MGM.

Briskin, M. (Producer), & Karlson, P. (Director) (1973). *Walking tall* [Motion Picture]. United States: Cinerama.

Camon, A., Hamori, A., McLean, A. (Producers), & Kwietniowski, R. (Director). (2003). *Owning Mahowny* [Motion picture]. Canada: Alliance Atlantis.

Cassavetti, P., Nabulsi, L., Nemeth, S. (Producers), & Gilliam, T. (Director). (1998). *Fear and loathing in Las Vegas* [Motion picture]. United States: Universal Pictures.

Cavan, S. (Producer), & McCulloch, B. (Director). (2002). *Stealing Harvard* [Motion picture]. United States: Columbia Pictures.

Cavendish, J., De Mardt, M., Olen, B., Ruppert, C. (Producers), & Hodges, M. (Director). (1998). *Croupier* [Motion picture]. France / United Kingdom / Germany / Ireland: Action Gitanes.

Cazès, L., Stewart, A. (Producers), & Figgis, M. (Director). (1995). *Leaving Las Vegas* [Motion picture]. USA: MGM.

Chartoff, R., Winkler, I. (Producers), & Reisz, K. (Director). (1974). *The Gambler* [Motion picture]. United States: Paramount Pictures.

Cohen, B. (Producer), & Levant, B. (Director). (2000). *The Flintstones in Viva Rock Vegas* [Motion picture]. United States: Universal Pictures.

Cohen, J,. Robinson J. G. (Producers), & Caruso, D.J. (Director), (2005). *Two for the money.* United States: Universal Pictures.

Coppola, F.F., (Producer & Director). (1974). *The godfather: Part II* [Motion picture]. United States: Paramount Pictures.

Damaschke, B., Healy, J., Segan, A.L. (Producers), Bergeron, B., Jenson, V., & Letterman, R., (Directors). (2004). *Shark tale* [Motion picture]. United States: Dreamworks.

Daniel,S., Ephron, N., Krane, J.D., Lazar, A. (Producers), & Ephron Resnick, N. (Director). (2000). *Lucky numbers* [Motion picture]. Unites States: Paramount Pictures.

Daniel, S., Zucker, J. (Producers), & Zucker, J. (Director/Producer) (2001). *Rat race* [Motion picture]. United States: Paramount Pictures.

Davey, B., (Producer), & Donner, R. (Director & Producer). (1994). *Maverick* [Motion picture]. United States: Warner Brothers.

De Fina, B. (Producer), & Scorsese, M. (Director). (1995). *Casino* [Motion picture]. United States: United International Pictures.

De Palma, B. (Producer & Director). (1998). *Snake eyes* [Motion picture]. United States: Paramount Pictures.

DeVito, D., Shamberg, M., & Sher, S. (Producers), & Sonnenfeld, B. (Director). (1995). *Get shorty* [Motion picture]. United States: Metro-Goldwyn-Mayer.

DiGiaimo, L., Greaney, P. (Producer), & Giraldi, B. (Director). (2000). *The dinner rush* [Motion picture]. United States: Access Motion Picture Group.

Engelman, B. (Producer), & Russell, C. (Director). (1994). *The mask* [Motion picture]. United States: New Line Cinema.

Fields, F. (Producer), & Brooks, R. (Director). (1985). *Fever pitch* [Motion picture]. United States: MGM.

Franco, L.J. (Producer), & Burton, T., (Producers & Director). (1996). *Mars attacks!* [Motion picture]. United States: Warner Home Video.

Furst, S., Pierce, M.A. (Producers), & Kramer, W. (Director). (2003). *The cooler* [Motion picture]. United States: Lions Gate.

Giler, D. (Producer), & Pytka, J. (Director). (1989). *Let it ride* [Motion picture]. United States: Paramount Pictures.

Goldwyn, S. (Producer), & Mankiewicz, J.L. (Director), (1955) *Guys and dolls* [Motion Picture]. United States: MGM.

Hammond, C., Hartley, T., Schnepp, D. (Producers), & Niemanm, D. (Director). (2003). *Shade* [Motion picture]. United States: Dimension Films.

Hausman, M. (Producer), & Mamet, D. (Director). (1987). *House of games* [Motion picture]. United States: MGM.

Hoffman, S.E., Salinger, M. (Producers), & Rachman, P. (Director), (1999). *Four dogs playing poker* [Motion picture]. Unites States: Warner Home Video.

Holmes, R., Murray, G. (Producers), & Jones, K. (Director), (1998). *Waking Ned Devine* [Motion pictures]. Ireland / UK / France / USA: Twentieth Century Fox.

Jacks, J., Daniel, S., Misiorowski, B. (Producers), & Cosmatos,G. (Director). (1993). *Tombstone* [Motion picture]. US: Released by Hollywood Pictures.

Johnson, M. (Producer), & Levinson, B. (Director). (1988). *Rain man* [Motion picture]. United States: MGM.

Jones, R., Lyons, J. (Producers), & Anderson, P.T., (Director). (1997). *Hard eight* [Motion picture]. United States: The Samuel Goldwyn Company.

Kane, M., Pressman, E.R. (Producers), & Ferrara, A. (Director). (1992). *Bad lieutenant* [Motion picture]. United States: Artisan Entertainment.

Katz, M. (Producer), & Brooks, A. (Director). (1985). *Lost in America* [Motion picture]. United States: Geffen Film Company, Warner Brothers.

Koch, HW. (Producer), & Saks, G. (Director). (1968). *The odd couple* [Motion Picture]. United States: Paramount.

Lester, D.V., Miller, D., Rappaport, M. (Producers), & Shelton, R. (Director). (1992). *White men can't jump* [Motion picture]. United States: Twentieth Century Fox.

Lichtenstein, D., (Director & Producer) Manes, E., Samaha, E., Spero, R., Stevens, A., (Producers), (2001). *3000 miles to Graceland* [Motion picture]. United States: Warner Bros.

McClory, K. (Producer), & Young, T., (Director). (1965). *Thunderball* [Motion picture]. United Kingdom/United States: United Artists.

Milestone, L. (Producer & Director). (1960). *Ocean's 11*. [Motion picture]. United States: Warner Brothers.

Moore, C., Weinstein, B., Katz, M., (Producers), & Frankenheimer, J. (Director). (2000). *Reindeer games* [Motion picture]. United States: Dimension Films.

Moore, D., Myers, M. Todd, J., Todd, S. (Producers), & Roach, J. (Director). (1997). *Austin Powers: International man of mystery* [Motion picture]. United States: New Line Cinema.

Pillsbury, S. & Sanford, M. (Producers), & Sayles, J. (Director). (1988). *Eight men out.* [Motion picture]. United States: MGM.

Ransohoff, M. (Producer), & Jewison, N. (Director). (1965). *The Cincinnati kid* [Motion picture]. United States: MGM..

Reinhardt, G. (Producer), & Siodmak, R. (Director). (1949). *The great sinner* [Motion picture]. United States: Metro-Goldwyn-Mayer.

Rossen, R. (Producer & Director). (1961). *The hustler* [Motion picture]. United States: Twentieth Century Fox Film Corp.

Ruddy, A.S. (Producer), & Coppola, F.F. (Director). (1972). *The godfather* [Motion picture]. United States: Paramount Pictures.

Schwartzman, J. (Producer), & Kershner, I. (Director). (1983). *Never say never again* [Motion picture]. USA: Warner Bros.

Scorsese M., Harris R. A., and Painter J. (Producers), & Frears S. (Director). (1990). *The grifters* [Motion picture]. United States: Miramax.

Seaward, T., McLean, S., Wells, J., and Woolley, S. (Producers), & Jordan, N. (Director). (2003). *The good thief* [Motion picture]. United States: Fox Searchlight Pictures.

Stillerman, J., Demme, T. (Producers), & Dahl, J. (Director). (1998). *Rounders* [Motion picture]. United States: Miramax Films.

Weintraub, J. (Producer), & Kessler, S. (Director). (1997). *Chevy Chase's Las Vegas vacation* [Motion picture]. United States: Warner Bros.

Weintraub, J. (Producer), & Soderbergh, S. (director) (2001). *Ocean's eleven.* [Motion picture]. United States: Warner Bros.

Weintraub, J. (producer), & Soderbergh, S. (director) (2004). *Ocean's twelve.* [Motion picture]. United States: Warner Bros.

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Barry Fritz. This article is dedicated to the memory of Barry Fritz (1940 - 2004) (PhD, psychology, Yeshiva University, New York, NY) who passed away before he could finish this article. He was professor of psychology at Quinnipiac University, Hamden, Connecticut. He was a member of the board of the Connecticut Council on Problem Gambling. Barry wrote, "My current research interests are focused on understanding the motivation to gamble and those factors that differentiate problem gamblers and recreational gamblers. I enjoy the game of poker and hope that my research will keep me on the recreational side of the table."

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Gambling and religion: Histories of concord and conflict

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Abstract

This paper discusses the diverse relationships between gambling and religion in various societies and at various times in history and suggests a theoretical model for how these relationships can be understood. It is argued that gambling and religion have certain elements in common: notions of the unknown, mystery, and fate, as well as imagery of suddenly receiving something of great value that changes life for the better. In many traditional cultures gambling has existed in concord with polytheistic and animistic religion; gambling and religion go well together precisely because of the elements they have in common. Monotheistic religions that claim authority in religious and transcendental matters, however, tend to denounce gambling, and this disapproval has been strengthened by a conception that gambling offers a wicked alternative to certain religious notions and experiences. The elements that gambling and religion share have thus become a source of conflict.
Keywords: gambling, religion, magic, morality, social anthropology, ethnography

Introduction

A source of inspiration for this paper was an advertising campaign launched by the Church of Sweden in 2001, intended to promote interest in religious matters as the public elections for the local parish councils approached. The theme of the campaign, which included full-page advertisements in national newspapers and on advertising pillars, was the question, 'Are you looking in the right place?' The advertisements depicted fictitious products: one depicted a 'Consolation' chocolate bar, another an 'Affirmation' brand cellular phone, a third a package of 'Fellowship' brand cigarettes, and still another a 'Hope' lottery ticket. On the ticket, fashioned after the Triss instant lottery ticket, three fields had been scratched, revealing the word 'hope' in each (three similar amounts or symbols indicate a win in this lottery). A single line of text asked the rhetorical question, 'Are you looking in the right place?' and the logo of the Church of Sweden indicated who the advertiser was. The message of the advertising campaign was thus that people are in need of consolation, affirmation, fellowship, and hope, but that they are looking in the wrong places and should approach the Church to see what it has to offer to fulfil these needs.

The advertisement depicting the instant lottery ticket attracted considerable attention in the press and also within the Church. Some welcomed it as it highlighted the perceived excessive gambling habits of the Swedes, while others thought it wrongly made ordinary people feel guilty about their innocent and occasional purchase of lottery tickets. A few Christians maintained that the very depiction in the advertisement of an instant lottery ticket called 'Hope' was reprehensible, since it could easily be misunderstood as actually promoting gambling. The state-owned

lottery company complained that the advertisement violated the trademark of the Triss lottery.

Evidently, the advertisement expressed an idea that caught the public's attention. The Church of Sweden was long expressly critical of gambling, picturing the gambler as sinful and depraved. In this advertisement, however, it presented gambling and religion as two alternative and competing ways of obtaining hope for a better life. The message is that the Church offers a better alternative than gambling.

This paper will discuss the diverse relationships between gambling and religion at various times in history and in various societies and suggest a general model of how these relationships can be understood. The elements common to gambling and religion are viewed in this model as both promoting concord and aggravating conflict.

Three topics will be discussed. The first is the unity of religion and gambling in many traditional cultures. Gambling, in a wide variety of societies, is associated with religious practices and mythology. A second topic is the religious, spiritual, and magical dimensions of gambling in modern Western societies. Notions of luck and fate will be discussed, as well as dissociative and transcendental experiences induced by intense gambling. The third topic is the religious denunciation of gambling, and it will be argued that religions strongly opposing gambling are characterised by a claim to universal religious authority. Established religions condemn gambling for several reasons, and four major themes in Christian antigambling arguments are identified.

A large number of ethnographic examples from various cultures and times will be used to support the arguments offered here. The examples were systematically selected to illustrate contrasts and similarities in how gambling and religion relate to each other. The examples pertain mainly to traditional tribal cultures and their animistic religions and ancient and modern states with polytheistic or monotheistic religions.

Gambling and religion in concord

In many traditional non-Western societies gamblers may pray to the gods for success and explain wins and losses in terms of divine will. The Zuñi Indians of southwestern North America, for instance, worshipped eight gods of war, believed to be great gamesters, each of whom was associated with a specific game (Coxe Stevenson, 1903; see also Culin, 1907, pp. 335–340, 374–382, 682–689). When gambling on one of these games, the players invoked the proper god of war, and prayers for success were addressed to him. Equipment used in the games was offered at the altars of these gods.

A contemporary example of gods being regarded as involved in gambling is the worship of local deities, represented by statues, in Taiwan (Yu, 1997, chap. 7). Some of these gods are asked by lottery players to reveal the winning numbers of the next draw. These gambling deities are given offerings, such as 'spirit money', and the lottery numbers are interpreted by means of various divinatory methods, such as

looking for figures in the ashes of incense offerings and drawing bamboo lots. Evidently, prayers to gambling gods are an old Chinese practice (Harrell, 1974, p. 201) and have also been reported from Chinese communities abroad (Nonini, 1979).

In southern Italy a number of saints were in the past and to some extent are still today believed to be willing to help lotto players. San Pantaleone has widely been regarded as the patron saint of lotto players, to be invoked by reading his *novena* at night (Conte, 1910, pp. 74–76; Di Mauro, 1982, pp. 40–41; Fiorenza, 1897). In Naples the Madonna di Piedigrotta and the Madonna del Carmine were asked for winning lotto numbers, and in Sicily such requests were addressed to San Alessio, San Marco, and San Giovanni Decollato (Pitrè, 1913, pp. 304–305). Similarly, the spirits of the dead in purgatory were in southern Italy believed to be able to reveal winning lotto numbers. This was a common belief at least up to the 1950s, and in some places, such as Naples, it persisted to the end of the 20th century (e.g., Ciambelli, 1980; Finamore, 1894, p. 86; Pitrè, 1889, Vol. 4, pp. 294–295). The Church did not officially embrace the ideas that saints and the spirits of the dead took an interest in lottery gambling.

Gamblers thus pray to deities, saints, and spirits for success. Games of chance, gambling, and religion can merge in a number of other ways (for overviews concerning the North American Indians, see Salter, 1974, 1980). In mythology there are numerous examples of gambling being linked with deities, often in episodes that describe the creation of the world. This was common among the North American Indians (Culin, 1907, esp. pp. 32–33) and in Mesoamerica, where the ancient ballgame, which included heavy betting, was tightly interwoven with religion and ritual (Krickeberg, 1948; Stern, 1950; Whittington, 2001). In Greek mythology the lordship of the parts of the world was decided by a dice game, the outcome of which made Zeus lord of the sky, Hades lord of the underworld, and Poseidon lord of the sea. Generally, the imagery of cosmogonal gambling can be seen as a way of reconciling a notion of the gods as powerful with the impression that the world to some extent was created arbitrarily: the gods gambled at the creation of the world and thereby the world happened to become as it is.

Among the North American Indians, success at gambling was commonly regarded as a proof of the spiritual power of the winner. There was a notion of a 'gambling power' or 'gambling spirit' that could be acquired as well as lost. This power was usually gained by arduous vision quests in the wilderness, where spiritual beings or phenomena were encountered (e.g., Maranda, 1984, chap. 4), and it could be imbued in specially prepared charms ('gambling medicines') or in a player's gambling equipment. Gambling thereby became a measure of the supernatural powers of the players; gambling was construed not as a game of chance, but as a contest in what could be called games of magical skill (for a telling example, see Culin, 1907, p. 285).

Although gambling could take place solely for amusement, among the North American Indians it was often part of rituals and ceremonies. Concerning Zuñi games and gambling, Culin (1907, p. 24) observed (see also Coxe Stevenson, 1903) that 'In general, games appear to be played ceremonially, as pleasing to the gods, with the object of securing fertility, causing rain, giving and prolonging life, expelling demons, or curing sickness'.

Gambling as a means of healing illness was also practised by the Huron (Culin, 1907, pp. 107–111; Herman, 1956, pp. 1051–1053; Trigger, 1990) and the Iroquois (Beauchamp, 1896; Salter, 1973). An early report from the Huron in the 18th century, cited by Culin (1907, pp. 106–107), emphasises the gathering of powerful spirits activated by gambling; for that reason, Christian missionaries were urged by the Indians to be present at such medicinal gambling because it was believed that 'their guardian genii are the most powerful'. The activation of powerful spirits by gambling was, among the Iroquois, also the rationale for staging gambling games for the purpose of promoting the growth of the crops (Salter, 1974).

Since gambling was part of religious ceremonies, religious leaders of North American tribes encouraged and took an active part in it. For example, among the Iroquois (Culin, 1907, p. 116, citing from L.H. Morgan's *League of the Iroquois*):

> … games were not only played at their religious festivals … but special days were set frequently apart for their celebration.… Betting upon the result was common among the Iroquois. As this practice was never reprobated by their religious teachers, but on the contrary, rather encouraged, it frequently led to the most reckless indulgence. It often happened that the Indian gambled away every valuable article which he possessed; his tomahawk, his medal, his ornaments, and even his blanket.

Finally, gambling could be used for divination. Among the Iroquois at New Year, for instance, men played against women at the game of the peach stones in order to foretell the quality of the harvest: if the men won, the corn would grow tall, but if the women won, it would grow short (Beauchamp, 1896, p. 270). Similarly, among the Zuñi, the hidden-ball game could be played in the spring by two parties, one representing the wind gods and the other the water gods. The result of the game was interpreted as signifying who among the gods would prevail—that is, if a dry or wet season was to be expected (Culin, 1907, pp. 374–375). Divinatory use of gambling is known from other parts of the world as well, for instance from China, where gambling can be a way to discover shifts in one's fate (on Chinese emigrants, see Gabb, 2001; Papineau, 2005). This affinity between divination and gambling was noted by the anthropologist Edward Tylor (1871, pp. 80–82), who, from the perspective of social evolutionary theory, speculated that secular gambling evolved from religious practices of divination.

Religious and magical elements of gambling in modern societies

In modern Western societies gambling and religion are construed as entirely separate spheres, kept apart through institutionalisation. To gamble in a church would be unacceptable (although church bingo comes close and therefore is a contested practice), while praying for salvation in a casino would probably be regarded as the symptom of a nervous breakdown caused by monumental losses and too many hours at the gaming tables. Nevertheless, gambling in modern societies has both religious and magical elements.

As in traditional cultures, gamblers may attribute winnings to God and higher powers. About a third of the winners of huge top prizes in American lotteries believed that their winning was guided by divine or mystical forces (Kaplan, 1978). From an account of Canadian lottery winners (Gudgeon & Stewart, 2001), we learn that these winners often recall unusual coincidences and psychic experiences that in the light of the lottery win retrospectively assume a portentous character; the authors conclude that 'the lottery is the only reliable miracle left in this age of reason' (p. 11). Thus, religious concepts are used to explain the question, 'Why me; why this miracle of winning a fortune?'

People who already have religious faith might be inclined to give divine powers the credit for a big win, and some believers, despite the fact that most clergy would certainly object, also pray to God for gambling winnings. In popular American gambling magazines one occasionally sees advertising for religious charms supposed to bring luck at gambling, such as holy water from Lourdes, 'blessed earth' from Fatima, and images of the 'patron saint of gamblers', Saint Cayetano.

To buy a lottery ticket is to buy hope. For a comparatively insignificant sum of money, buyers of lottery tickets acquire the possibility of winning a fortune that could change their lives for the better. Therefore, lottery operators have been described as 'selling hope' (Binde, 2005; Clotfelter & Cook, 1989; Griffiths, 1997), and those who buy lottery tickets have been called 'dream buyers' (Campbell, 1976; Forrest, Simmons, & Chesters, 2002). This dream of personal transformation has similarities, as the advertisement of the Church of Sweden discussed earlier suggests, with the Christian hope for salvation and spiritual peace.

It might be objected that lottery jackpots inspire indulgence in dreams of material and mundane excess, while Christians put hope in spiritual salvation. At least in Sweden, however, the realisation of the truer and better self is typical both in the hope for a jackpot and in jackpot winners' accounts of their plans for the future. This is a salient theme in the frequent newspaper reporting on jackpot winners (Binde, 2007; cf. Davies, 1997; Falk & Mäenpää, 1999; Gudgeon & Stewart, 2001). Most lottery players seem to hope for greater peace of mind and relief from economic difficulties and worries for the future. It is common for winners to give substantial sums of money as gifts to relatives; work less and allow themselves more time for personal interests, such as sports, cultural events, and hobbies; and travel in order to get away

from everyday life and gain a broader perspective on life. Thus, the imagined as well as the actual new life of the lottery winner is more often characterised by altruism, self-fulfilment, and peace of mind than by going on an exorbitant spending spree.

Jackpot wins and jackpot winners are quite frequent topics in Swedish newspaper reporting and also in everyday conversations among Swedes. An analysis of over 2,000 Swedish newspaper articles on these topics, conducted by the present author (Binde, 2007), has revealed that they contain themes similar to those found in old folk tradition, most notably Christian moral lectures and legends of enchanted treasures and 'cursed wealth' (e.g., Hand, 1980; Lindow, 1982; Pitrè, 1889, Vol. 4, pp. 369–434). The jackpot win is described as a test of morals and character, it is implied that the good are rewarded and those in need are blessed, and it is suggested that luck and destiny are important for winning the jackpot. Thus, jackpot wins inspire reflections on luck, fate, blessings, and an eventual higher justice.

'Good fortune' brings riches to the lottery winner while divine grace bestows blessings on the believer. The theological meaning of grace is (according to the *Enciclopedia cattolica*, 1948–1954) a free gift, conferred upon human beings by God. A human being cannot do anything that is *certain* to be rewarded by grace. He or she can only try to do what is righteous according to Christian teaching and hope that God grants him or her grace. Good fortune is typically perceived in a similar way. A person suddenly has good fortune. There is no action that he or she can perform that for certain will bring forth good fortune, although charms and luck-bringing rituals may be believed to have the potential to do so. In a structural sense, then, grace and good fortune are similar: good fortune can be viewed as a secular form of divine grace (Binde, 1999, pp. 110–111; Pitt-Rivers, 1992; Walker, 1999, p. 53). Both grace and good fortune derive from a notion that the cornerstone of social and economic relations—reciprocity—can temporarily be suspended and one can receive without having to give. As Claude Lévi-Strauss wrote, in the concluding chapter of his monumental work on kinship (1969, pp. 496–497), 'To this very day, mankind has always dreamed of seizing and fixing that fleeting moment when it was permissible to believe that the law of exchange could be evaded, that one could gain without losing, enjoy without sharing'.

To gamble has been seen by numerous scholars as a way to ask a question of fate: 'Am I lucky or unlucky?' (e.g., Allen, 1952, p. 215; Chevalier, Geoffrion, Allard, & Audet, 2002; Cohen, 1960, p. 58; Downes, Davies, David, & Stone, 1976, p. 26; Reith, 1999, pp. 176–178; R.J. Rosenthal, 2005). A win is interpreted as a sign that good luck will continue or that a streak of bad luck is about to end, and a loss is interpreted in the opposite way. This notion builds upon a conception that 'life is a gamble' and that the odds of success might be revealed from the outcome of bets made at the gaming table. The elevation of gambling to a fatalistic philosophy of life—constituting an alternative to the Christian outlook that God has inscrutable plans for the individual lives of human beings—has a long history. In the Age of Reason this philosophy was perceived as crumbling under the weight of deistic (Voltaire) and mechanistic (Descartes) determinism, hence these verses by the Russian poet Mikhail Lermontov (1814–1841), cited in Lotman (1978, p. 457):

> Whatever Voltaire or Descartes may say—
> The world for me is a pack of cards,
> Life is the bank; fate deals, I play
> And the rules of the game I apply to people.

Indeed, gambling as a metaphor for the vicissitudes of life has not withered away in popular imagination and culture.

Thus, notions of luck, fortune, and fate are important in gambling. It is not an exaggeration to say that it is very difficult to gamble without being affected at least to some extent by intuitive notions of luck (cf. Darke & Freedman, 1997). Luck is something inherently mystical—there are today no elaborate folk theories on the subject, but rather vague intuitions and a plethora of lore about how luck is gained and lost. Thus, luck belongs to a mystic sphere, contrasting with the rationality favoured in much of today's society.

Within the mystical sphere of luck and gambling thrives a multitude of magical beliefs and practices. The superstitions of gamblers, their ideas of what brings either good or bad luck in gambling, are innumerable (for an overview, see Reith, 1999, chap. 5). Among these superstitions we find phenomena that otherwise belong to religion: belief in omens, charms, and mystical revelation, as well as ritualistic behaviour and the idea that messages are conveyed from a transcendent realm by means of dreams.

The mystical dimension of gambling encompasses altered states of consciousness and dissociation, which are reported to follow from intense gambling and in particular when playing highly repetitive games such as slot machines. A survey of Swedish pathological gamblers found that as many as 40% 'regularly experienced a state of altered consciousness', such as being 'removed from reality', being in 'a trance-like state of mind', or experiencing 'exhilaration' (Bergh & Kühlhorn, 1994). A survey of American pathological gamblers found that 79% had experienced trance when gambling (Jacobs, 1988). Two investigations, one American and one Swedish, have found that about 5% of non-problem gamblers have entered trance-like states while gambling (Jacobs, 1988; Jonsson et al., 2003). Dissociative experiences such as these have been documented in several other studies (e.g., Diskin & Hodgins, 1999, 2003; Doiron & Mazer, 2001; Dow Schull, 2002; Gupta & Derevensky, 1998; Jacobs, 1989; Lynch, 1990; Smith, Volberg, & Wynne, 1994).

A particularly suggestive example of dissociation induced by gambling is the Japanese game of Pachinko, a hybrid of pinball and slot machine in which tiny metal balls bounce down through a grid of pins attached to a horizontal surface. The typically hectic and repetitive pachinko gambling can be viewed as a kind of meditation, a way of clearing the mind of thoughts in order to reach a blank state of mind, comparable to Eastern religious mind exercises such as repeating a mantra or focussing on an insoluble riddle (Richie, 2003, pp. 110–123; Shinohara et al., 1999). Japanese scholars have concluded that 'Pachinko satisfies people's everyday needs for

spiritual healing, and a parlor may be said to be a convenience store for one's mental health' (Hirano & Takahashi, 2003, p. 56).

Brian Sutton-Smith (1997, pp. 66–67) points out the similarity—and rivalry—between such game-induced psychological states and religious experiences:

> … modern chance games and modern festivals have fallen away from religion and become secularised. Yet one can see that, along with all forms of play, they both still provide experiences of 'otherness', 'alterity', or 'altered states of consciousness'. And these or similar states of mind are as essential to religious ritual and prayer as they are to game involvement. In both cases one becomes 'lost' in the experience and thus transcends everyday cares and concerns. It is worth considering that because the two (religion and play) are in modern times so separate, they are in effect rivals for the promotion of such altered states of consciousness.

To sum up: gambling encompasses notions of a magical, mystical, and religious nature not only in traditional non-Western cultures but also in modern Western societies (France, 1902; Reith, 1999, chap. 5). In our modern societies gambling therefore has a kind of spiritual or religious attraction—the gambler shifts into 'a mystical state' (Kusyszyn, 1984, p. 138) or a 'conscious mood of mysticism' (Martinez, 1976, pp. 359–60). 'Gambling possesses a metaphysical and almost sacred meaning' (Lévy-Bruhl, 1924, p. 200), it 'encapsulates the area of mystery diffused throughout life' (Downes et al., 1976, p. 26), and it 'excites the deepest of all interest in life—that in the transcendent, the dark obscure beyond' (France, 1902, p. 406). It has also been suggested that animistic ideas find their expression in gambling (Allen, 1952; Veblen, 1970). It might thus be concluded that gambling to some extent fills the void, in the realm of the mystical and transcendental, left by the decline of official religion in secularised Western societies.

Religious denunciation of gambling

The many religions of the world have varying attitudes to gambling. We have seen that, on the one hand, religion and gambling can coexist in harmony and unity. On the other hand, some religions are severe in their denunciation of gambling. Gambling tends to be condemned by religions that are monotheistic, that rely on text sources believed to contain the word of God, that have developed a rigid set of doctrines, and that are intolerant of deviations from the 'true creed'—in short, religions that claim to hold a monopoly on truth and on the channels of communication with the supernatural.

Religious critiques of gambling can therefore to some extent be explained by seeing gambling as an activity that in certain matters competes with religion, as suggested before by a few scholars (Brenner & Brenner, 1990; Reefe, 1987, pp. 61–62; Sutton-Smith, 1997, pp. 65–68). From a psychoanalytical perspective it has even been argued that gambling is a 'secular "religion" for the obsessional neurotic' and that the real

reason Christians regard it as sinful is that gambling 'cannot be tolerated because it provides a similar alternative to Christianity' (Fuller, 1974, p. 67).

Significantly, Islam is a world religion with a strong emphasis on monotheism and also consistently condemning gambling. In Islamic societies gambling is either totally forbidden or very restricted (F. Rosenthal, 1975). Gambling is explicitly condemned as sinful in the Koran (Surah al-Baqarah 2:219 and Surah Ma'idah 5:90, 91), which by Muslims is regarded as the complete and final revelation from the only God.

From its origin, Christianity has been critical of gambling (Slater, 1909). Early Church councils forbade games of chance, and up to the time of the Reformation the Church in general viewed gambling as sinful and reprehensible. After the Reformation, the current liberal attitude of the Roman Catholic Church towards gambling gradually emerged. Games of chance are not regarded as sinful in themselves, but only when played to excess and when they 'deprive someone of what is necessary to provide for his needs and those of others' (The Roman Catholic Catechism, paragraph 2413). There are, however, many Roman Catholics, especially in the United States, who are strongly opposed to gambling and would like the Church to reconsider its current standpoint.

With its emergence, ascetic Protestantism stressed arguments relating to the work ethic that opposed gambling. Lutheran churches have been harsh in their condemnation of gambling, and it generally holds that the more dogmatic they are, the more strongly they repudiate gambling. Since the 1950s many Lutheran churches have adopted a more permissive outlook on gambling, but there are still, especially in the United States, a considerable number of Lutherans who categorically denounce all forms of gambling.

When, on the other hand, gambling and religion coexist in harmony and fuse with each other, the religion is most commonly of the animistic and polytheistic kind, such as the traditional belief systems of the North American Indians. Chinese religion—as practised in prerevolutionary mainland China and in Taiwan of today—is also a case in point. It can briefly be described as a composite of ancestor worship, devotion to local deities, the philosophical and moral teachings of Confucianism and Taoism, and a belief in fate. Such systems acknowledge a multitude of deities and spirits, and there is a tolerance of different opinions and of religious innovations. In short, there is no claim to a monopoly on religious and transcendent matters. There seem to be few, if any, animistic religions in the world that condemn indigenous gambling on doctrinal and moral grounds.

Earlier we described widespread beliefs in traditional southern Italy that certain saints and spirits of the dead help lotto players. Does not this merging of Roman Catholicism and gambling contradict the argument just presented that religions aspiring to monopoly in supernatural matters tend to denounce gambling? We have to consider that, in the case of large, established religions that have spread to many societies and cultures, there is often a difference, sometimes slight but sometimes considerable, between official religion and religion as actually practised locally.

Popular Roman Catholicism in traditional southern Italy had, through the cult of local saints, a polytheistic character, and local belief systems included various forms of magic, sorcery, and witchcraft, as well as beliefs in spirits and non-Christian supernatural beings (Binde, 1999). These beliefs were so tightly integrated in the worldview of the common people that the Church, despite attempts to do so, was unable to suppress them. Thus, the religion that in southern Italy was associated with lottery gambling was in fact a polytheistic and animistic system of beliefs, transmitted from generation to generation mainly through oral tradition, and therefore liable to be subject to local variations and innovations.

A contrast between official religion and locally practised religion also characterises Hinduism and Buddhism. Hinduism is a multifaceted religion in which older layers of belief have been integrated with more recent ones. In popular religious practices a great number of gods are worshipped; in official religious doctrine, however, there is an emphasis on a few high gods, and a strict moral code has been established. A similar ambiguity is found in Hindu views on gambling. On the one hand, gambling has long been practised in India and by figures in mythology; on the other hand, religious authorities harshly condemn gambling, and most forms of gambling are today illegal in India. The relationship between Buddhism and gambling is comparable. In popular practice Buddhism is often a polytheistic religion with a multitude of divinities, and gambling has been, or is today, widespread in many Buddhist countries, such as Thailand. Many believers evidently do not experience a conflict between their religion and gambling; for instance, gambling at Thai funerals is very common (Klima, 2002). According to orthodox Buddhist doctrine, however, gambling is an activity that leads away from the proper path of spiritual development, and all forms of gambling except lotteries are illegal in Thailand.

Thus, religions that claim a strict monopoly in matters concerning the divine and supernatural tend to have a critical attitude towards gambling, while polytheistic and animistic religions, where there is no such strong claim, accept gambling and often merge with gambling. Variations over time in a certain religion's attitudes towards gambling can, of course, be understood only by a more detailed analysis of shifts in its moral doctrines and of political and cultural contexts. For instance, the mild criticism of gambling expressed by the advertisement discussed in the introduction to this paper, in which the Church of Sweden asked lottery ticket buyers if they were looking for hope in the right place, illustrates a shift in attitude towards gambling. By adapting to the more liberal moral judgements current in society at large, the Church has, over a period of 50 years, modified its earlier puritan standpoint on most matters and become more modern in its attitudes: homosexual couples are blessed in church, 'dialogues' are held with immigrants on their religions, and pantheistic ideas of God's presence in unspoiled nature, rather than in Heaven, are accepted. Similarly, gambling is no longer considered as sinful by the Church of Sweden, but as something that unfortunately engages many people who are assumed to be experiencing a sense of dissatisfaction with their lives. Hence, when the Church still had decisive authority in moral matters in Sweden, the gambler was harshly condemned as sinful. Now that the Church has adjusted itself to a changing moral climate that calls for more tolerance, it

acknowledges that the lottery is a way of 'buying hope' and reminds the public that the Church supplies hope for free.

Themes in Christian arguments against gambling

What more precisely have religious monopolies to say against gambling? Let us consider Christianity. An examination of Christian literature, historical works, and gambling studies reveals that the arguments raised against gambling have been, and still are, many and varying. The following overview derives from the reading of numerous such texts. Since the source documents to a large extent include pamphlets and devotional literature in various languages, which only with difficulty can be accessed by the international reader, detailed references are not supplied here. A representative older work is the treatise by the minister John Northbrooke (1843 [1577]); typical modern texts are the sermons by John MacArthur (1997) and the paper by M.E. Otterstatter (1975), and an investigation of how conservative Protestants in Texas view lotteries (Ellison & Nybroten, 1999) might exemplify a social science source. A scrutiny of the critical arguments reveals that they pertain to four major themes.

The first theme in the Christian criticism of gambling is *greed*. The kernel argument is that the prime mover of gambling is greed and the love of money, which is the 'root of all evil'. An elaboration of this argument is that gamblers in their greed wish their opponents to lose and do not care about the suffering and pain caused by this; thus they do not 'love their neighbour'. Another version, suggesting that gambling violates the eighth commandment, is that gambling is a kind of theft, albeit by consent; it is equally as wrong as duelling, which is murder by consent. A contemporary variation on the greed theme is the following argument: lotteries are sinful since they, in order to make a profit, exploit the desperation and vain hopes of the poor and the weakness of those addicted to gambling. The greed arguments relate to the ethical dimension of Christianity, which concerns the proper conduct between human beings in reciprocal social and economic systems.

The demonic force of gambling constitutes a second theme of criticism. The words, 'The Devil invented gambling', are attributed to the church father St. Augustine (CE 354–430). Of perhaps equal antiquity is the idea that the fall of the dice is controlled by the Devil, who cunningly uses this opportunity to instigate discord among human beings and to entice them to sin. More generally it has been maintained that gambling has a demonic power that inevitably causes sinful behaviour and misery. The British preacher John Northbrooke (1843 [1577], p. 119) summed up the evil consequences of gambling (in a treatise published in the 16th century):

> '… (gambling) is a doore and windowe into all theft, murther, whoredome, swearing, blaspheming, banketting, dauncing, rioting, drunkennesse, pryde, couetousnesse, craft, deceyt, lying, brawling, fighting, prodigalitie, night-watchings, ydlenesse, beggerie, pouertie, bankrupting, miserie, prisonment, hanging, &c. and what not?'

Arguments pertaining to this theme thus claim the reality of evil non-Christian supernatural forces and state that these are at work in gambling.

The third theme in the Christian criticism of gambling includes arguments that concern cosmology. These express the opinion that gambling in one way or another conflicts with God's creation and with Christian cosmology; they elaborate upon the disturbance that gambling, being an activity governed by chance, causes to the orderly and purposeful universe created by God.

Examples of such arguments are the following:

- God is almighty; nothing happens by chance; thus throwing the dice is a wicked act that forces God to take an interest in gambling.
- As it is told in the Bible, the will of God might righteously be disclosed through the drawing of lots; gambling is a corruption and profanation of this sacred practice.
- God has imposed work on human beings—man shall 'by the sweat of his brow' eat his bread (Genesis 3:18–19 (King James Version)) and work 6 days a week (Exodus 20:9); gambling discourages industriousness and promotes idleness.
- God has in his wisdom decided that there shall be a proper correspondence between work and reward; gambling upsets this balance because a gambler can win a fortune without having to work.
- In contrast to animals, God has created human beings with the faculty of reason; gambling is irrational and hence contrary to the intentions of the Creator.

The fourth theme in Christian antigambling arguments is that gambling is to some extent perceived to offer mundane, fatalistic, or occult alternatives to what is offered or held as true in Christianity. The 'alternative' arguments thus derive from the ambition of Christianity to monopolise the 'truth' about the supernatural and the channels for communicating with it. Current in the early Church was the following argument: gambling has its origin in heathen divination and is therefore inappropriate for the Christian. Assuming God's absolute omnipotence, it has also been argued that since God is almighty, 'luck' does not exist. Thus, gambling, which is based on notions of luck, relies on erroneous non-Christian and fatalistic beliefs. In Christian criticism of gambling today the following two arguments are often heard: gambling encourages many superstitions and often involves the invocation of occult powers, and gambling offers hope of becoming rich and happy, but true riches and true happiness are spiritual, not material. It is this latter argument that is expressed in the advertisement of the Church of Sweden discussed earlier.

It has even been claimed that gambling, when it becomes a passion, is a sin against the first commandment: 'You shall have no other gods before me'. This argument relies on a broad definition of the concept of 'God', following Luther, who in his Large Catechism made the following explication: 'That now, I say, upon which you set your heart and put your trust is properly your god' (Luther, 1921 [1530], part 1, 1st commandment). Thus, the passionate gambler is viewed as worshipping a false god;

an article in the magazine *Christianity Today* was titled 'Playing the lottery is idolatry' (Watson, 1989). Sometimes Isaiah 65:11, a verse of the Bible that condemns fortune-telling and blind submission to fate, is referred to. The person who gambles for money rather than excitement is criticised using a similar argument, based on the statement in the Bible that 'No servant can serve two masters: for either he will hate the one, and love the other; or else he will hold to the one and despise the other. Ye cannot serve God and mammon' (Luke 16:13). Thus, the gambler worships mammon, the personification of wealth, rather than God.

To sum up, Christian criticism of gambling comprises four major themes: the supposed greed of the gambler, gambling having a demonic power, gambling conflicting with Christian cosmology, and gambling being an undesired alternative to Christianity in some matters relating to fate, the unknown, and transcendence. As the historian Thomas Reefe (1987, p. 61) remarked, 'gambling challenges monotheism implicitly as metaphysics and explicitly as ritual'.

Concluding discussion

Examples abound of how gambling and religion have in many cultures coexisted in harmony. The gods are regarded as gamblers; deities, saints, and spirits are believed to be ready to help players; gambling is part of religious ritual; religious officials encourage ceremonial gambling; and mythology tells about gambling. Gambling always involves an element of chance, and if chance, in the sense of randomness, is not acknowledged, then the possibility presents itself that divine and mystical forces govern the outcome of chance games. From the viewpoint of the religious believer, the supernatural can thereby be invoked through games of chance; from the viewpoint of the gambler, there is a prospect of winning in games of chance by invoking the supernatural.

It is often argued in a superficial manner that in modern Western societies religion is withering away, giving way to a rational and secular outlook. Certainly, in many countries traditional Christian religion has difficulties recruiting active members for its congregations and making its voice heard in public debate; however, sentiments, attitudes, and notions of a religious nature, though they may have taken new forms, continue to be of importance. As the anthropologist Ernst Gellner (1985, p. 195) wrote when discussing the psychoanalytic movement, '… the old religious or metaphysical transcendent is withering away not because it is transcendent, but because it is the wrong kind of transcendent'.

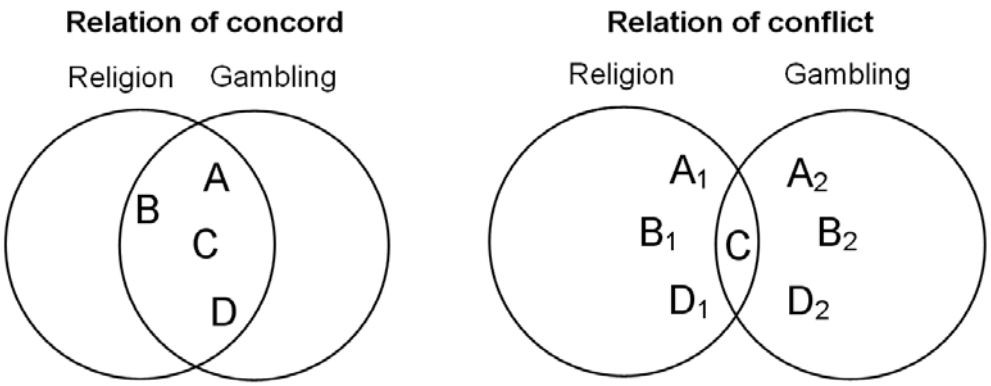
From this perspective gambling can be viewed as a way in which people in a secularised society connect with and probe the realm of the transcendental and mystical. As we have seen, gamblers often hold superstitious and irrational beliefs concerning games of chance, beliefs based on notions of luck and fortune as mystical powers. These notions extend into the mythological domain in everyday discourse and in newspaper articles about jackpot wins as moral tests or blessings, and they also connect with the realm of action when gambling creates altered states of consciousness. The dream of winning a jackpot in the lottery has transcendent

qualities in the vision of a new and better life; 'good fortune' in this context emerges as a secular form of divine grace.

Thus, if gambling contains elements of a religious character and competes with religion for people's attention, then an attack on gambling is to be expected from a religion that strives to maintain a religious and moral monopoly (Brenner & Brenner, 1990; Sutton-Smith, 1997, pp. 65–68). The present survey of Christian arguments against gambling reveals the theme that gambling is to some extent an alternative to religion. Gambling offers hope of a better and new life, it opens a path for luck as a secular form of grace, it provides transcendental experiences, and it brings about a communion with fate, destiny, and the unknown.

Figure 1 illustrates the relationships of concord and conflict that are formed between gambling and religion. Gambling and religion are here depicted as two spheres of ideas and activities. The letters A, B, C, and D in the figure signify culturally specific notions pertaining to fate, luck, the unknown, transcendence, the transformation of personal life, and other pertinent concepts and states of mind. Thus, their denotation will vary between specific cultures.

Figure 1. Gambling and religion in concord and in conflict.



Note: Shared (A, B...) or conflicting (A_1, A_2...) culturally specific notions of fate, luck, the unknown, transcendence, hope, the transformation of personal life, and other pertinent concepts and states of mind.

In a relationship of concord, there is considerable overlap between the two spheres. Gambling and religion fit well together. In a hypothetical world, where there was no chance and everything was fully predictable, there would certainly be no gambling and probably no religion. In a relationship of conflict, the shared domain is minimal, comprising only a few elements, such as the belief that God can reward the deserving with a lottery win, a belief of which official religion typically disapproves. Instead there are a number of elements that exist in various versions: for instance, 'luck' versus 'God's providence', and the hope of the lottery gambler for a better life versus the hope for salvation and grace of the Christian believer. Official religion thereby has one more reason, in addition to the moralistic and theological ones, for denouncing gambling. From a Christian perspective, gambling is wrong not only because it relies

on a wish to receive without giving and because it introduces chance into the ordered world of God but also because it in some respects offers an alternative path to experiences that are of a transcendental and religious nature.

References

Allen, D. (1952). *The nature of gambling.* New York: Coward-McCann.

Beauchamp, W.M. (1896). Iroquois games. *Journal of American Folklore, 9* (35), 269–277.

Bergh, C., & Kühlhorn, E. (1994). The development of pathological gambling in Sweden. *Journal of Gambling Studies, 10,* 261–274.

Binde, P. (1999). *Bodies of vital matter: Notions of life force and transcendence in traditional southern Italy.* Göteborg: Acta Universitatis Gothoburgensis.

Binde, P. (2005). *Att sälja en dröm: Om spelreklam och dess påverkan* [Selling dreams: On the effects of gambling advertising]. Stockholm: Statens folkhälsoinstitut.

Binde, P. (2007). The good, the bad, and the unhappy: The cultural meanings of newspaper reporting on jackpot winners. *International Gambling Studies* (forthcoming).

Brenner, R., & Brenner, G.A. (1990). *Gambling and speculation: A theory, a history, and a future of some human decisions.* Cambridge: Cambridge University Press.

Campbell, F. (1976). Gambling: A positive view. In W.R. Eadington (Ed.), *Gambling and society: Interdisciplinary studies on the subject of gambling* (pp. 218–228). Springfield, IL: Charles C. Thomas.

Chevalier, S., Geoffrion, C., Allard, D., & Audet, C. (2002, October). *Motivations for gambling as tools for prevention and treatment of pathological gambling.* Paper presented at the 5th European conference on gambling studies and policy issues, Barcelona, Spain.

Ciambelli, P. (1980). *Quelle figlie quelle spose: Il culto delle anime purganti a Napoli* [Those daughters, those brides: The cult of the souls in purgatory in Naples]. Roma: De Luca.

Clotfelter, C.T., & Cook, P.J. (1989). *Selling hope: State lotteries in America.* Cambridge, MA: Harvard University Press.

Cohen, J. (1960). *Chance, skill, and luck: The psychology of guessing and gambling.* Harmondsworth: Penguin Books.

Conte, M. (1910). *Tradizioni popolari di Cerignola* [Popular traditions of Cerignola]. Cerignola: Scienza e diletto.

Coxe Stevenson, M. (1903). Zuñi games. *American Anthropologist, 5*, 468–497.

Culin, S. (1975 [1907]). *Games of the North American Indians*. New York: Dover.

Darke, P.R., & Freedman, J.L. (1997). Lucky events and beliefs in luck: Paradoxical effects on confidence and risk-taking. *Personality and Social Psychology Bulletin, 23*, 378–388.

Davies, H. (1997). *Living on the lottery.* London: Warner.

Di Mauro, A. (1982). *L'uomo selvatico: Miti, riti e magia in Campania* [The savage man: Myth, ritual and magic in Campania]. Baronissi: Anarcord.

Diskin, K.M., & Hodgins, D.C. (1999). Narrowing of attention and dissociation in pathological video lottery gamblers. *Journal of Gambling Studies, 15*, 17–28.

Diskin, K.M., & Hodgins, D.C. (2003). Psychophysiological and subjective arousal during gambling in pathological and non-pathological video lottery gamblers. *International Gambling Studies, 3*, 37–51.

Doiron, J.P., & Mazer, D.B. (2001). Gambling with video lottery terminals. *Qualitative Health Research, 11*, 631–646.

Dow Schull, N. (2002). *Escape mechanism: Women, caretaking, and compulsive machine gambling* (Working paper No. 41). Berkeley, CA: Center for Working Families, University of California, Berkeley.

Downes, D.M., Davies, B.P., David, M.E., & Stone, P. (1976). *Gambling, work and leisure: A study across three areas.* London: Routledge & Kegan Paul.

Ellison, C.G., & Nybroten, K.A. (1999). Conservative Protestantism and opposition to state-sponsored lotteries: Evidence from the 1997 Texas poll. *Social Science Quarterly, 80*, 356–369.

Enciclopedia cattolica [The Catholic Encyclopaedia] (1948–1954). Città del Vaticano: Ente per l'enciclopedia cattolica e per il libro cattolico.

Falk, P., & Mäenpää, P. (1999). *Hitting the jackpot: Lives of lottery millionaires.* Oxford & New York: Berg.

Finamore, G. (1894). *Tradizioni popolari Abruzzesi* [Popular traditions of Abruzzo]. Torino & Palermo: Clausen.

Fiorenza, V. (1897). La leggenda di S. Pantaleone in Palermo [The legend of Saint Pantaleone in Palermo]. *Archivio per lo studio delle tradizioni popolari, 16,* 123–126.

Forrest, D., Simmons, R., & Chesters, N. (2002). Buying a dream: Alternative models of demand for lotto. *Economic Inquiry, 40,* 485–496.

France, C.J. (1902). The gambling impulse. *American Journal of Psychology, 13,* 364–407.

Fuller, P. (1974). Gambling: A secular 'religion' for the obsessional neurotic. In J. Halliday & P. Fuller (Eds.), *The psychology of gambling* (pp. 1–114). London: Allen Lane.

Gabb, D. (2001). Belief and value systems: Understanding all Australians. *Electronic Journal of Gambling Issues: eGambling, 3.* Retrieved September 22, 2005, from http://www.camh.net/egambling/issue3/opinion/index.html

Gellner, E. (1985). *The psychoanalytic movement, or the coming of unreason.* London: Granada.

Griffiths, M.D. (1997). Selling hope: The psychology of the National Lottery. *Psychology Review, 4* (1), 26–30.

Gudgeon, C., & Stewart, B. (2001). *Luck of the draw: True-life tales of lottery winners & losers.* Vancouver: Arsenal Pulp Press.

Gupta, R., & Derevensky, J.L. (1998). An empirical examination of Jacob's general theory of addictions: Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14,* 17–49.

Hand, W.D. (1980). The quest for buried treasure: A chapter in American folk legendry. In N. Burlakoff & C. Lindahl (Eds.), *Folklore on two continents: Essays in honor of Linda Dégh.* Bloomington, IN: Trickster Press.

Harrell, S. (1974). When a ghost becomes a god. In A.P. Wolf (Ed.), *Religion and ritual in Chinese society* (pp. 193–206). Stanford, CA: Stanford University Press.

Herman, M.W. (1956). The social aspect of Huron property. *American Anthropologist, 58,* 1044–1058.

Hirano, K., & Takahashi, K. (2003). Trends of Japan's giant leisure industry: Pachinko. *UNLV Gaming Research and Review Journal, 7* (2), 55–56.

Jacobs, D.F. (1988). Evidence for a common dissociative-like reaction among addicts. *Journal of Gambling Behavior, 4,* 27–37.

Jacobs, D.F. (1989). A general theory of addictions: Rationale for and evidence supporting a new approach for understanding and treating addictive behaviors. In H. J. Shaffer, S.A. Stein, & B. Gambino (Eds.), *Compulsive gambling: Theory, research, and practice* (pp. 35–64). Lexington, MA: Lexington Books.

Jonsson, J., Andrén, A., Nilsson, T., Svensson, O., Munck, I., Kindstedt, A., et al. (2003). *Spelberoende i Sverige—vad kännetecknar personer med spelproblem? Rapport om andra fasen av den svenska nationella studien av spel och spelberoende* [Gambling addiction in Sweden—what are the characteristics of persons with gambling problems? Report on phase two of the Swedish national study of gambling and problem gambling] (Rapport nr. 2003:22.). Stockholm: Statens folkhälsoinstitut.

Kaplan, H.R. (1978). *Lottery winners: How they won and how winning changed their lives.* New York: Harper and Row.

Klima, A. (2002). *The funeral casino: Meditation, massacre, and exchange with the dead in Thailand.* Princeton: Princeton University Press.

Krickeberg, W. (1948). Das Mittelamerikanische Ballspiel und seine religiose Symbolik [The Central American ballgame and its religious symbolism]. *Paideuma: Mitteilungen zur Kulturkunde, 3* (3–5), 118–190.

Kusyszyn, I. (1984). The psychology of gambling. *Annals of the American Academy of Political and Social Science, 474,* 133–145.

Lévi-Strauss, C. (1969). *The elementary structures of kinship.* Boston: Beacon Press.

Lévy-Bruhl, L. (1924). Primitive mentality and gambling. *The Criterion, 2* (6), 188–200.

Lindow, J. (1982). Swedish legends of buried treasure. *Journal of American Folklore, 95,* 257–279.

Lotman, J.M. (1978). Theme and plot: The theme of cards and the card game in Russian literature of the nineteenth century. *PTL: A Journal for Descriptive Poetics and Theory of Literature, 3,* 455–492.

Luther, M. (1921 [1530]). The large catechism. In *Triglot concordia: The symbolical books of the Evangelical Lutheran Church* (pp. 565–773). St. Louis, MO: Concordia Publishing House.

Lynch, R. (1990). Working-class luck and vocabularies of hope among regular poker-machine players. In D. Rowe & G. Lawrence (Eds.), *Sport and leisure: Trends in Australian popular culture* (pp. 189–208). Sydney: Harcourt Brace Jovanovich.

MacArthur, J.J. (1997). *Gambling: The seductive fantasy, Parts 1 and 2* (two sermons held in the Grace Community Church, Panorama City, California). Transcribed by

Tony Capoccia. Retrieved September 26, 2006, from http://www.biblebb.com/files/MAC/90-164.htm and http://www.biblebb.com/files/MAC/90-165.htm

Maranda, L. (1984). *Coast Salish gambling games.* Ottawa: National Museums of Canada.

Martinez, T. (1976). Compulsive gambling and the conscious mood perspective. In W.R. Eadington (Ed.), *Gambling and society: Interdisciplinary studies on the subject of gambling* (pp. 347–370). Springfield, IL: Charles C. Thomas.

Nonini, D. (1979). The mysteries of capital accumulation, honoring the gods and gambling among Chinese in a Malaysian market town. In *Proceedings of the first international symposium on Asian studies: Vol. 3 (southeast Asia)* (pp. 701–710). Hong Kong: Hong Kong Asian Research Service.

Northbrooke, J. (1843 [1577]). *A treatise against dicing, dancing, plays, and interludes. With other idle pastimes* (from the earliest edition, about AD 1577). London: The Shakespeare Society.

Otterstatter, M.E. (1975, September). *Gambling.* Paper presented at the Metro-North Conference. Retrieved September 26, 2006, from http://www.wlsessays.net/authors/O/OtterstatterGambling/OtterstatterGambling.PDF

Papineau, E. (2005). Pathological gambling in Montreal's Chinese community: An anthropological perspective. *Journal of Gambling Studies, 21,* 157–178.

Pitrè, G. (1889). *Use e costumi, credenze e pregiudizi del popolo Siciliano.* [The usages, customs, beliefs and prejudices of the Sicilian people.] Palermo: Carlo Clausen.

Pitrè, G. (1913). *Cartelli, pasquinate, canti, leggende, usi del popolo Siciliano.* [The chapbooks, pasquinades, songs, legends, and customs of the Sicilian people.] Palermo: A. Reber.

Pitt-Rivers, J. (1992). Postscript: The place of grace in anthropology. In J.G. Peristiany & J. Pitt-Rivers (Eds.), *Honor and grace in anthropology* (pp. 215–255). Cambridge: Cambridge University Press.

Reefe, T.Q. (1987). The biggest game of all: Gambling in traditional Africa. In W.J. Baker & J.A. Mangan (Eds.), *Sport in Africa: Essays in social history* (pp. 47–78). New York: Africana Publishing Company.

Reith, G. (1999). *The age of chance: Gambling in Western culture.* London: Routledge.

Richie, D. (2003). *The image factory: Fads and fashions in Japan.* London: Reaktion Books.

Rosenthal, F. (1975). *Gambling in Islam.* Leiden: Brill.

Rosenthal, R.J. (2005). Staying in action: The pathological gambler's equivalent of the dry drunk. *Journal of Gambling Issues, 13.* Retrieved September 22, 2005, from http://www.camh.net/egambling/issue13/jgi_13_rosenthal.html

Salter, M.A. (1973). Medicinal games-rites of the Iroquoian linguistic family. In *Proceedings of the North American Society for Sport History* (pp. 30–31). University Park, PA: Pennsylvania State University.

Salter, M.A. (1974). An analysis of the role of games in the fertility rituals of the native North American. *Anthropos, 69,* 494–504.

Salter, M.A. (1980). Play in ritual: An ethnohistorical overview of native North America. In H.B. Schwartzman (Ed.), *Play and culture. 1978 proceedings of the Association for the Anthropological Study of Play* (pp. 70–82). West Point, NY: Leisure Press.

Shinohara, K., Yanagisawa, A., Kagota, Y., Gomi, A., Nemoto, K., Moriya, E., et al. (1999). Physiological changes in Pachinko players: Beta-endorphin, catecholamines, immune system substances and heart rate. *Applied Human Science: Journal of Physiological Anthropology, 18,* 37–42.

Slater, T. (1909). Gambling. In *The Catholic Encyclopedia*. New York: Encyclopedia Press.

Smith, G.J., Volberg, R.A., & Wynne, H.J. (1994). Leisure behavior on the edge: Differences between controlled and uncontrolled gambling practices. *Society and Leisure, 17* (1), 233–248.

Stern, T. (1950). *The rubber-ball games of the Americas.* New York: J.J. Augustin.

Sutton-Smith, B. (1997). *The ambiguity of play.* Cambridge, MA: Harvard University Press.

Trigger, B.G. (1990). *The Huron: Farmers of the north.* Fort Worth, TX: Holt, Rinehart and Winston.

Tylor, E.B. (1871). *Primitive culture.* London: John Murray.

Veblen, T. (1970). *The theory of the leisure class.* London: Unwin Books.

Walker, J. (1999). Gambling and Venetian noblemen, c. 1500–1700. *Past and Present, 162,* 28–69.

Watson, T. (1989). Playing the lottery is idolatry. *Christianity Today, 33* (16), 8.

Whittington, E.M. (Ed.). (2001). *The sport of life and death: The Mesoamerican ballgame.* London: Thames & Hudson.

Yu, C. (1997). *Three types of Chinese deities: Stone, tree, and land.* Doctoral dissertation, University of Lancaster, Lancaster, U.K.

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Selling dreams—causing nightmares? On gambling advertising and problem gambling

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Abstract

A review of the literature leads to the conclusion that there are no reliable figures on the impact of gambling advertising on the extent of problem gambling. To measure that impact appears as a very difficult research task. However, we can infer that gambling advertising does add to problem gambling, but with a smaller impact than other influential factors. Thus, alarming claims that gambling advertising substantially increases problem gambling and reassuring statements from gambling companies that advertising merely affects market share and has no impact on the prevalence of problem gambling both appear to be erroneous. Gambling providers are advised to avoid publishing advertising that elaborates on features of gambling known to relate to problem gambling. The controversial nature of gambling advertising is illustrated by the case of Sweden, where advertising and its impact on problem gambling have been hotly debated over the past decade.

Keywords: gambling, problem gambling, advertising, marketing, promotion

Introduction

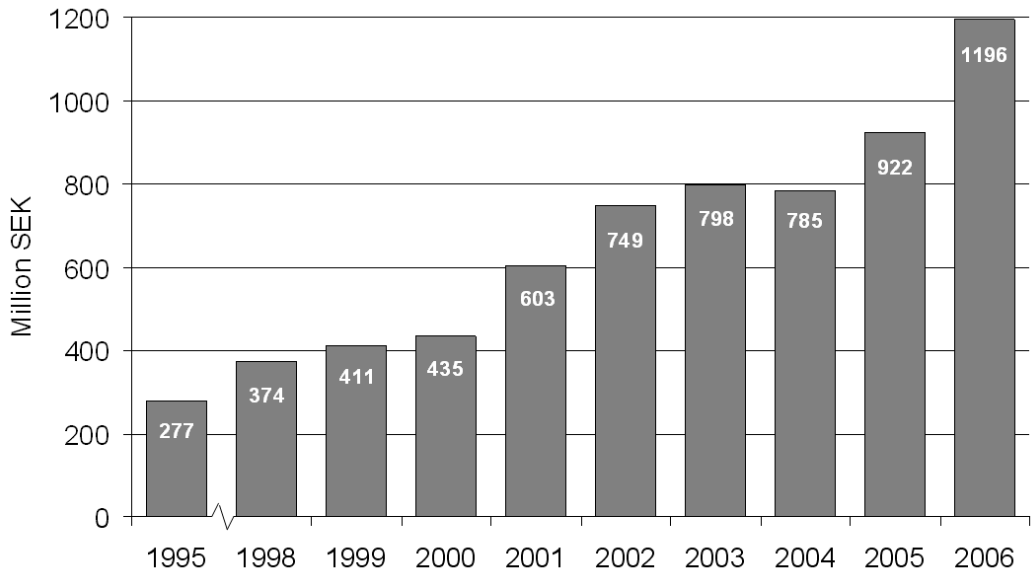
Gambling advertising is controversial in many countries. A telling example is the case of Sweden, where it is repeatedly claimed in public debate that it is unethical to promote an activity with an addictive potential, and that gambling advertising is often misleading; encourages fatalism, materialism, hedonism, and irrationality; undermines the work ethic; and increases the prevalence of problem gambling (Binde, 2005a).

In Sweden gambling advertising is generally perceived as becoming increasingly conspicuous and insistent, and the term 'aggressive' is often used to describe it. This perception has a basis in fact, as the amount of gambling advertising has indeed increased significantly in recent years. Figure 1 shows the estimated total outlay (before rebates) in recent years for gambling advertising in the Swedish mass media (TV, movies, newspapers, magazines, and billboards).

Advertising expenditures in 2006 were more than four times as high as in 1995. This increase reflects a rise in advertising volume, with inflation in this period accounting for only approximately 11.5% of the increased expenditures. Overall, the rise in advertising expenditure has exceeded the rise in the gambling companies' gross

Figure 1

Outlay for gambling advertising in Swedish mass media (million SEK, before rebates)



Source: SIFO/RM, Research International. Figures for 1996–1997 were not available. 100 million SEK ≈ 11 million EUR or 14 million USD.

turnover. The slight decrease in advertising expenditure in 2004 compared to 2003 stems from a ruling of the Supreme Administrative Court, confirming the contested prohibition against the Swedish mass media publishing ads for foreign gambling companies. The significant increase in 2005 and 2006 compared to 2004 reflects that foreign companies intensely marketed Internet poker by advertising on TV channels available for viewing in Sweden but not governed by Swedish law.

Over the same period, i.e., the last decade, awareness of problem gambling has increased greatly. Problem gambling has become a common topic in Swedish newspapers, and it is regularly debated in Parliament and on TV. There is a widespread perception that problem gambling has become more common in recent years. Although there are no academic studies that confirm this, one gambling company's yearly surveys of gambling behaviour suggest a slightly increased prevalence of problem gambling in 2005 compared to 2004 (Svenska Spel, 2005).

Thus, there is a perception that gambling advertising has become increasingly extensive and aggressive and that problem gambling is becoming more widespread, almost in an epidemic fashion. A causal link is suggested: the insistent exhortation in advertising that people should gamble more is effective, causing a substantial number of people to gamble excessively.

This article discusses to what extent this might be true. Gambling advertising does sell the dream of winning a fortune, but does it cause some people to experience the nightmare of becoming addicted to gambling? Does advertising on TV, in newspapers and magazines, and on billboards add to problem gambling, and if so, to what extent? First, the few existing studies that have a bearing on the subject will be reviewed. Then follows an attempt to assess, in approximate terms, on the basis of available facts, the impact of gambling advertising on problem gambling. Suggestions are made here for future research in this difficult field of inquiry, and finally some implications for the responsible provision of gambling are pointed out.

Empirical studies

Econometric studies of advertising impact

Most gambling companies keep statistics on the influence of advertising campaigns on the sales of various types of games, but such data, although useful for marketing purposes, are rarely made public and may not meet scientific standards. Academic econometric studies of gambling advertising are rare. A few studies compare advertising expenses and/or volume with sales of gambling products, and from that draw conclusions regarding advertising efficiency. One such study is *Over- or under-advertising by state lotteries* by the economist Ping Zhang (2004). This study of lottery advertising in three American states concludes that the impact of advertising on sales is fairly large compared to many other consumer products; a 1% increase in advertising spending would increase sales by 0.1% to 0.24%. A similar study of lottery advertising in the state of Colorado, however, found no significant effect of TV and radio advertising on lottery sales (Heiens, 1999). An analysis of the purchase pattern of lottery tickets in the state of Florida found a negative binomial distribution, suggesting that advertising and other marketing efforts (except for the degree of retail distribution) had little effect on the aggregate size of the lottery market once it matured (Mizerski & Mizerski, 2001; Mizerski, Miller, Mizerski, & Lam, 2004). However, since no comparison was made between periods of different levels of advertising, no definite conclusion could be drawn regarding advertising impact on sales (Mizerski & Mizerski, 2001, p. 144).

Conflicting results such as these are to be expected with regard, more generally, to the issue of advertising efficiency, on which scholars tend to disagree (Kim, 1992). A saying in the advertising industry is that 'only half of the advertising works, but we don't know which half'. In the 1960s it was concluded, 'there is no more difficult, complex, or controversial problem in marketing than measuring the influence of advertising on sales' (Bass, 1969, p. 291). Although advances have since been made in advertising research, this statement still largely holds true today.

It is fairly evident, however, that some advertising campaigns are quite effective in that they make people consume more of a specific gambling product. To increase sales is the rationale of gambling companies spending huge sums on advertising. If

advertising did not maintain or increase sales, there would be no reason to spend money on it. However, in a mature and competitive market the gain in sales for one product often leads to a decrease in sales for another similar product. While advertising may thus work well for each company, by maintaining or increasing sales, the volume of the market as a whole may be unaffected. Advertising may primarily affect the market share of competing products and companies.

Studies that aim at analysing the relationship between volume of advertising and volume of the gambling market as a whole or for specific products face several challenges. They may need to take the following into account:

- There are probably differences in the effect on gambling behaviour between informative advertising (e.g., telling about a new jackpot) and brand and profile advertising (e.g., associating gambling products with certain attitudes and lifestyles).
- Market segments have different degrees of maturity; generally, advertising has a greater impact when the market is immature.
- Advertising has a saturation effect (increased advertising yields diminishing returns in sales).
- Many companies follow a rule of thumb that advertising should be proportional to sales. If sales of a particular product are rising, the company spends more money on advertising that product. This creates a covariation between advertising volume and sales that can be falsely interpreted as advertising causing an increase in sales.
- There are many factors other than advertising that influence the extent of gambling, such as huge jackpots, change in payback percentages of games, introduction of new forms of gambling, significant changes in how games are played, public debate on the risks of gambling, increased availability of gambling through an increased number of sales outlets, and availability on the Internet and via cell phone.
- There are relations both of complementarity and substitution in the leisure and entertainment sectors: variations in the extent of gambling may have to do with the attractiveness of other forms of entertainment and leisure activities.
- There are differences between market segments where there is competition and segments where there is monopoly; in the former case advertising is more likely to affect the size of market share and in the latter case it is more likely to affect total sales (cf. Productivity Commission, 1999, chap. 16, p. 37).

The potential difficulties for assessing advertising impact on the extent of gambling are thus many. The more complex the market, the more problems arise. If the ambition is to analyse the impact of advertising on *problem* gambling, rather than on gambling more generally, there are additional difficulties. Given this complexity, it is not surprising that there seem to be no studies that (a) measure to what extent advertising increases sales of gambling products and then (b) in some way extrapolate to an eventual increase in problem gambling. The problems involved in taking the second step, from an increase in gambling to an increase in problem gambling, will be discussed later in this paper.

Questionnaire studies

Few quantitative questionnaire studies have a bearing on the possible impact of gambling advertising on problem gambling. The studies discussed in this section are all that were found by the present author in a fairly thorough search of the literature.
A study conducted in New Zealand employed a sample of 143 gamblers of four types: (a) probable pathological gamblers and (b) problem gamblers, as well as frequent gamblers who did not experience gambling problems and played either (c) continuous or (d) noncontinuous games (Abbott, Williams, & Volberg, 1999). Respondents were asked, among other questions, to what extent they recalled gambling advertising. Probable pathological gamblers showed a pattern of recall that differed slightly from those of the other groups, but the differences between the groups were generally small.

Several studies, however, have found that people who gamble more than average recall seeing more gambling advertising than others do (Amey, 2001, p. 178; Carlson & Moore, 1998; Clotfelter & Cook, 1989; Stranahan & O'Malley Borg, 1998). It is not clear, however, whether this covariance is because (a) those who see a lot of gambling advertising are persuaded to gamble more than average people do, or (b) those who gamble a lot are interested in gambling and are thus more attentive to such advertising. Both causes appear to be possible and may have a simultaneous impact, though other factors may also be at work in creating covariance. For example, if younger people gamble more on a specific type of game than older people do, and also spend more time viewing TV channels with a lot of advertising for such games, then there will be a covariance between recall of such advertising and participation in such games without there necessarily being a causal connection. In marketing science, determining the causality of covariance between advertising recall and consumer behaviour has long been a problem (e.g., Palda, 1966).

In these questionnaire studies separate questions dealt with advertising recall and gambling habits, and the answers to the questions were then compared. Another approach is to ask respondents how they think they have been influenced by gambling advertising. A Canadian survey of youth between 10 and 18 years old indicated that over 90% of respondents recalled seeing advertising for lotteries on TV, as well as on billboards (69%), in newspapers (68%), and in magazines (55%) (Felsher, Derevensky, & Gupta, 2004). Among those who recalled seeing such advertising, 39% thought that because of this they would be more likely to buy lottery tickets.

In a Swedish study (Jonsson et al., 2003) 151 people without gambling problems were compared to 151 problem gamblers. The participants in the study were selected from respondents to a prevalence study conducted 2 years earlier (Rönnberg et al., 1999) according to a 'twin' design: each problem gambler was matched with a non-problem gambler with respect to age, sex, and social characteristics. Problem gambling was defined as scoring 3 or more on the South Oaks Gambling Screen (SOGS, lifetime measure, Lesieur & Blume, 1987) in the prevalence study. The extensive battery of

screens and questionnaires administered to the 302 participants included a question asking to what extent the respondent had been tempted by gambling advertising to gamble more frequently or spend more money on gambling. A statistically significant difference was found between the two groups: problem gamblers reported to a greater extent than non-problem gamblers to have been influenced by advertising. Inspecting the distribution of responses on the 5-point Likert-type scale used in the questionnaire reveals that the difference arises mainly from problem gamblers stating to a greater extent than non-problem gamblers that they were 'scarcely' or 'somewhat', rather than 'not at all', influenced by gambling advertising (J. Jonsson, personal communication, February 28, 2004).

It should be noted that in this Swedish study, the great majority in both groups of gamblers report that advertising had little or no impact on their gambling habits: 71.2% of problem gamblers answered that they had 'not at all' or 'scarcely' been influenced by gambling advertising, while the corresponding figure for non-problem gamblers was 77.9%. Only 8 of the 151 problem gamblers and 5 of the 151 non-problem gamblers reported that advertising influenced their gambling 'quite a lot' or 'very much'. A notable weakness of this study is that the 'problem gamblers', according to the definition used in the study, at the time of answering the question on advertising impact had a mean past-year SOGS score of 2.48. Thus, the majority had no or only minor current problems with gambling; only 2 of the 151 'problem gamblers' reported having ever sought help for gambling problems.

In an American study there was, however, no doubt that the participants had severe gambling problems, since they consisted of 131 pathological gamblers in treatment (Grant & Kim, 2001). Pathological gambling according to DSM-IV criteria (American Psychiatric Association, 1994) was verified by clinical assessment, and the mean SOGS score was 14.1. The respondents had spent on average 16 hours a week and 45% of their income on gambling. A quarter of them had committed crimes in order to pay gambling debts. The study included a question regarding the perceived impact of gambling advertising, and 46% of the participants reported that the urge to gamble was triggered by advertising on billboards, television, or radio. No other phenomenon was mentioned as a trigger to a similar extent. The second most common trigger was 'boredom/free time' (24%), and the third most common was 'thoughts of winning' (19%).

This American study found that those who reported gambling advertising as a trigger appeared to have developed pathological gambling comparatively rapidly. The two researchers conducting the study suggest that the reason for this may be that 'constant exposure to specific triggers to urges would naturally reinforce the behaviour, and this may explain why these subjects progressed to pathological gambling quickly' (p. 961). It should be noted, however, that in other investigations of the triggers experienced by problem gamblers advertising has not emerged as important (Brown, 1987; Hodgins & el-Guebaly, 2000, 2004; Hodgins & Peden, 2005).

Canadian female gamblers who had concerns about their gambling but were not in treatment were the participants ($N = 365$) in a study of various aspects of problem

gambling (Boughton & Brewster, 2002). When addressing the importance of 20 items in creating urges and temptations to gamble, 20% indicated that 'exposure to ads on TV, billboards and newspapers' was 'very or extremely' important. The most commonly endorsed item was 'feeling that my luck will change' (67%), while the least endorsed was 'drinking or drug use' (8%).

The four questionnaire studies described above, in which respondents were asked to assess the impact of advertising on their propensity to gamble or on their gambling habits, have several limitations. First, when respondents are asked about the urge to gamble or likelihood of gambling, it is not clear to what extent this self-assessment reflects actual influence on gambling behaviour.

Second, assessing the impact of advertising on one's own mental processes and behaviour may be difficult. A person's consciousness of advertising impact ranges from high to low. An example of high consciousness would be someone noticing an ad in which a casino offers food and entertainment at a good price. The person subsequently visits the casino, dines, is entertained, and gambles. In retrospect, the person can state that had it not been for seeing the ad, he or she would not have gambled that evening. An example of low consciousness would be someone reading a newspaper article located next to an ad for a scratch lottery ticket. Some days later, the person passes by a billboard advertising the same lottery; later that day, when buying a chocolate bar in a convenience store, he or she gets the idea of buying a scratch lottery ticket as well. If asked about the reason for buying the ticket, the person may reply that the purchase was on a whim and say nothing about the ads, which were barely noticed but nevertheless entered his or her mind.

Psychological research has shown that advertising influences people in ways in which they are largely unaware (Harris, 1987; Krugman, 1965, 1968, 1977, 1988; Messaris, 1992; Walsh & Gentile, in press). People may be exposed to ads that they barely notice, but that nevertheless influence their behaviour, for example, when they have to choose between two brands of a similar product in a store (Krugman, 1977). Repeated exposure to an advertising message may lead to a subtle, and for a person unnoticeable, restructuring of perceptions of and attitudes to brands and products (Krugman, 1965). The impact of advertising on aggregated consumer behaviour can be substantial, even if the impact on the individual is small. People who have not thought of buying a specific product will hardly be persuaded to do so by advertising, but those who are already thinking of buying it might be. In a large population these people constitute a considerable number of consumers. Furthermore, advertising often appeals to emotion and imagination rather than rational thought, and is therefore difficult to handle with critical reason: 'the most effective influence occurs when the person influenced doesn't realize it is happening' (Walsh & Gentile, in press).

Yet another problem obscuring the degree of advertising impact is present when someone is asked to self-report on the impact, constituting a third limitation of these studies. To admit that advertising has a major impact on *oneself* is to present oneself

as easily led and somewhat unintelligent. In psychology, the third-person effect is well documented (Davison, 1983): individuals tend to rate the influence of persuasive messages in mass media to be higher on others than on themselves. Probably, the third-person effect is created by both the understatement of the persuasive effect on oneself and the overstatement of the effect on others. The effect is particularly strong with respect to advertising for stigmatized products such as cigarettes and alcohol (Banning, 2001).

Two studies document the third-person effect with respect to gambling advertising (Shah, Faber, & Youn, 1999; Yuon, Faber, & Shah, 2000). In one of these studies (Yuon et al., 2000) respondents were asked to what extent they agreed with statements that advertisements for lotteries had a powerful effect on themselves and on others. The responses on a 5-point Likert-type scale ranged from 1 ('strongly disagree') to 5 ('strongly agree'). The mean score for advertising impact on oneself was 2.09 while the score for impact on others was 3.78; thus, individuals considered lottery advertising to have a small effect on themselves but quite a large effect on others. The study revealed that the more someone believed that others were influenced by lottery advertising, the more willing that person was to censor such advertising. There was no such linkage between censorship attitude and perceived effect of advertising on oneself.

Finally, a fourth limitation of self-reporting studies is the difference between non-problem and problem gamblers in terms of their reactions to gambling advertising. For non-problem gamblers, gambling advertising is merely one of many types of advertising that compete for attention. It does not generally attract more attention than advertising for other products does, and, as argued above, non-problem gamblers are likely to underestimate advertising impact, since at least some of it 'slips under the radar' of full attention and conscious examination. In contrast, problem gamblers, who are aware of their problems and are trying to cut down or abstain from gambling, may notice gambling advertising to a much greater extent. Unpublished results from a qualitative interview study of gambling advertising and problem gambling conducted by the present author (Binde, 2007), indicate that the exhortation to gamble delivered by advertising is often clearly noticed by problem gamblers, setting off a conscious mental process characterized by conflicting impulses, emotions, and thoughts. These might include the desire to gamble, distaste for gambling and its negative consequences, evaluation of the consequences of gambling, and thoughts regarding the intentions and morality of the advertiser. This mental process may result in the person either gambling or keeping to an earlier decision not to gamble. Thus, problem gamblers are more likely than non-problem gamblers to recall seeing gambling advertising and to remember eventual gambling episodes connected to such advertising exposure.

Qualitative studies

There are a few qualitative studies, concerning perceptions and attitudes of gamblers more generally, that tell something about how gambling advertising is experienced (e.g., Wood, Griffiths, Derevensky, & Gupta, 2002). However, there are apparently no

published results from qualitative studies dedicated to the subject of gambling advertising. The yet unpublished interview study conducted by the present author (Binde, 2007) focuses on how problem gamblers experience and react to gambling advertising. The sample of informants is strategic, including people having problems with a variety of games, so the study can give only a rough indication of frequencies. Some problem gamblers report that their problems are entirely independent of advertising. Others report that advertising has an occasional and marginal impact on their gambling behaviour. Problem gamblers of a third category, apparently a minority, state that advertising has a manifest and not negligible impact: excessive gambling is sustained and aggravated, and attempts to cut down on gambling fail because of advertising that tempts the person with hard-to-resist offers. However, gamblers of this category stressed that advertising was not a major cause of their gambling problems, which they attributed mainly to personality factors and the high availability of gambling.

An example of manifest advertising impact was a horse bettor, trying to cut down on gambling, who could not resist advertising that told about roll-over jackpots on the popular 'pick seven' trotting game. Also, advertising for new types of horse betting games attracted this person's attention, initiating gambling episodes sustained by the idea that each novelty should be tried to determine if it would prove to be the 'dream' game for which he had an exceptional talent. The preliminary results of this study are in line with anecdotal evidence suggesting that for some problem gamblers excessive gambling is indeed triggered by advertising (Binde, 2005a, pp. 75-76). Similarly, recovered alcoholics have reported that alcohol advertising might trigger drinking (Treise, Taylor, & Wells, 1994).

In conclusion, there are no reliable figures concerning the impact of gambling advertising on problem gambling (cf. Griffiths, 2005). Given that advertising impact is difficult to measure and that problem gambling is neither well understood nor well defined, is it at all possible to get hard figures on the impact of gambling advertising on problem gambling, and if so, what research designs appear promising? To discuss these questions, it is apposite to make a rough estimate of the magnitude of impact: is it likely to be zero, small, or large? That the impact is virtually zero is sometimes claimed by actors in the gambling industry, who argue that advertising mainly affects market share and does not substantially increase the overall consumption of gambling products. In social debate, however, it is often suggested that the impact is considerable.

None, small, or large? A rough estimate of advertising impact on problem gambling

The studies discussed in the previous section have notable limitations, but taken together suggest that gambling advertising contributes somewhat to problem gambling. At least some advertising makes some people gamble more frequently and for more money. Two studies show that quite a number of problem gamblers report

being triggered to gamble by advertising (Boughton & Brewster, 2002; Grant & Kim, 2001), while another study indicates that problem gamblers are more strongly influenced by advertising than non-problem gamblers are (Jonsson et al., 2003). When interviewed (Binde, 2007), some problem gamblers give detailed accounts of how advertising contributes to excessive gambling and thwarts efforts to cut down on the habit. Others, however, testify that advertising has little or nothing to do with their gambling problem. While these studies indicate that advertising indeed has an impact on the extent of problem gambling, the following three observations suggest that the impact is small rather than large.

First, the most widely advertised types of gambling may have a low prevalence of problem gambling, while games with a comparatively high prevalence of problem gambling may not be advertised at all. In Sweden, for example, the most advertised games are lotteries, which have a low prevalence of problem gambling. At the same time, a substantial number of problem gamblers play almost exclusively on video lottery terminals or illegal poker machines, forms of gambling for which there is no advertising whatsoever. This is the inverse of what one would expect if advertising had a great impact on problem gambling, in which case the most advertised games would attract many problem gamblers. This does not rule out, however, that a person may be persuaded to play one type of game by seeing advertising for another.

Second, if gambling advertising had a substantial effect on the prevalence of problem gambling, this effect should have been noted. For example, in some countries and states, gambling advertising has suddenly increased or decreased as a consequence of changes in laws and regulations, but no evident effects on problem gambling seem to have been reported. Furthermore, a cursory comparison of problem gambling prevalence rates between countries where there is a great deal of gambling advertising and countries where there is little does not suggest any obvious covariation. Excessive gambling is doubtless a behaviour as old as gambling itself. There are numerous historical examples of societies in which the prevalence of problem gambling was apparently high, despite the absence of gambling advertising. Thus, problem gambling can be widespread in a society even in the absence of advertising.

Finally, studies of advertising for addictive substances (i.e., alcohol and tobacco) provide an indication of the magnitude of the possible impact of advertising on problem gambling. Such studies are numerous and of different types. Since alcohol and tobacco advertising is controversial, the results of some of these studies have been contested. However, when the results are critically examined and taken together, these studies suggest that advertising for alcohol (Nelson, 2001; Smart, 1988) and tobacco (M. Duffy, 1996) generally has only a marginal impact on total consumption and excessive use. Advertising seems to have a greater impact only in certain circumstances, among which the most obvious is an immature market. As an illustration of the complexities of the relationship between advertising and consumption, consider the impact of informative (price) advertising as distinct from brand (image) advertising (Tremblay & Okuyama, 2001). In theory, if advertising

focusing on the *price* of an alcoholic beverage increases, then this would signal increased price competition. Such competition implies lowered prices, which means higher consumption. Advertising focusing on *brands*, however, increases brand loyalty; consumers become more willing to pay extra for a particular brand of alcoholic beverage. This allows companies to raise prices, which consequently may decrease total consumption. In sum, if advertising for psychoactive and addictive substances such as alcohol and tobacco has only a marginal impact on the extent of the detrimental health effects of consumption, then it is likely that the same holds true for advertising for a psychoactive and potentially addictive activity like gambling.

Possible mechanisms of advertising impact

Having concluded that gambling advertising is likely to have some impact on the extent of problem gambling, we can speculate on the possible mechanisms of this impact.

A number of individual and social factors have been identified as increasing the risk of a person developing problem gambling (for summaries of such factors, see Blaszczynski & Nower, 2002; Griffiths & Delfabbro, 2001; McGowan, Droessler, Nixon, & Grimshaw, 2000; Potenza, Fiellin, Heninger, Rounsaville, & Mazure, 2002; Raylu & Oei, 2002). If advertising can be connected to such factors, then this suggests that advertising adds to the prevalence of problem gambling and indicates possible mechanisms by which this influence is exerted. Some of these factors apparently have little to do with advertising, as the following list indicates:

- sociological and demographic factors, such as low income, low education, young age, being male, and belonging to a minority ethnic group;
- friends who gamble and approve of gambling;
- gambling at an early age;
- a family history of problem gambling;
- traumatic childhood experiences;
- a strongly felt need for dissociative experiences;
- obsessive-compulsive disorder;
- antisocial personality disorder;
- age-related damage to certain parts of the brain;
- alcoholism.

There are, however, other factors commonly regarded as increasing the risk of developing gambling problems, factors that in theory can be connected to advertising for gambling products:

- *High availability of gambling*. Gambling advertising informs and reminds us of the availability of gambling. It increases awareness of the existence of games and their features as well as of where these games can be played. A high availability of gambling would not affect the extent of problem gambling if people were not *aware*

of the availability.

- *Participation in gambling*. This factor should be considered as distinct from availability. Advertising exhorts people to gamble and is likely to increase overall participation. When someone gambles, he or she is exposed to the features of that form of gambling that make it enjoyable for the casual gambler. At least some of these features are those that also make that form of gambling addictive for the problem gambler. Continuous exposure to the potentially addictive features of games—such as their capacity to excite or relax—makes it more likely that someone with the potential for developing problem gambling may realize it, for example, during a stressful period of his or her life.
- *Features of the brain's reward system*. As mentioned above, the study by Grant and Kim (2001) suggests that advertising constitutes a trigger for gambling. In neurobiological terms, such triggers are linked to the activation of the reward system of the brain. In Skinnerian terms, they constitute cues that activate conditioned responses.
- *Impulsive personality*. Advertising can be assumed to have a greater influence on the behaviour of an impulsive person than on a person of average impulsiveness. According to the DSM-IV criteria (APA, 1994), pathological gambling is an impulse control disorder.
- *A substantial early win*. Numerous studies conducted in various countries report that a large proportion of problem gamblers had won a substantial amount of money early in their gambling careers (Delfabbro, Lahn, & Grabosky, 2005; Turner, Zangeneh, & Littman-Sharp, 2006; Walker, 1992, p. 137-138). Presumably, this event created a lasting impression that it is easy to win and that gambling can produce intense feelings of joy and satisfaction. Much advertising for gambling gives the impression that it is easy to win, which might reinforce such impressions.
- *Overconfidence in one's own skill in sports and horse betting*. Advertising for sports and horse betting often exaggerates the importance of skill (Binde, 2005a). Attribution of gambling wins to one's own skill, while blaming losses on bad luck or occasional and unlikely events, is a thought configuration found among some problem gamblers (Gilovich, 1983; Rosecrance, 1986).
- *Sensation-seeking personality*. The theme of some advertising is the excitement of gambling. For example, ads may emphasize high odds, big jackpots and the thrill of gambling. This may persuade people who are exceptionally sensation seeking to satisfy their need for excitement through gambling rather than through other activities. Although not all gambling involves sensation seeking (Dickerson, Hinchy, & Fabre, 1987), some forms do (Zuckerman, 1994).
- *Irrational thinking*. Although the importance of irrational thinking and cognitive factors in problem gambling is somewhat disputed (Delfabbro, 2004; Dickerson, 1991; May, Whelan, Meyers, & Steenbergh, 2005), most researchers agree that irrational thinking contributes to problem gambling. Advertising often suggests that luck is of importance. It emphasizes the wonderful consequences of jackpot wins while saying little about the minute probability of winning, and in other ways exploits biases in how people think about probabilities (Binde, 2005a; Mumpower, 1988).

Thus, among the individual and social factors identified as increasing the risk of someone developing problem gambling behaviour, some appear unrelated to advertising, while some in theory could be related.

So far the discussion has concerned mainly the short-term impact of advertising on problem gambling. However, advertising may also have a long-term impact. The power of influencing social attitudes and values is often attributed to advertising, typically in an undesirable way, towards favouring selfishness, materialism, and irrationality (for an overview, see Pollay, 1986). In this vein gambling advertising is commonly assumed to reinforce the idea that money brings happiness, the thinking that easy money is preferable to honest work, and, more generally, the perception that gambling is a perfectly normal and acceptable form of entertainment for everyone—young and old, men and women alike. This impact on attitudes contributes, it is argued, to the increased prevalence of gambling, which has the consequence of making problem gambling more prevalent.

It is difficult to determine to what extent this is true. Undoubtedly, advertising to some extent speeds up changes in values and attitudes, and this might apply to gambling advertising as well. The more liberal view of gambling that emerged in the 1960s and 1970s, however, was part of a general shift of attitudes in Western societies towards many behaviours formerly not generally accepted, behaviours such as homosexuality, swearing, nudity in public media, working on Sundays, and extramarital sex (Binde, 2005b; Brenner & Brenner, 1990; Burnham, 1993; Clotfelter & Cook, 1989; Dixon, 1991; Dombrink, 1996; Panasitti & Schull, 1994; Reith, 1999). It should also be noted that despite massive amounts of gambling advertising, attitudes towards gambling have actually become more critical over the past decade in some countries, such as Sweden. Problem gambling is a 'hot topic' in public debate, and there are frequent calls for stricter regulation of the gambling sector.

To conclude, it is possible that, from a long-term perspective, gambling advertising has contributed somewhat to more liberal attitudes towards gambling, and that a consequence of this shift has been an increase in problem gambling. There are reasons for also assuming that gambling advertising increases problem gambling in the short term, but its effect is most likely smaller than those of other factors that influence prevalence rates. This short-term impact can be assumed to consist of three distinct effects, all of which connect with social and psychological risk factors for developing problem gambling.

(a) Advertising recruits new players, some of whom later become problem gamblers. This effect ought to be at its strongest when a new game is introduced and when the market is immature. For example, people may be persuaded by advertising (Web banners or TV commercials) to try Internet poker, a game that for some becomes an obsession. Had it not been for advertising, a number of these persons would not have started playing and others would have done so later, when they were perhaps more aware of the risks involved or when Internet poker operators had increased their implementation of measures to counter excessive gambling.

(b) Advertising intensifies established gambling habits. On the continuum between problem-free gambling and pathological gambling, some people will, because of advertising impact, move a little towards pathological gambling. A problem-free gambler may develop at-risk gambling behaviour, an at-risk gambler may become more of a problem gambler, and a problem gambler may behave more like a pathological gambler.

(c) Advertising may sustain and aggravate established problem gambling by providing hard-to-resist impulses for gambling that make it harder to adhere to a decision to quit or cut down on gambling.

To determine more precisely the magnitude of advertising impact on the extent of problem gambling, an impact which as far as can be judged is small, what research methods appear promising?

Suggestions for future research

Questionnaire studies and qualitative investigations

Individuals may be asked, via questionnaires, separate questions about their recollection of advertising and their gambling habits. However, there is, as pointed out earlier, a fundamental problem in analysing answers concerning causality, and also a bias in how non-problem compared to problem gamblers recall advertising. Such studies will hardly give an idea of the extent of advertising impact. Studies in which respondents themselves assess the impact of gambling advertising yield results concerning how individuals *believe* advertising has influenced their gambling. In the case of the problem-free gambler, however, such self-reporting appears to be of little value in measuring actual advertising impact, since advertising often has a subtle and hard-to-gauge impact on individual behaviour. Problem gamblers can, as argued, be expected to notice the influence of advertising more clearly than ordinary gamblers can, and questionnaires asking apposite questions about this influence will probably illuminate this aspect of advertising impact.

Qualitative investigations, e.g., interview studies, are likely to produce knowledge about how people experience gambling advertising and about the mechanisms of advertising impact. If gambling advertising adds to problem gambling, people who have or have had gambling problems can tell at least something about the ways advertising has had a detrimental effect on their gambling habits. Such studies may also indicate the extent of advertising impact on problem gambling. For instance, they might indicate that advertising for specific types of games has comparatively little or great impact on problem gambling behaviour.

The problematic Ledermann model

There are numerous econometric studies of the impact of alcohol and tobacco advertising, so it is well worth considering whether econometric methods could be

applied in examining gambling advertising. The principal task of such research would be to compare the volume of advertising with the extent of problem gambling; if a covariation were found, this would indicate that advertising increases the prevalence of problem gambling.

Two main approaches can be discerned in alcohol and tobacco advertising studies: one in which advertising volume is compared to *total* consumption, which is assumed to be an indicator of *harmful* consumption, and another in which advertising volume is compared to tangible indicators of harm, such as the incidence of lung cancer or the number of motor vehicle accidents caused by drunk drivers.

In the first approach, if total consumption of tobacco increases, adverse effects on public health are taken for granted, since every cigarette smoked is dangerous to an individual's health. If total consumption of alcohol increases, it is commonly assumed that problematic and harmful use of alcohol also increases. This assumption was originally formulated 50 years ago by the French researcher Sully Ledermann (1956), and is known as the 'Ledermann model', the 'total consumption model', or the 'single distribution theory'. However, the assumption has been contested, and some researchers argue that the harmful use of alcohol cannot be described with any precision as a function of total consumption; at best, the level of total consumption can be used only in roughly approximating alcohol harm in a given society (J.C. Duffy, 1986).

The application of this type of econometric approach in studying the impact of gambling advertising would seem to be very difficult. As pointed out earlier, such econometric studies would have two steps: (a) measuring advertising impact on the consumption of gambling products and (b) somehow relating levels of consumption to prevalences of problem gambling. Some problems involved in the first step were outlined above. In the second step, the task is to compute problem gambling as a function of total gambling. Evidently, there is some connection between the two. Consider the two extremes: (a) there is no gambling at all in a society, and (b) all citizens gamble for large amounts of money every day. In the first case there would certainly be no problem gambling, while in the second there would be a great deal. In reality, however, the connection between total and problem gambling is quite complex.

Consumption of alcohol is easily and validly defined as the average daily intake of pure alcohol (in beverage equivalent), and it does not matter much what kinds of alcoholic beverages (beer, wine, whiskey, etc.) are consumed. This reasoning is sound, since alcohol is equally addictive and potentially harmful, regardless of the form in which it is consumed. However, the same does not hold for gambling, since not all forms of gambling are equally addictive or hence potentially harmful. The availability of forms of gambling associated with a relatively high risk of developing problem gambling appears to be more decisive for the prevalence of problem gambling than the average consumption of gambling products. For example, the

introduction of slot machines or casinos in a country that previously lacked them would no doubt have a greater impact on the prevalence of problem gambling than would a doubling of the average net expenditure on lotteries. As the critique of the Ledermann model of alcohol use and misuse maintains, the extent of total consumption provides only a very rough indication of harmful use.

Is it possible to use prevalence data?

Let us now consider the other possible econometric approach, in which direct indicators of harm are compared to the volume of advertising. Severe addiction to gambling may cause evident harm in many ways, such as financial troubles, emotional stress, depression, ruined social life, job loss, and incarceration. The severity of such harms is measured, together with behavioural and cognitive indications of problem gambling, by almost all gambling screens. Among these, the SOGS and DSM-IV-based questionnaires are the most commonly used today. Would it be possible to measure, using such instruments, problem gambling at certain points in time, and then to compare the results with a series of measurements of gambling advertising volume, thereby getting an idea of the impact of advertising on problem gambling? This would be difficult, even if the investigation were limited to certain types of gambling.

A basic problem is that, although these screens are widely used, their accuracy in assessing the extent of problem gambling among the general population is not very high. For example, the Swedish prevalence survey of 1999 is considered to be exemplary in its design and execution and used a sample of 9917 individuals (Rönnberg et al., 1999; Volberg, Abbott, Rönnberg, & Munck, 2001). The prevalence of probable pathological gambling according to the SOGS-R (in the past year) in this population was estimated to be 0.6% (±0.2%), and an additional 1.4% (±0.3%) of individuals scored as problem gamblers. Given these margins of error, probable pathological gambling may be between 0.4% and 0.8% and problem gambling between 1.1% and 1.7%. Since the impact of advertising on problem gambling appears to be relatively small, it would likely be lost in the fairly large margin of error of prevalence estimates and obscured by variations in the prevalence caused by a host of other factors. These include, as already mentioned, the introduction of new forms of gambling, significant changes in existing games, public debate on the risks of gambling, increased availability of gambling through an increased number of sales outlets, availability of gambling via the Internet and cell phones, and other changes in the gambling market and in society.

Using data on percentage of disposable income lost

Composite measures of problem gambling–inflicted harm, i.e., problem gambling screens, are thus not likely to be useful for studies attempting to measure the impact of gambling advertising on problem gambling. It would be more promising to focus

on a specific harm inflicted by excessive gambling that can be quantified and measured comparatively easily. One such tangible harm is economical: losing a significant proportion of available income when gambling on a specific type of game. Such a method would, on one hand, measure the extent of advertising for a specific type of gambling and, on the other, assess the PDI lost by gamblers on that form of gambling. If there is covariation between these two variables, this would indicate the impact of advertising on problem gambling. To regard the prevalence of problem gambling as a function of PDI lost is an approach first proposed by Michael Walker and Mark Dickerson: 'If it is assumed that gambling-related problems are closely associated with gambling losses in monetary terms, then it makes sense to investigate gambling losses directly, and to express the prevalence of gambling-related problems as a function of personal expenditure on gambling' (1996, p. 245). The rationale of this view is that a relatively reliable indicator of problem gambling is that a person is gambling beyond his or her means.

A well-off person with an interest in gambling may thus spend substantial net amounts of money on gambling without suffering any harm. However, when gambling expenditures increasingly consist of money that ought to have been used for other things, then problem gambling can be assumed. This is especially true when the gambling expenditures are greater than disposable income minus necessary expenditures for food, rent, etc. In that case, a person's gambling can lead to financial ruin.

Gambling for more money than a person can afford to lose is one of the criteria by which problem gambling is usually defined and measured. Ten of twenty items in the SOGS questionnaire address the detrimental effects of gambling on personal finances. Another two questions also relate to money, asking whether the respondent has argued with people he or she lives with about money used for gambling, and whether he or she has lied about winning money when losing. Two of ten DSM-IV criteria for pathological gambling expressly concern financial troubles; in questionnaire form they appear as, 'Have you committed a crime in order to finance gambling or to pay gambling debts?' and 'Have you asked others to provide money to help with a desperate financial situation caused by gambling?' There are also questions concerning thoughts about ways to get money to gamble, on the need to gamble with increasing amounts of money to get excitement, and on going back to gamble the next day to win back money lost. A person who loses a significant PDI is likely to score as a problem or pathological gambler on these screens.

SOGS has been criticized for including too many questions about money. On one hand, the critics claim that those who are regularly short of money and often have to borrow it may falsely be classified as problem gamblers (Stinchfield, 2002). On the other hand, it is claimed that problem gambling is essentially an impulse control disorder, and that the economic effects are secondary: a person may have gambling problems without having to suffer economically. It has been argued, however, that it is precisely those questions concerning the detrimental economic impact of gambling that are a strong suit of SOGS. There is little doubt that one who borrows money from

here and there, sells personal property to finance gambling, and so on, has a gambling problem. This view is supported by at least one study (Strong, Breen, Lesieur, & Lejuez, 2003), in which it was found that five of the SOGS questions concerning economic troubles, together with the question as to whether or not the respondent has ever gambled more than he or she intended to, discriminate well between different levels of problem gambling severity.

Problem gambling is thus very likely to have negative economic consequences. In terms of absolute amounts of money lost at gambling, these consequences may vary greatly, depending on a person's disposable income: what for one gambler is a huge weekly loss may be insignificant for a wealthier one. The PDI lost at gambling is a relative measure of negative economic consequences: whether poor or rich, the gambler who loses 100% of his or her disposable income on gambling has no money left for housing, food, or anything else. A person with a low income spending 50% of disposable income on gambling may, however, suffer more harm than a person with a high income spending 50%. This could be adjusted by including a logarithmic function.

Thus, a substantial increase in the average PDI lost by gamblers at a particular type of game would most likely indicate an increase in problem gambling. In theory, a model could be developed to describe how PDI lost at gambling is related to the severity of gambling problems and how these problems translate into other indicators of problem gambling, such as SOGS scores. If adequate data could be collected, then such a model might be created and calibrated. If the model's output figures were compared over time to advertising volume, the short-term impact of advertising on problem gambling could be assessed. As a complement to survey-based screens, such an econometric model for measuring problem gambling could be useful for other purposes as well.

Conclusion

Alarming claims that gambling advertising substantially increases problem gambling and reassuring statements from gambling companies that advertising merely affects market share and has no impact on the prevalence of problem gambling both appear to be erroneous. On the basis of available facts, it can be inferred that advertising indeed increases the prevalence of problem gambling, but its effect is less than those of other relevant factors. Hard figures and reliable estimates of the impact of advertising on problem gambling are, however, lacking. This is not too surprising, since it is very difficult to measure the impact. Using the approaches available today, it is doubtful whether reliable measurements can be made. There is a theoretical possibility of using econometric methods to measure the prevalence of excessive gambling. If such methods can be implemented, it may be possible to get an approximate idea of the impact of advertising on problem gambling with regard to specific game types.

It appears untenable for gambling companies—with the exception of operators offering only traditional lotteries or that have chosen a low-key marketing

strategy—to claim that their advertising does not to some extent contribute to problem gambling. Responsible companies should avoid advertising that features aspects of gambling associated with loss of control and excessive play. Increasing marketing efficiency by targeting those who already consume a great deal—a common strategy in the consumer sector—is questionable in the case of gambling advertising (cf. Wolburg, Hovland, & Hopson, 1999). People who gamble a great deal should not be urged to gamble even more, thereby facing the risk of aggravating problem gambling. The efficacy of widespread advertising in promoting sales should be weighed against the unfavourable impression it creates among large segments of the public, i.e., that it increases problem gambling and is insensitive towards those who are trying to free themselves from an addiction to gambling. Responsible provision of gambling means that companies should be responsive to the opinions of stakeholder groups and the public (Hing, 2003).

Like other advertising, gambling advertising is biased: it exaggerates the positive side of gambling while telling nothing about the possible drawbacks. There is a focus on winning, fun, and excitement, and silence about losing money and the risk of losing control of one's gambling. Gambling providers should counterbalance the biased picture of gambling conveyed in their advertising by explicitly informing consumers of the actual chances of winning, the true cost of gambling, and the risk of becoming addicted to gambling (Binde, 2005a; Dickerson, 1991, pp. 333-334; Eggert, 2004).

References

Abbott, M.W., Williams, M.M., & Volberg, R.A. (1999). *Seven years on: A follow-up study of frequent and problem gamblers living in the community. Report number two of the New Zealand gambling survey*. Wellington, New Zealand: The Department of Internal Affairs.

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Association.

Amey, B. (2001). *People's participation in and attitudes to gaming, 1985–2000: Final results of the 2000 survey.* Wellington, New Zealand: Department of Internal Affairs.

Banning, S.A. (2001). Do you see what I see? Third-person effects on public communication through self-esteem, social stigma, and product use. *Mass Communication and Society, 4,* 127–147.

Bass, F.M. (1969). A simultaneous equation regression study of advertising and sales of cigarettes. *Journal of Marketing Research, 6,* 291–300.

Binde, P. (2005a). *Att sälja en dröm: Om spelreklam och dess påverkan* [Selling dreams: On the effects of gambling advertising]. Stockholm: Statens folkhälsoinstitut.

Binde, P. (2005b). Gambling, exchange systems, and moralities. *Journal of Gambling Studies, 21,* 445–479.

Binde, P. (2007) (In press). *Spelreklam och spelberoende: En intervjustudie* [Gambling advertising and problem gambling: An interview study]. Östersund: Statens folkhälsoinstitut.

Blaszczynski, A., & Nower, L. (2002). A pathway model of problem and pathological gambling. *Addiction, 97,* 487–499.

Boughton, R., & Brewster, J.M. (2002). Voices of women who gamble in Ontario: A survey of women's gambling, barriers to treatment and treatment service needs. Retrieved November 22, 2006, from http://www.gamblingresearch.org/download.sz/voicesofwomen Boughton (1).pdf?docid=1524

Brenner, R., & Brenner, G.A. (1990). *Gambling and speculation: A theory, a history, and a future of some human decisions*. Cambridge: Cambridge University Press.

Brown, R.I.F. (1987). Gambling addictions, arousal, and an affective/decision-making explanation of behavioral reversions or relapses. *International Journal of the Addictions, 22,* 1053–1067.

Burnham, J.C. (1993). *Bad habits: Drinking, smoking, taking drugs, gambling, sexual misbehavior, and swearing in American history*. New York: New York University Press.

Carlson, M.J., & Moore, T.L. (1998). *Adolescent gambling in Oregon: A report to the Oregon gambling addiction treatment foundation*. Salem, OR: Oregon Gambling Addiction Treatment Foundation.

Clotfelter, C.T., & Cook, P.J. (1989). *Selling hope: State lotteries in America*. Cambridge, MA: Harvard University Press.

Davison, W.P. (1983). The third-person effect in communication. *Public Opinion Quarterly, 47,* 1–15.

Delfabbro, P. (2004). The stubborn logic of regular gamblers: Obstacles and dilemmas in cognitive gambling research. *Journal of Gambling Studies, 20,* 1–21.

Delfabbro, P., Lahn, J., & Grabosky, P. (2005). Further evidence concerning the prevalence of adolescent gambling and problem gambling in Australia: A study of the ACT. *International Gambling Studies, 5*, 209–228.

Dickerson, M. (1991). Internal and external determinants of persistent gambling: Implications for treatment. In N. Heather, W.R. Miller, & J. Greeley (Eds.), *Self-control and the addictive behaviours* (pp. 317–338). Botany, NSW, Australia: Maxwell Macmillan.

Dickerson, M., Hinchy, J., & Fabre, J. (1987). Chasing, arousal and sensation seeking in off-course gamblers. *British Journal of Addiction, 82,* 673–680.

Dixon, D. (1991). *From prohibition to regulation: Bookmaking, anti-gambling, and the law*. London: Clarendon.

Dombrink, J. (1996). Gambling and the legislation of vice: Social movements, public health and public policy in the United States. In J. McMillen (Ed.), *Gambling cultures: Studies in history and interpretation* (pp. 43–64). London: Routledge.

Duffy, J.C. (1986). The distribution of alcohol consumption: 30 years on. *British Journal of Addiction, 81,* 735–741.

Duffy, M. (1996). Econometric studies of advertising, advertising restrictions and cigarette demand: A survey. *International Journal of Advertising, 15,* 1–23.

Eggert, K. (2004). Truth in gaming: Toward consumer protection in the gaming industry. *Maryland Law Review, 63,* 217–286.

Felsher, J.R., Derevensky, J.L., & Gupta, R. (2004). Lottery playing amongst youth: Implications for prevention and social policy. *Journal of Gambling Studies, 20,* 127–153.

Gilovich, T. (1983). Biased evaluation and persistence in gambling. *Journal of Personality and Social Psychology, 44,* 1110–1126.

Grant, J.E., & Kim, S.W. (2001). Demographic and clinical features of 131 adult pathological gamblers. *Journal of Clinical Psychiatry, 62,* 957–962.

Griffiths, M. (2005). Does gambling advertising contribute to problem gambling? *International Journal of Mental Health and Addiction, 3* (2), 15–25.

Griffiths, M., & Delfabbro, P. (2001). The biopsychosocial approach to gambling: Contextual factors in research and clinical interventions. *Electronic Journal of Gambling Issues: eGambling, 5*. Retrieved November 22, 2006 from http://www.camh.net/egambling/issue5/feature/index.html

Harris, G. (1987). The implications of low-involvement theory for advertising effectiveness. *International Journal of Advertising, 6,* 207–221.

Heiens, R.A. (1999). The influence of product publicity on product sales in a noncompetitive environment. *Academy of Marketing Studies Journal, 3* (1), 1–10.

Hing, N. (2003). Principles, processes and practices in responsible provision of gambling: A conceptual discussion. *UNLV Gaming Research and Review Journal, 7* (1), 33–47.

Hodgins, D.C., & el-Guebaly, N. (2000). Natural and treatment-assisted recovery from gambling problems: A comparison of resolved and active gamblers. *Addiction, 95,* 777–789.

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,* 72–80.

Hodgins, D.C., & Peden, N. (2005). Natural course of gambling disorders: Forty-month follow-up. *Journal of Gambling Issues, 14*. Retrieved November 22, 2006 from http://www.camh.net/egambling/issue14/jgi_14_hodgins.html

Jonsson, J., Andrén, A., Nilsson, T., Svensson, O., Munck, I., Kindstedt, A., et al. (2003). *Spelberoende i Sverige—vad kännetecknar personer med spelproblem? Rapport om andra fasen av den svenska nationella studien av spel och spelberoende*. [Gambling addiction in Sweden—what are the characteristics of persons with gambling problems? Report on phase two of the Swedish national study of gambling and problem gambling.] Statens folkhälsoinstitut, Rapport nr. 2003:22.

Kim, P. (1992). Does advertising work: A review of the evidence. *Journal of Consumer Marketing, 9* (4), 5–21.

Krugman, H.E. (1965). The impact of television advertising: Learning without involvement. *Public Opinion Quarterly, 29,* 349–356.

Krugman, H.E. (1968). Processes underlying exposure to advertising. *American Psychologist, 23,* 245–253.

Krugman, H.E. (1977). Memory without recall, exposure without perception. *Journal of Advertising Research, 17* (4), 7–12.

Krugman, H.E. (1988). Limits of attention to advertising. *Journal of Advertising Research, 28* (5), 47–50.

Ledermann, S. (1956). *Alcool, alcoolisme, alcoolisation, tome 1* [Alcohol, alcoholism, alcoholisation, part 1]. Paris: Presses Universitaires de France.

Lesieur, H.R., & Blume, S.B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144,* 1184–1188.

May, R.K., Whelan, J.P., Meyers, A.W., & Steenbergh, T.A. (2005). Gambling-related irrational beliefs in the maintenance and modification of gambling behaviour. *International Gambling Studies, 5,* 155–167.

McGowan, V., Droessler, J., Nixon, G., & Grimshaw, M. (2000). *Recent research in the socio-cultural domain of gaming and gambling: An annotated bibliography and critical overview.* Edmonton: Alberta Gaming Research Institute. Retrieved November 22, 2006 from https://dspace.ucalgary.ca/bitstream/1880/355/2/sociocultural_mcgowan.pdf

Messaris, P. (1992). Visual 'manipulation': Visual means of affecting responses to images. *Communication, 13* (3), 181–195.

Mizerski, D., Miller, R., Mizerski, K., & Lam, D. (2004). The stochastic nature of purchasing a state's lottery products. *Australasian Marketing Journal, 12* (3), 56–69.

Mizerski, D., & Mizerski, K. (2001). The effect and implications for a stochastic pattern of lotto game play. *International Gambling Studies, 1,* 132–149.

Mumpower, J.L. (1988). Lottery games and risky technologies: Communications about low-probability/high-consequence events. *Risk Analysis, 8,* 231–235.

Nelson, J.P. (2001). Alcohol advertising and advertising bans: A survey of research methods, results, and policy implications. In M.R. Baye & J.P. Nelson (Eds.), *Advances in applied microeconomics, Vol. 10: Advertising and differentiated products* (pp. 239–295). Amsterdam: Elsevier Science.

Palda, K.S. (1966). The hypothesis of a hierarchy of effects: A partial evaluation. *Journal of Marketing Research, 3,* 13–24.

Panasitti, M., & Schull, N. (1994). Re-articulating the moral economy of gambling. *Kroeber Anthropological Society Papers, 77,* 65–102.

Pollay, R.W. (1986). The distorted mirror: Reflections on the unintended consequences of advertising. *Journal of Marketing, 50* (2), 18–36.

Potenza, M.N., Fiellin, D.A., Heninger, G.R., Rounsaville, B.J., & Mazure, C.M. (2002). Gambling: An addictive behavior with health and primary care implications. *Journal of General Internal Medicine, 17,* 721–732.

Productivity Commission. (1999). *Australia's gambling industries*. Report No. 10. Canberra: Productivity Commission, AusInfo.

Raylu, N., & Oei, T.P.S. (2002). Pathological gambling: A comprehensive review. *Clinical Psychology Review, 22,* 1009–1061.

Reith, G. (1999). *The age of chance: Gambling in Western culture*. London: Routledge.

Rönnberg, S., Volberg, R.A., Abbott, M.W., Moore, W.L., Andrén, A., Munck, I., et al. (1999). *Gambling and problem gambling in Sweden.* Stockholm: Statens folkhälsoinstitut.

Rosecrance, J.D. (1986). Attributions and the origins of problem gambling. *Sociological Quarterly, 27,* 463–477.

Shah, D.V., Faber, R.J., & Youn, S. (1999). Susceptibility and severity: Perceptual dimensions underlying the third-person effect. *Communication Research, 26,* 240–267.

Smart, R.G. (1988). Does alcohol advertising affect overall consumption? A review of empirical studies. *Journal of Studies on Alcohol, 49,* 314–323.

Stinchfield, R. (2002). Reliability, validity, and classification accuracy of the South Oaks Gambling Screen (SOGS). *Addictive Behaviors, 27,* 1–19.

Stranahan, H., & O'Malley Borg, M. (1998). Horizontal equity implications of the lottery tax. *National Tax Journal, 51,* 71–82.

Strong, D.R., Breen, R.B., Lesieur, H.R., & Lejuez, C.W. (2003). Using the Rasch model to evaluate the South Oaks Gambling Screen for use with nonpathological gamblers. *Addictive Behaviors, 28,* 1465–1472.

Svenska Spel. (2005). *Spelkartläggning* [Annual Player Survey]. Unpublished internal document.

Treise, D.M., Taylor, R.E., & Wells, L.G. (1994). How recovering alcoholics interpret alcoholic-beverage advertising. *Health Marketing Quarterly, 12* (2), 125–139.

Tremblay, V.J., & Okuyama, K. (2001). Advertising restrictions, competition, and alcohol consumption. *Contemporary Economic Policy, 19,* 313–321.

Turner, N.E., Zangeneh, M., & Littman-Sharp, N. (2006). The experience of gambling and its role in problem gambling. *International Gambling Studies, 6*, 237–266.

Volberg, R.A., Abbott, M.W., Rönnberg, S., & Munck, I.M.E. (2001). Prevalence and risk of pathological gambling in Sweden. *Acta Psychiatrica Scandinavica, 104,* 250–256.

Walker, M.B. (1992). *The psychology of gambling*. Oxford: Pergamon.

Walker, M.B., & Dickerson, M.G. (1996). The prevalence of problem and pathological gambling: A critical analysis. *Journal of Gambling Studies, 12,* 233–249.

Walsh, D., & Gentile, D.A. (in press). Slipping under the radar: Advertising and the mind. In L. Riley & I. Obot (Eds.), *Drinking it in: Alcohol marketing and young people*. Geneva: World Health Organization. Retrieved November 22, 2006 from www.psychology.iastate.edu/FACULTY/dgentile/Walsh_Gentile_WHO.pdf

Wolburg, J.M., Hovland, R., & Hopson, R.E. (1999). Cognitive restructuring as a relapse prevention strategy: Teaching alcoholics to talk back to beer ads. *Alcoholism Treatment Quarterly, 17* (4), 29–51.

Wood, R.T.A., Griffiths, M.D., Derevensky, J.L., & Gupta, R. (2002). Adolescent accounts of the UK National Lottery and scratchcards: An analysis using Q-sorts. *Journal of Gambling Studies, 18,* 161–183.

Yuon, S., Faber, R.J., & Shah, D.V. (2000). Restricting gambling: Advertising and the third-person effect. *Psychology and Marketing, 17,* 633–649.

Zhang, P. (2004). *Over- or under-advertising by state lotteries*. Unpublished doctoral dissertation, University of Maryland.

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. Cambridge: Cambridge University Press.

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Mapping the prevalence of problem gambling and its association with treatment accessibility and proximity to gambling venues

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Abstract

This study examined geographic variation in the prevalence of problem gambling in Ontario and the association with various demographic factors and proximity to treatment for problem gambling and gambling venues. Drawing upon multiple sources, secondary data analysis was undertaken based on multivariate statistical methods and techniques of geographic information systems (GIS).

Regional variation in prevalence of problem gambling was found in the province. Prevalence of problem gambling was associated with many demographic characteristics, as well as mental disorders, co-occurring substance abuse problems, and physical health status. Geographic access to treatment was not associated with the risk of being a problem gambler. However, proximity to gambling venues was marginally important in predicting risk of problem gambling. Results are interpreted in the context of needs-based planning of treatment and prevention programs for problem gambling.

Keywords: gambling availability, geographic information systems, problem gambling prevalence

Introduction

Spatial variation in the prevalence and incidence of disease can quantify risks presented by hazards, inform decisions about the allocation of treatment resources, and help identify previously unknown risk factors. Interest in this area has been increasing recently, and methods of spatial analysis are now widely used in epidemiological research. Geographic information systems (GIS), used principally as visualization tools, are also increasingly popular in public health research. Both spatial analysis and GIS have been effectively applied in many areas of health care, including psychiatry (e.g., Chaix, Merlo, Subramanian, Lynch, & Chauvin, 2001) and substance abuse (Latkin,

Glass, & Duncan, 1998; Midford et al., 1998). Despite its emergence as a significant public health concern (Korn, 2001), problem gambling has seen fewer applications of these methods. Geographic variation in prevalence has, however, been reported in the United States (Volberg, 1994), in Quebec (Kairouz, Nadeau, & Lo Siou, 2005), and between Canadian provinces (Cox, Yu, Afifi, & Ladouceur, 2005). The links between gambling availability and local area characteristics, such as socioeconomic status, have also been explored (Gilliland & Ross, 2005).

Spatial variation of problem gambling in Ontario is of some special interest because the establishment of major gambling venues in the province constitutes something of a natural experiment. Spatial associations between availability and public health have been studied in the context of alcohol (e.g., Zhu, Gorman, & Horel, 2004) and fast food (e.g., Reidpath, Burns, Garrard, Mahoney, & Townsend, 2002), but these studies are limited by the difficulty of establishing precedence. It is not clear, for example, whether a high density of bars and liquor stores precedes a high prevalence of alcohol abuse; it is at least equally likely that their presence is simply a response to high local demand. Casinos, however, did not exist in the province before 1994, and their sites were not chosen principally to meet anticipated local demand. Similarly, funding of treatment services for problem gamblers has not followed a formal, needs-based funding formula (Rush, Shaw Moxam & Urbanoski, 2002).

A substantial body of Canadian research now exists on the occurrence, course, and treatment of problem gambling. A published review of studies conducted in eight provinces reported that between 2.7% and 5.4% of Canadian adults were problem or pathological gamblers in 1996 (National Council of Welfare [NCW], 1996). Several surveys of Ontario residents have also been conducted. In 1993, 7.7% of Ontario respondents scored between 1 and 4 on the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987), indicating the presence of gambling problems, and an additional 0.9% scored 5 or higher, indicating probable pathological gambling (Ferris, Wynne, & Single, 1998). In 2000, 2.6% of a representative sample of Ontario adults scored 2 or greater on the SOGS (Adlaf & Ialomiteaunu, 2000). These results have important limitations, however. The use of the SOGS in community-based studies has met with some criticism, owing in part to the lack of validation work with the general population (NCW, 1996; Ladouceur, 1996). Since 1994, the availability of gambling venues in Ontario has also changed rapidly, and the possible effects of these changes on the prevalence and distribution of problem gambling make it important to use the most recent available data. More recently, a 2001 Ontario population survey using the Canadian Problem Gambling Index (CPGI) reported a prevalence of 3.1% for moderate and 0.7% for severe gambling problems (Wiebe, Single, and Falkowski-Ham, 2001). A follow-up survey conducted in 2005 found prevalences of 2.6% and 0.8%, respectively (Wiebe, Mun, & Kauffman, 2006).

In 2002, Statistics Canada conducted cycle 1.2 of the Canadian Community Health Survey (CCHS 1.2), a large (n = 36,984) representative community survey of Canadians

aged 15 and older focused on mental health and well-being. CCHS 1.2 included a detailed inventory of gambling behaviour and an assessment for problem gambling (Statistics Canada, 2003a; 2003b). These data have made it possible to examine problem gambling at the population level—its prevalence, risk factors, and distribution across demographic and socioeconomic groups, as well as geographic variation. In this study, we examined geographic differences across Ontario in rates of problem gambling, measured the extent to which these differences are explained by known risk factors (e.g., age, gender, comorbidity with mental and substance use disorders), and tested the independent effects of two potential environmental risk factors: exposure to gambling opportunities and accessibility of treatment. Although our study design will not permit a causal interpretation, increased exposure to gambling opportunities would be expected to be associated with higher prevalence rates. Research on alcohol use and abuse, for example, has been able to show at the population level that as the number of people in treatment increases there is a net decline in indicators of alcohol-related harms such as liver cirrhosis and suicide (Mann et al., 2005; Mann et al., in press). Thus, we also predicted increased proximity to treatment venues to be associated with lower prevalence rates, as a result of positive treatment impact.

Methods

Four sources of Ontario data were used in the project: (a) population survey data from CCHS 1.2; (b) problem gambling treatment centre locations and capacities, as measured by a survey of treatment programs undertaken as part of the present study; (c) locations and capacities of casinos and racetrack facilities with slot machines; and (d) spatial datasets.

a) Population survey data on the prevalence of problem gambling

CCHS 1.2 was a nationally representative community mental health survey conducted by Statistics Canada between May and December of 2002. The survey questionnaire included the CPGI, a measure of problem gambling appropriate for use with the general population (Ferris & Wynne, 2001). The survey was targeted at the Canadian population aged 15 years or older living in private dwellings, excluding full-time members of the Armed Forces as well as individuals living in health care institutions, on First Nations (aboriginal) reserves or government-owned land, in one of the three northern territories, or in other remote regions. This sampling frame included 98% of the Canadian population. The overall response rate for the survey was 77%, and the final sample size was 36,984. The Ontario subsample used here numbers 13,184. Further details on the design and methodology of the survey have been reported by Gravel and Beland (2005).

An important characteristic of the assessment of problem gambling in CCHS 1.2 is that respondents were screened out of the problem gambling section if they did not gamble

with a certain frequency. Modules for mood and anxiety disorders also used short screens to avoid unnecessary interviews, but in these cases the screening items corresponded to core symptoms of the disorder in question. In the gambling module, however, individuals were screened out if they had not gambled more than five times in the previous year, or if they volunteered that they were "not a gambler" in response to the first question of the CPGI. Current clinical definitions of problem gambling, like those of substance use disorders, do not include a minimum frequency requirement, and individuals who identify themselves as current nongamblers may still have experienced problems in the previous year or with activities that may not be popularly considered "gambling" (e.g., high-risk investments). Although it is reasonable to expect that the majority of the excluded respondents would not have met criteria for problem gambling, the impact of this filtering process is unknown.

Our analysis defines problem gambling as a CPGI score of 3 or more. According to the instrument's scoring guidelines, this includes moderate-risk gamblers (CPGI score between 3 and 7) and problem gamblers (CPGI score between 8 and 27). Mood and anxiety disorders were identified using the World Mental Health version of the Composite International Diagnostic Instrument (WMH-CIDI), a widely used instrument in community surveys (Kessler & Üstün, 2004). Substance use problems are identified here by the presence of one or more abuse or dependence criteria according to *Diagnostic and statistical manual of mental disorders* (4th ed.) (American Psychiatric Association, 1994) within the previous 12 months.

CCHS 1.2 was designed to be representative at the provincial level. Ontario's contract for extra representation in the survey included adequate sampling procedures and sample size to be representative at the level of public health regions. Representativeness is not guaranteed at smaller scales, however, and so caution must be used in the interpretation of other geographic differences.

b) Problem gambling treatment capacity

A survey was conducted of managers of Ontario's outpatient problem gambling treatment programs to determine treatment capacity. A list of problem gambling programs was obtained from the Drug and Alcohol Registry of Treatment for this purpose and was cross-validated with a list of programs reporting to the Drug and Alcohol Information System (DATIS). Data were collected by telephone interview or e-mail correspondence. Of 48 programs targeted for the survey, we obtained data from 45 programs, for a response rate at the program level of 94%. This reflects data capture for the main site of the program, since our survey showed some missing data for a small number of low-caseload satellite offices. For analytical purposes, we measured *treatment capacity* of treatment centres as the estimated number of clients who could be treated in a given month and *treatment accessibility* as the estimated waiting time to assessment.

c) Location of casinos and racetracks with slots

The analysis included 28 gambling venues representing all commercial casinos (6), charity casinos (7), and racetracks with slot machines (15) located within the province or nearby in neighbouring provinces. Locations, opening dates, capacities, and other details were obtained from the Ontario Lottery and Gaming Corporation, occasionally supplemented from other sources where necessary.

d) Spatial datasets

Spatial data were obtained principally from the University of Toronto data library, which maintains a repository of GIS datasets. A postal code conversion file, which contains latitude and longitude coordinates for the centre point of all Canadian postal codes, was used to assign geographic locations to survey respondents. Files containing basic "background" geographic data, such as provincial and health region boundaries, were also obtained and used in the mapping process.

Measuring exposure and accessibility

In order to test possible effects of "exposure" to gambling venues and accessibility of gambling treatment, it was necessary to quantify both of these as proximity measures.

In the case of gambling, we concentrated on major gambling venues: commercial casinos, charity casinos, and slots facilities at racetracks. These represent all legal and permanent facilities in the province offering slot machines and card gambling. These are the gambling habits cited as a primary problem by the majority of problem gamblers in treatment (Urbanoski & Rush, 2006) and by callers to the Ontario Problem Gambling Helpline. Locations of gambling venues and treatment centres are mapped in Figure 1. Other common gambling activities, such as lottery tickets and bingo, were not considered because these are almost universally available, are more rarely cited as problem activities by gamblers, are more strongly responsive to local demand (making their inclusion as independent "risk factors" dubious), and are extremely difficult to collect adequate data on. Gambling venues in Hull, Quebec, and Winnipeg, Manitoba, were included, but those in the United States were not. This decision was based on evidence from the DATIS client database, which indicated that gambling in other provinces was relatively common among problem gamblers in treatment in eastern and northwestern Ontario, while gambling in other countries was comparatively rare.

In order to quantify exposure to gambling, several variables were entered into logistic regression models and combined into an index. These measures were

- the natural logarithm of the linear distance from each respondent to the nearest commercial casino, to the nearest charity casino, and to the nearest slots facility, where each was 200 km or less;
- dummy variables indicating distances greater than 200 km for each venue type;
- the number of days the nearest venue of each type had been open (important because most large gambling venues in Ontario were relatively new at the time of the CCHS 1.2 survey).

Initially, both the linear distance and its transformation were included in the first measure, but the latter proved as good a predictor as both together.

Only gambling venues open for 90 days or longer as of the respondent's survey date were included. This was an important consideration in the case of the Thousand Islands Charity Casino, which opened during the survey period, and the Georgian Downs racetrack, which opened a slots facility late in 2001.

Our use of a combined proximity index was adopted as a compromise between flexibility and the need to keep the number of statistical tests reasonable. A more complete method would allow the exposure relationship itself to vary geographically (since distance, for example, can be expected to be less of a deterrent in more remote areas), but the limited sample size means that the number of tests involved would quickly become problematic.

Treatment accessibility was similarly measured by

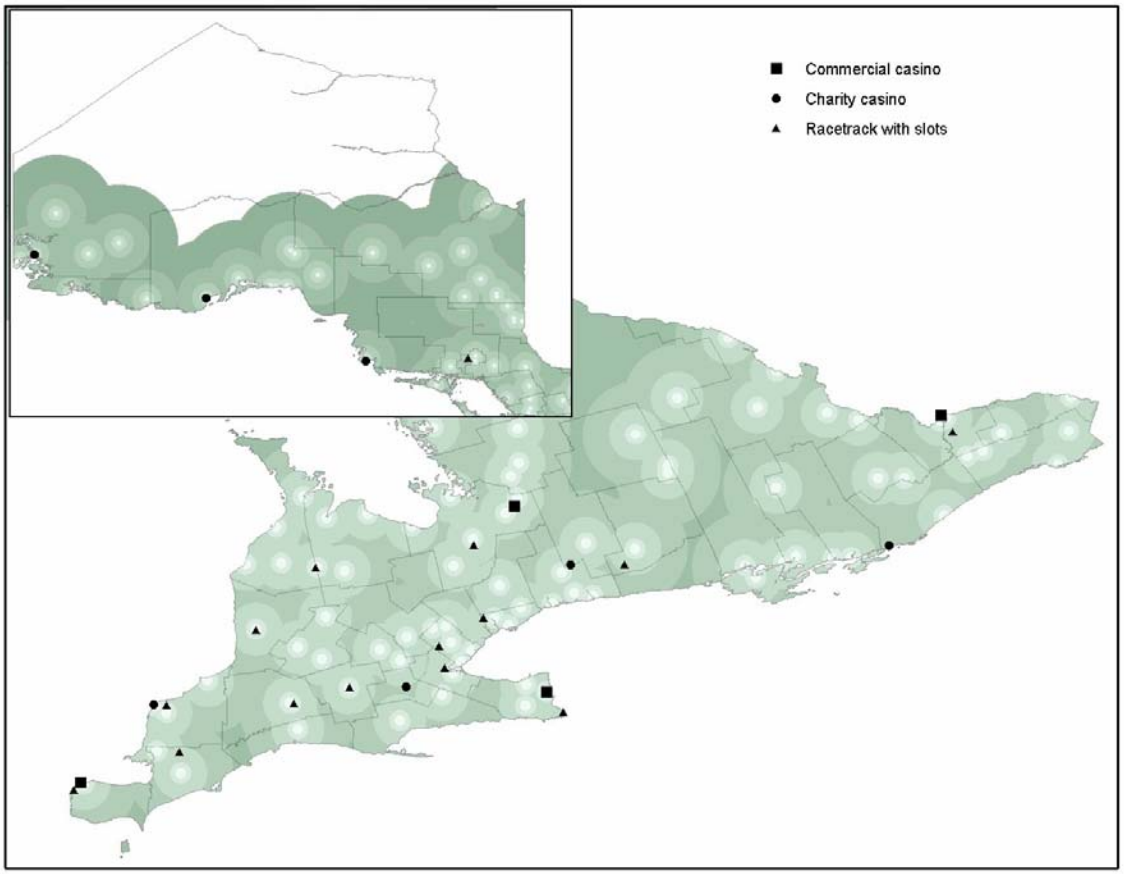
- the distance to the nearest treatment centre,
- the capacity of that centre,
- the estimated waiting time for assessment of problem gambling at that centre.

Treatment accessibility measures were calculated for each respondent by identifying the nearest available treatment centre without demographic or other restrictions that would have excluded him or her. This meant, for example, that centres offering treatment for women only were not considered for male respondents.

Six-digit postal codes were used to assign latitude/longitude locations to respondents, making it possible to treat individuals as "point" data. An external geocoding service was used to obtain more precise locations for treatment facilities and gambling venues, for which addresses were known. Linear distance was used because respondent locations were not known exactly and available road and rail network data were inadequate;
attempts to estimate travel barriers in more detail would, therefore, not have produced acceptable results. Other geographic identifiers supplied with the CCHS 1.2 data made it possible to group respondents by census metropolitan area (CMA) and health region.
CCHS 1.2 used a complex survey design. In order to obtain accurate standard errors and significance tests, all models and bivariate tests were bootstrapped using a set of replicate

weights supplied by Statistics Canada. The WesVar 4.2 software package was used for this purpose.

Figure 1. Location of major gambling venues and treatment centre accessibility[1] in 2002[2].



[1]Buffers are shown around gambling treatment centres.
[2] Inset map shows the northern part of the province

Cluster scans were performed with SaTScan 3.0, using survey weights rescaled to a mean of one and divided by the overall survey design effect, which was 2.3. Mapping and interpolation was done with ArcGIS 8.3 and 9.0.

Analysis

Describing the geography of problem gambling in Ontario

We used three approaches to characterize spatial patterns of problem gambling in the province. First, we calculated estimates and confidence intervals for those existing regions that were both large enough to support stable estimates and of some independent interest: CMAs and provincial health regions.

In addition to conventional tests of regional variation, we also performed a spatial cluster scan for areas of high and low prevalence. The software used, SaTScan 3.0.5 (Kulldorf & Information Management Services, Inc., 2002), considers the counts of cases and noncases in all possible clusters (circles of varying sizes including one or more data points) within a region and reports the most likely along with an estimate of relative risk and statistical significance. Details on this process are available in Kulldorff (1997). Full cluster scan results cannot be displayed because of disclosure issues raised by Statistics Canada, but they functioned as a valuable check on the general regional patterns observed.

Testing gambling availability and treatment accessibility as predictors of problem gambling

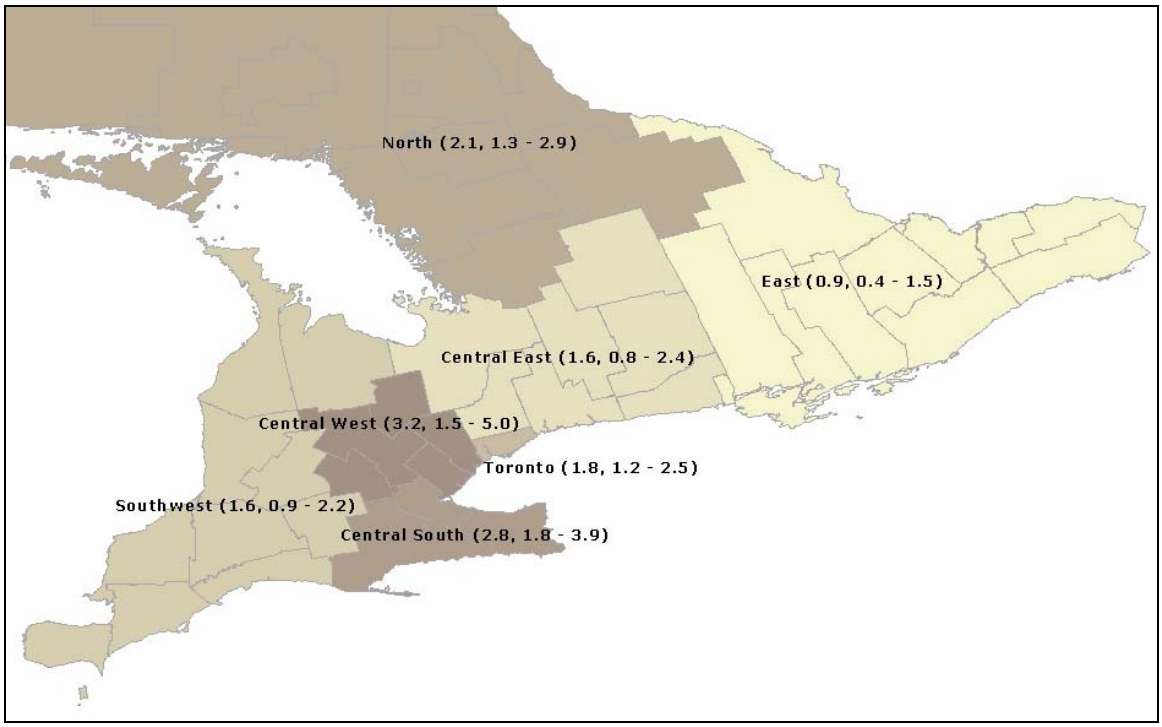
Variables previously shown to be associated with problem gambling and other important control variables were tested against problem gambling "caseness" in a series of bivariate tests. Health regions and CMAs were also tested in this way.

Along with proximity measures, these variables were then entered into a series of logistic regressions predicting caseness for problem gambling. Significance for proximity variables was assessed as the difference in overall model fit, with and without the exposure and "accessibility" variables, respectively. The inclusion of multiple indicators of a single source of risk has the effect of reducing this significance level; this penalty reflects the risk of overfitting. Another limitation of this approach is that it is difficult to represent the relationship between exposure and risk when the former is defined by several different variables. In this analysis, the possibility of reporting a dose-response relationship has been sacrificed in favour of a broader test to establish the presence or absence of a relationship.

Results

A total of 244 probable problem gamblers were identified in the CCHS 1.2 sample from Ontario. After taking survey design into account, prevalence in the province was 2.0% (95% CI = 1.6% to 2.4%), a rate identical to the national estimate. Prevalence varied significantly by health region (Figure 2), with that in the Ontario East region, at 0.9%, significantly lower than in the rest of the province. Statistically significant clusters of low and high prevalence were identified in the East and in the Central West regions, with a large low-risk area covering most of the eastern region and two smaller high-risk areas in the western part of the Greater Toronto Area (GTA). Low prevalence rates were observed for London and Ottawa (Figure 3; both 0.9%). Rates were higher in several regions and CMAs, but 95% confidence intervals for these areas substantially overlap those obtained for the province as a whole.

Figure 2. Prevalence of problem gambling by public health unit (%, 95% CI)



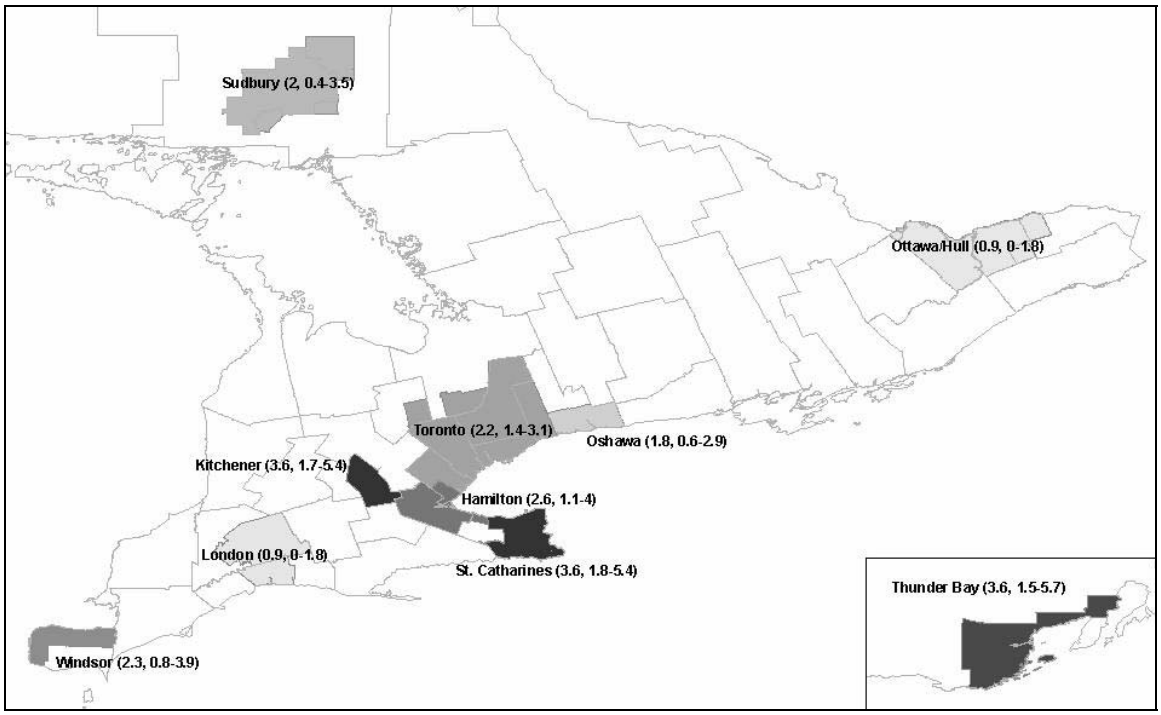
Among demographic and other predictor variables, problem gambling was significantly, and independently, associated with male gender, current employment, low education, being formerly married, having poor self-described health, and having a substance use disorder (abuse or dependence) in the previous 12 months (Table 1). The age variables (age and age squared) indicated a nonlinear relationship, with increasing risk up to age 35 and then declining thereafter. Odds ratios were above one for ages between 25 and 45. Variables indicating the presence of mood and anxiety disorders became nonsignificant in the presence of the substance problem variable, with the odds ratio for anxiety disorders, in particular, moving very close to one.

No effect on risk was observed for treatment accessibility (Table 2). However, the variables chosen to capture exposure to gambling venues had a modest, but significant, positive association with being a problem gambler.

Discussion

At 2%, our estimate of the prevalence of problem gambling in Ontario is somewhat lower than rates reported in earlier and even contemporaneous studies. This may be due to differences in the instruments and cutoffs used, and perhaps also to low response rates in

Figure 3. Prevalence of problem gambling for major CMAs (%, 95% CI).



some surveys. As researchers have acknowledged (e.g., Wiebe et al., 2006), nonresponse bias is a considerable problem in gambling research: Respondents who do not gamble may be disinclined to participate in dedicated surveys, which they may perceive as irrelevant or uninteresting. This may be less important in the case of CCHS 1.2, in which assessment of problem gambling was a small part of a much larger questionnaire. While not without its limitations, CCHS 1.2 was also carefully designed to be representative and combined a large sample size, a well-validated instrument, and a reasonably good response rate. The estimate it provides is, therefore, likely to be the best currently obtainable.

There are substantial regional variations in the prevalence of problem gambling in Ontario that have not been identified previously. The most robust finding is the low prevalence in eastern Ontario. This is supported by all measures and methods of analysis used, with results including a large cluster of low rates covering much of the region and comparatively low prevalences for the Ottawa CMA and the Ontario East health region, the latter remaining significant after adjustment for known risk factors. Somewhat above-average rates were noted in several areas, but these fell short of statistical significance.

Table 1.

Results for base logistic regression model predicting problem gambling and for model with regions added (odds ratios and 95% CIs)

Variable	Base model	Region variables
Constant	0.01	0.01
Female	0.53 (0.35–0.8)**	0.52 (0.35–0.8)**
Male	(ref.)	(ref.)
Age	1.06 (0.99–1.13)	1.05 (0.99–1.12)
Age squared	0.999 (0.999–0.999)	0.999 (0.999–0.999)
Employed	1.81 (1.03–3.16)*	1.77 (1.0–3.14)*
Not employed	(ref.)	(ref.)
Low income adequacy	0.58 (0.3–1.14)	0.61 (0.31–1.18)
Education: < Secondary	2.07 (1.3–3.3)**	2.09 (1.3 1–3.32)**
Education: Completed secondary	1.68 (1.08–2.61)*	1.68 (1.07–2.63)*
Education: Some postsecondary	0.77 (0.36–1.66)	0.81 (0.38–1.75)
Education: Postsecondary degree	(ref.)	(ref.)
Rural	0.88 (0.27–2.89)	0.98 (0.29–3.27)
Urban	(ref.)	(ref.)
Marital status: Single	1.25 (0.74–2.11)	1.23 (0.72–2.08)
Marital status: Married	(ref.)	(ref.)
Marital status: Formerly married	2.34 (1.34–4.08)**	2.3 (1.32–3.99)**
Immigrant status	0.98 (0.61–1.57)	1.16 (0.68–1.97)
12-month substance use disorder	2.59 (1.53–4.36)**	2.51 (1.48–4.26)**
12-month mood disorder	1.44 (0.78–2.66)	1.38 (0.73–2.59)
12-month anxiety disorder	1.03 (0.54–1.94)	1.01 (0.53–1.92)
Health-description index	0.77 (0.61–0.97)*	0.77 (0.61–0.98)*
Central E Ontario		0.69 (0.31–1.54)
Central S Ontario		1.2 (0.62–2.32)
Central W Ontario		1.42 (0.71–2.84)
East Ontario		0.41 (0.18–0.93)*
N Ontario		0.83 (0.4–1.7)
SW Ontario		0.63 (0.3–1.31)
Toronto		(ref.)

**$p < 0.01$; *$p < 0.05$.

Table 2.

Results for model predicting problem gambling with proximity measures added (odds ratios and 95% CIs)

Variable	Treatment accessibility	Proximity of gambling venues	Full model
Constant	0.01	2.13	0.8
Female	0.53 (0.35–0.8)**	0.52 (0.34–0.79)**	0.52 (0.34–0.79)**
Male	ref.	ref.	ref.
Age	1.05 (0.98–1.12)	1.05 (0.98–1.12)	1.05 (0.98–1.12)
Age squared	0.999 (0.999–0.999)	0.999 (0.999–0.999)	0.999 (0.999–0.999)
Employed	1.83 (1.04–3.2)*	1.83 (1.04–3.23)*	1.85 (1.05–3.26)*
Not employed	ref.	ref.	ref.
Low income adequacy	0.58 (0.29–1.13)	0.6 (0.31–1.18)	0.59 (0.3–1.16)
Education: < Secondary			
Education: Completed secondary	2.06 (1.3–3.28)**	2.05 (1.29–3.26)**	2.08 (1.3–3.31)**
Education: Some postsecondary	1.69 (1.08–2.64)*	1.69 (1.08–2.63)*	1.7 (1.08–2.67)*
Education: Postsecondary degree	0.78 (0.36–1.68)	0.79 (0.37–1.7)	0.8 (0.37–1.71)
Rural	1.13 (0.31–4.16)	1.03 (0.28–3.79)	1.19 (0.3–4.68)
Urban	ref.	ref.	ref.
Marital status: Single	1.2 (0.7–2.05)	1.19 (0.69–2.06)	1.18 (0.68–2.04)
Marital status: Married	ref.	ref.	ref.
Marital status: Formerly married	2.32 (1.32–4.06)**	2.32 (1.33–4.05)**	2.31 (1.32–4.04)**
Immigrant status	1 (0.63–1.6)	1.12 (0.69–1.82)	1.11 (0.68–1.81)
12-month substance use disorder	2.56 (1.52–4.32)**	2.53 (1.51–4.24)**	2.54 (1.52–4.26)**
12-month mood disorder	1.34 (0.71–2.51)	1.36 (0.72–2.56)	1.32 (0.7–2.51)
12-month anxiety disorder	0.97 (0.5–1.87)	0.96 (0.49–1.89)	0.95 (0.48–1.88)
Health-description index	0.76 (0.6–0.97)*	0.76 (0.6–0.97)*	0.76 (0.6–0.97)*
Treatment accessibility	ns	—	ns
Gambling venue proximity	—	*	*

**$p < 0.01$; *$p < 0.05$.

The elevated rate for the Central West health region deserves further attention, however. Small clusters of high rates were detected in the western suburbs of the GTA, and individual CMAs partly within the region (Toronto, Hamilton, and Kitchener) all had rates above the provincial average.

While it is not possible to fully explain the observed regional differences in prevalence, problem gambling appears to be modestly but significantly associated with proximity to casinos and racetracks with slot facilities. As we have noted, this relationship is difficult to interpret with confidence; it is possible, for example, that geographic differences in unmeasured variables may have confounded the association. Nevertheless, treatment data, as we have noted, indicate that casino games are the most common primary problem of people in treatment, and it is not difficult to accept that easy access to these forms of gambling might constitute an independent risk factor for problem gambling. Future research might provide more substantial evidence on this question by making careful use of multiple community surveys to detect emerging differences between areas with and without easy access to casino gambling.

In existing research, the most consistently observed demographic correlates of problem gambling in the general population have been male gender, living outside a married/common-law relationship, and lower education (National Research Council, 1999). Our findings are consistent with earlier reports in these areas. Whereas younger age is usually associated with a higher risk of problem gambling (National Research Council, 1999), some studies have reported higher risk in the middle age categories (Smart & Ferris, 1996; Petry, Stinson, & Grant, 2005). We found a nonlinear relationship with age (peaking at age 35) and submit that the association between problem gambling and age is more complex than a comparison of younger versus older clients can fully assess. Comparisons across studies are complicated, however, by differences in measures and possibly by cohort effects.

Previously reported findings have been inconsistent with respect to employment status and problem gambling, with many studies finding no association (National Research Council, 1999), and others finding the unemployed to be more likely to be problem gamblers (Abbott & Volberg, 1996). Our findings showed problem gambling to be associated with being employed. The significance level of this association is, however, marginal ($p = 0.04$) and, given the number of other control variables included, would not survive a correction for multiple tests.

Co-occurring substance abuse is an important correlate of problem gambling in the present sample, a finding consistent with previous work in both community and clinical samples (Shaffer & Korn, 2002; Volberg, 1994; Cunningham-Williams, Cottler, Compton, & Spitznagel, 1998; Shaffer, Freed, & Healea, 2002; Smart & Ferris, 1996; Spunt, Dupont, Lesieur, Liberty, & Hunt, 1998). Like many other studies, we also found a strong bivariate relationship between problem gambling and co-occurring mood and anxiety disorders (Shaffer & Korn, 2002; Cunningham-Williams et al., 1998). Interestingly, however, this relationship was nonsignificant when substance abuse was included in the analysis. While neither causality nor precedence can be reliably determined with cross-sectional data, it remains interesting that problem gambling was

more closely associated with substance abuse than with co-occurring mood and anxiety disorders.

The relationship between problem gambling and poor self-reported physical health status has been reported in other studies, with samples drawn from methadone maintenance clinics (Weinstock, Blanco, & Petry, 2006) and a nonrandom community sample of older adults (Erickson, Molina, Ladd, Pietrzak, & Petry, 2005). In a general population sample, Wiebe et al. (2001) reported that those with moderate and severe gambling problems were more likely to report being under a doctor's care for emotional or physical problems brought on by stress. The results of the present study showing the link between poorer health status and problem gambling confirm these associations in a large representative community sample and go further by showing this association to be independent of co-occurring mental disorders or substance abuse. Explanations for this association focus on the role of stress as a mediating factor (e.g., Potenza, Fiellin, Heninger, Rounsaville, & Mazure, 2002), although a recent study by Scherrer et al. (2005) shows the important role of both genetic and family environment. Regardless of the underlying mechanisms, the results suggest the need for programs and professionals providing treatment for problem gamblers to assess physical health status and incorporate the results into treatment plans. The findings also suggest the need for proactive screening for problem gambling in primary care and other health care settings. Further research is also needed on the burden of illness and health care costs associated with problem gambling in order to better assess consequences of problem gambling from a population health perspective.

As noted, we have identified considerable variation in the prevalence of problem gambling across Ontario. Given our reliance on secondary data analysis, we are limited in our capacity to tease apart what is undoubtedly a host of individual and community level factors underlying this intraprovincial variation. Our data do, however, provide modest evidence that some of the variation is associated with availability of gambling venues.

Thus, the data lend modest support to policy options intended to reduce harms associated with gambling by controlling the expansion of legalized gambling venues such as casinos and racetracks with slot machines. Our findings are also consistent with the gaming profile of clients entering treatment for problem gambling, namely an increase in the proportion of treated cases for whom slot machine play is the primary problem during a period of rapid increase in community access to legalized slots (Urbanoski & Rush, 2006).

We did not confirm a relationship between the availability of treatment for problem gambling and rates of problem gambling in the community. One might have expected closer proximity to treatment to attenuate community prevalence by facilitating recovery from problem gambling. Other research with respect to alcohol use/abuse has been able to show associations at the population level between the number of people in treatment and indicators of alcohol-related harms such as liver cirrhosis and suicide (Mann et al., 2005; Mann et al., in press). The lack of association between the availability of treatment

for problem gambling and community prevalence rates may result from the low level of treatment seeking—estimated at 1% to 2% per year (Rush, Shaw Moxam, & Urbanoski, 2002)—of people meeting criteria for gambling problems. This does not make an effect on prevalence inconceivable, however; treatment centres also raise awareness of the problem, and effective treatment might still have an observable effect over time. Also working against the probability of finding an association, however, is the fact that the capacity and location of treatment are to some extent responsive to levels of local need. As we have noted, although establishment or funding of treatment facilities in Ontario is not tied formally to a quantitative assessment of local need, it is not unlikely that capacity exists where need is greatest. So we may not have found an association with treatment proximity since prevalence may have been substantively higher in those areas from the outset. Finally, it is possible that treatment provides a public health benefit, even in the absence of a discernable effect on overall prevalence, by successfully treating or ameliorating the most severe problems.

Overall, our findings are important for discussion of intraprovincial needs-based allocation of prevention and treatment resources for problem gambling. In this context, the strong association between problem gambling and substance abuse also confirms the importance of addressing prevention and treatment of problem gambling in the context of addictive behaviour and disorders generally. Our use of GIS technology contributed uniquely to our understanding of regional variations in prevalence by enhancing our ability to efficiently organize our data along spatial dimensions, to efficiently and rapidly visualize relationships in several ways, and to interpolate data across regions. Expanding the data set to incorporate a variety of other population level indicators associated with substance use and harms may provide additional insights. The recent reorganization of health services into Local Integrated Health Networks also provides a new policy-relevant, geographic structure for organizing and interpreting such data for decision-makers.

Limitations

In addition to the difficulties in quantifying exposure to gambling opportunities already mentioned, our findings are constrained in other ways. While CCHS 1.2 provided a large sample, the relatively low prevalence of problem gambling means that only 244 problem gamblers were identified. This affects the precision of the regional survey estimates and our ability to identify statistically significant differences. Our methods also did not include detailed consideration of neighbourhood-level factors such as local employment rates, neighbourhood density, and other indicators of community wellness. Other potentially important missing variables are markers of culture such as ethnicity and language. These could not be included because of data limitations or sample size issues.

Future research

A number of more sophisticated approaches to the modelling of the spatial relationships might be applied if their data requirements could be met. The attractive power of individual gambling or treatment facilities, or of the cities in which they are located, might usefully be modelled. With a larger sample, it might also become reasonable to attempt to include known patterns of travel, such as commuting for work, recreation, or shopping. More precise information on respondent locations might also make it possible to use detailed information on road and rail networks to construct measures of accessibility that would be more meaningful than simple proximity.

Another technique of spatial analysis that might usefully be brought to bear is spatially weighted regression, which might be used to examine variations in the effect of risk factors across areas. One candidate for such an analysis is proximity itself. For example, distance may be a weaker deterrent to individuals in remote areas who are accustomed to regularly travelling long distances. Other techniques of cluster scanning might also prove useful, including "hazard" methods and space/time scans, which take the timing of cases into account.

Finally, if the availability of casino gambling does affect the prevalence of problem gambling, differences should be observed at the population level and over time. If future large and well-designed national health surveys continue to assess respondents for problem gambling, it will be possible to obtain more robust estimates and to track changes in prevalence and availability over time. Such a series of cross-sectional surveys might provide a robust opportunity to study the impact of changes in both treatment and gambling availability.

References

Abbott, M.W., & Volberg, R.A. (1996). The New Zealand National Survey of Problem and Pathological Gambling. *Journal of Gambling Studies, 12,* 143–161.

Adlaf, E.M., & Ialomiteaunu, A. (2000). Prevalence of problem gambling in adolescents: Findings from the 1999 Ontario Student Drug Use survey. *Canadian Journal of Psychiatry, 44,* 752–755.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).* Washington, DC: Author.

Chaix, B., Merlo, J., Subramanian, S.V., Lynch., J., & Chauvin, P. (2001). Comparison of a spatial perspective with the multilevel analytical approach in neighborhood studies: The case of mental and behavioral disorders due to psychoactive substance use in Malmo, Sweden. *American Journal of Epidemiology, 162,* 171–182.

Cox, B., Yu, N., Afifi, T., & Ladouceur, R. (2005). A national survey of gambling problems in Canada. *Canadian Journal of Psychiatry, 50,* 213–217.

Cunningham-Williams, R., Cottler, L.B., Compton, W.M., & Spitznagel, E. (1998). Taking chances: Problem gamblers and mental health disorders—Results from the St. Louis Epidemiologic Catchment Area study. *American Journal of Public Health, 88,* 1093–1096.

Erickson, L., Molina, C.A., Ladd, G.T., Pietrzak, R.H., & Petry, N.M. (2005). Problem and pathological gambling are associated with poorer mental and physical health in older adults. *International Journal of Geriatric Psychiatry, 20,* 754–759.

Ferris, J., & Wynne, H. (2001). *The Canadian Problem Gambling Index: Final report.* Ottawa: Canadian Centre on Substance Abuse.

Ferris, J., Wynne, H., & Single, E. (1998). *Measuring problem gambling in Canada: Draft final report for the inter-provincial task force on problem gambling*. Ottawa, ON: Canadian Centre on Substance Abuse.

Gilliland, J.A., & Ross, N.A. (2005). Opportunities for video lottery terminal gambling in Montreal: An environmental analysis. *Canadian Journal of Public Health, 96,* 55–59.

Gravel, R., & Béland, Y. (2005). The Canadian Community Health Survey: Mental Health and Well-Being. *Canadian Journal of Psychiatry, 50,* 573–579.

Kairouz, S., Nadeau, L., & Lo Siou, G. (2005). Area variations in the prevalence of substance use and gambling behaviours and problems in Quebec: A multilevel analysis. *Canadian Journal of Psychiatry, 50,* 591–598.

Kessler, R.C., & Üstün, T.B. (2004). The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research, 13,* 93–121.

Korn, D. (2001). Examining gambling issues from a public health perspective. *Electronic Journal of Gambling Issues: eGambling, 4*. Retrieved May 2005 from www.camh.net/egambling/issue4/feature/index.html

Kulldorff, M. (1997). A spatial scan statistic. *Communications in Statistics: Theory and Methods, 26,* 1481–1496.

Kulldorff, M., & Information Management Services, Inc. (2002). *SaTScan v.3.0.5: Software for the spatial and space-time scan statistics.* Bethesda, MD: National Cancer Institute.

Ladouceur, R. (1996). The prevalence of pathological gambling in Canada. *Journal of Gambling Studies, 12,* 129–142.

Latkin, C., Glass, G.E., & Duncan, T. (1998). Using geographic information systems to assess spatial patterns of drug use, selection bias and attrition among a sample of injection drug users. *Drug and Alcohol Dependence, 50,* 167–175.

Lesieur, H.R., & Blume, S.B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144,* 1184–1188.

Mann, R.E., Flam-Zalcman, R., Smart, R.G., Rush, B.R., & Suurvali, H.C. (2006). Alcohol consumption, Alcoholics Anonymous membership and suicide mortality rates, Ontario 1968–1991. *Journal of Studies in Alcohol, 67, 445-453.*

Mann, R.E., Smart, R.G., Rush, B.R., Flam-Zalcman, R., & Suurvali, H.C. (2005). Cirrhosis mortality in Ontario: Effects of alcohol consumption and Alcoholics Anonymous participation. *Addiction, 100,* 1669–1679.

Midford R., Masters L., Phillips M., Daly A., Stockwell T., Gahegan M., & Philp, A. (1998). Alcohol consumption and injury in Western Australia: a spatial correlation analysis using geographic information systems. *Australian and New Zealand Journal of Public Health*. 22(1), 80-5.

National Council of Welfare. (1996). *Gambling in Canada.* Ottawa, ON: Author.

National Research Council ((1999). Pathological gambling: A critical review. Washington: D.C.: National Academy Press.

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.

Potenza, M.N., Fiellin, D.A., Heninger, G.R., Rounsaville, B.J., & Mazure, C.M. (2002). An addictive behavior with health and primary care implications. *Journal of General Internal Medicine, 17,* 721–732.

Reidpath, D.D., Burns, C., Garrard, J., Mahoney, M., & Townsend, M. (2002). An ecological study of the relationship between social and environmental determinants of obesity. *Health & Place, 8,* 141–145.

Rush, B.R., Shaw Moxam, R., & Urbanoski, K. (2002). Characteristics of people seeking help from specialized programs for the treatment of problem gambling in Ontario. *Electronic Journal of Gambling Issues: eGambling, 6*. Retrieved August 2005 from http://www.camh.net/egambling/issue6/research/

Scherrer, J.F., Xian, H., Shah, K.R., Volberg, R., Slutske, W., & Eisen, S.A. (2005). Effect of genes, environment, and lifetime co-occurring disorders on health-related quality of life in problem and pathological gamblers. *Archives of General Psychiatry, 62,* 677–683.

Shaffer, H.J., Freed, C., & Healea, D. (2002). Gambling disorders among homeless persons with substance use disorders seeking treatment at a community center. *Psychiatric Services, 53,* 1112–1117.

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

Smart, R.G., & Ferris, J. (1996). Alcohol, drugs and gambling in the Ontario adult population, 1994. *Canadian Journal of Psychiatry, 41,* 36–45.

Spunt, B., Dupont, I., Lesieur, H., Liberty, H.J., & Hunt, D. (1998). Pathological gambling and substance misuse: A review of the literature. *Substance Use and Misuse, 33,* 2535–2560.

Statistics Canada. (2003a). *Canadian Community Health Survey Mental Health and Well-being: Master file documentation. Cycle 1.2*. Ottawa, ON: Author. Retrieved May 2005 from http://www.statcan.ca/english/sdds/document/5015_D4_T1_V1_E.pdf

Statistics Canada. (2003b). *Canadian Community Health Survey Mental Health and Well-being: Questionnaire. Cycle 1.2*. Ottawa, ON: Author. Retrieved May 2005 from http://www.statcan.ca/ english/sdds/instrument/5015_Q1_V1_E.pdf

Urbanoski, K., & Rush, B.R. (2006). Characteristics of people seeking treatment for problem gambling in Ontario: Trends from 1998 to 2002. *Journal of Gambling Issues, 16*. Available at http://www.camh.net/egambling/issue16/pdf/jgi_16_urbanoski.pdf

Volberg, R.A. (1994). The prevalence and demographics of pathological gamblers: Implications for public health. *American Journal of Public Health, 84,* 237–241.

Weinstock, J., Blanco, C., & Petry, N.M. (2006). Health correlates of pathological gambling in a methadone maintenance clinic. *Experimental and Clinical Psychopharmacology, 14,* 87–93.

Wiebe, J., Mun, P., & Kauffman, N. (2006). *Gambling and problem gambling in Ontario 2005*. Guelph, ON: Ontario Problem Gambling Research Centre.

Wiebe, J., Single, E., & Falkowski-Ham, A. (2001). *Measuring gambling and problem gambling in Ontario*. Ontario: Canadian Centre on Substance Abuse Responsible Gambling Council.

Zhu, L., Gorman, D.M., & Horel, S. (2004). Alcohol outlet density and violence: A geospatial analysis. *Alcohol, 39,* 369–375.

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Slot machine structural characteristics: Distorted player views of payback percentages

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Abstract

This paper presents a sample three-reel three-coin slot machine game with a bonus for three coins, and a true payback percentage of 85.6% when one or two coins are wagered and 92.5% when three coins are wagered. The player sees the winning or losing combination of three symbols on the payline as well as (a) the physical reels as they scroll by and (b) what is just above and just below the payline at the end of play. An analysis of this game shows that observing the physical reels and what is just above and just below the payline indicates that the slot machine would lose money, and thus the player would make money, as the game would have a payback percentage in the range of 192%–486% if this reflected reality. The paper concludes by discussing the results of the analysis in terms of gaming regulations and problem gambling.
Keywords: slot machine, probability, randomness, virtual reels, gaming regulations, problem gambling

Introduction

The payback percentage of a slot machine is determined by a computer program inside the slot machine. The underlying algorithms that the computer uses to create a slot machine game have been described by Turner and Horbay (2004) in their paper directed toward counsellors who treat and researchers who study problem gambling. The algorithms are also documented in articles in other disciplines, such as the gaming industry papers by Locke (2001) and Wilson (2003, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f) and by a senior executive from an independent gaming lab (Maida, 1997). The algorithms are based on a recently expired patent (Telnaes, 1984).

The payback percentage of a slot machine game cannot be determined by examining (a) the symbols on the physical reels in the slot machine or (b) what is displayed just above or just below the payline in the payline window at the end of a play. The purpose of this paper is to use a sample slot machine game to determine the difference between the true payback percentage, as determined by the computer, and the payback percentage as indicated (a) on the physical reels and (b) by what is displayed just above or just below the payline in the payline window at the end of a play.

The difference between the true payback percentage and the payback percentage as indicated on the physical reels will be termed the physical reel distortion factor (PRDF). The difference between the true payback percentage and what the player sees just above

and just below the payline in the payline window will be referred to as the payline window distortion factor above/below (PWDFa and PWDFb, respectively).

The paper is written to help problem gambling researchers better understand how slot machines can be random and yet guarantee that the physical reel distortion and the payline window distortions do exist.

To do this analysis, a slot machine pay table is needed. The manufacturers of slot machines and the jurisdictions in which they are located do not make the pay tables publicly available. Thus, a sample slot machine pay table detailed by Wilson's seven articles in *Slot Tech Magazine* is used (Wilson, 2003, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f). It is a three-reel three-coin slot machine with a bonus for the maximum bet of three coins. Although there are many different slot machine games available on the market, Wilson chose to document a simple three-reel three-coin machine to keep the calculations "simple and easy" (Wilson, 2003, p. 12).

Using the sample slot machine from Wilson, the first section of this paper shows the calculations that determine the payback percentage based on the physical reels, while the second section shows the true payback percentage as determined by the computer. In the third section, an analysis is done on the difference between the true payback percentage and what appears just above and just below the payline in the payline window. The fourth section discusses the distortions as they relate to gaming regulations and problem gambling.

PRDF

Until the mid-1980s, the true payback percentage on a slot machine could be calculated using the physical reels. Older, mechanical slot machines were built so that each symbol on each reel had an equal chance of occurring on the payline. The reels commonly had 22 stops, so the total number of reel combinations on the payline in a three-reel mechanical slot machine was 10,648 (22 × 22 × 22).

When computers were introduced into slot machines, the computer randomly controlled the outcome with an equivalent number of combinations as the mechanical slot machines had, so that a slot machine with 22 stops per reel would continue to have 10,648 reel combinations on the payline. The technique the computer used for doing this was patented by Saxton (1978) and used a straightforward mapping of random numbers to the 22 stops.

In this section, the payback percentage of a sample slot machine game is calculated using the physical reels as though the physical reels represented the odds as they did in the older, mechanical slot machines.

The game Wilson designed is a three-coin, three-reel slot machine with 22 stopping positions per reel and a bonus for the jackpot on a maximum bet of three coins. On each reel, half of the stops are blank and half are symbols. The layout of the three physical reels is shown in Table 1. Note that in this slot machine the layout of all three physical reels is the same. This is found among some slot machines, but in others the layouts of the three physical reels are different from one another. The calculations and descriptions in this paper apply equally to slot machines in which all three physical reels are the same and slot machines in which the physical reels are different from one another, so the PRDF and the PWDF calculations will be the same in both instances.

Table 1

Layout of the 22 symbols on the physical reels

#	Symbol
1	Double Bar
2	–
3	Single 7
4	–
5	Double Bar
6	–
7	Double 7
8	–
9	Triple Bar
10	–
11	Single 7
12	–
13	Single Bar
14	–
15	Single 7
16	–
17	Single Bar
18	–
19	Double 7
20	–
21	Triple Bar
22	–

For this sample slot machine, the pay table in Table 2 contains the pay glass information—the winning combinations and what they pay. Table 2 shows, for example, that three double 7 symbols on the payline pays 500 credits if one coin is wagered, 1,000

Table 2

Pay table (using the 22 stops on the physical reels)

	Pays per coin			Occurrences			Hits	Credits		
				Per reel						
	1	2	3	1	2	3		1 Coin	2 Coins	3 Coins
3 Double 7s	500	1,000	6,000	2	2	2	8	4,000	8,000	48,000
3 Single 7s	200	400	600	3	3	3	27	5,400	10,800	16,200
Any 3 7s	75	150	225	5	5	5	90	6,750	13,500	20,250
3 Triple Bar	40	80	120	2	2	2	8	320	640	960
3 Double Bar	20	40	60	2	2	2	8	160	320	480
3 Single Bar	10	20	30	2	2	2	8	80	160	240
Any 3 Bars	5	10	15	6	6	6	192	960	1,920	2,880
Any 3 Symbols	2	4	6	11	11	11	990	1,980	3,960	5,940
Total reel combinations				22	22	22	10,648			
Total wagered over the 10,648 reel combinations								10,648	21,296	31,944
Payback over the 10,648 reel combinations								19,650	39,300	94,950
Payback percentage								184.5%	184.5%	297.2%

credits if two coins are wagered, and a bonus jackpot of 6,000 credits if three coins are wagered. Three double 7 symbols is the only winning combination with a bonus for the third coin. All other winning combinations are linear payouts, with two and three coins paying two and three times as much as one coin would.

Calculating the odds using the physical reels

Table 2 shows what the pay table for this slot machine would be if the physical reels were used to determine the true odds. The calculations for the top three winning combinations will be discussed here.

There are eight combinations of three double 7 symbols on the payline because there are two double 7 symbols on each reel (2 × 2 × 2). Thus, the chance of getting any combination of three double 7 symbols is 8 out of 10,648, the total number of reel combinations. There are three single 7 symbols on each reel, thus there are 27 combinations of three single 7 symbols on the payline (3 × 3 × 3) out of 10,648 total reel combinations.

Any three 7s is a winning combination. There are five 7s on each reel (two double 7 symbols and three single 7 symbols), giving 125 reel combinations of any three 7s (5 × 5 × 5) out of 10,648 total reel combinations. However, slot machines pay only the highest amount for any combination of 7s, so we have to subtract from the 125 combinations the eight occurrences of three double 7 symbols on the payline and the 27 occurrences of

three single 7 symbols on the payline, leaving 90 combinations (out of 10,648 total reel combinations) that would pay for any three 7s (125 – 8 – 27).

Payback percentage using the physical reels

The payback percentage is the average amount that is paid on each play. For example, a payback percentage of 90.0% means that, on average, the slot machine pays out 90.0% of the amount that was wagered. Table 2 shows the calculation of the payback percentage as if physical reels were used to determine the payback percentage. With 22 stops, the total number of reel combinations is 10,648 (22 × 22 × 22). For one coin wagered, the payback over these 10,648 reel combinations is 19,650 credits, yielding a payback percentage of 185% (19,650/10,648). The payback percentage for two coins is also 185% (39,300/21,296). For three coins, the total wagered over the 10,648 combinations is 31,944 (10,648 × 3) and the payout is 94,950, yielding a payback percentage of 297% (94,950/31,944). If the physical reels accurately reflected the outcome, the casino would lose money on this slot machine, and players, on average, would make money.

But slot machines make money. Gross gaming profits in Ontario for 2004 are reported in the Ontario Lottery and Gaming Corporation's annual report and fact sheets (OLGC 2006a, 2006b) and the *Canadian Gaming News* (Sack 2005a, 2005b). Using the data from OLGC and Sack's data for eight gaming facilities, we can calculate that the average annual gross profit per slot machine at these eight gaming facilities is $198,828 (with a range from $80,300 to $350,765), yielding an annual gross profit of $1,179,845,352 from the 5,934 slot machines in these eight facilities.

A summary of this section

This section has shown that the physical reels on a sample slot machine would indicate that the player makes, on average, 185% or 297% of his or her wager and thus the machine loses money. However, slot machines make money, so this cannot be true.

The next section details how virtual reel mapping determines the true payback percentage. This information is complementary to and expands upon the description of virtual reel mapping in Turner and Horbay (2004). Virtual reel mapping is used to determine the outcome, and the physical reels are just used as displays to inform the player whether he or she has won or lost.

Table 3

Layout of the 64 symbols on the virtual reels

#	Reel 1	Reel 2	Reel 3	#	Reel 1	Reel 2	Reel 3
1	1) DoubleBar	1) DoubleBar	1) DoubleBar	33	13) SingleBar	13) SingleBar	13) SingleBar
2	1) DoubleBar	1) DoubleBar	1) DoubleBar	34	13) SingleBar	13) SingleBar	13) SingleBar
3	1) DoubleBar	2) –	1) DoubleBar	35	13) SingleBar	13) SingleBar	13) SingleBar
4	2) –	2) –	2) –	36	13) SingleBar	13) SingleBar	13) SingleBar
5	2) –	3)Single 7	3)Single 7	37	13) SingleBar	14) –	13) SingleBar
6	3) Single 7	4) –	4) –	38	13) SingleBar	14) –	13) SingleBar
7	4) –	4) –	4) –	39	14)–	15) Single 7	14) –
8	4) –	5) DoubleBar	5) DoubleBar	40	14)–	16) –	14) –
9	5) DoubleBar	5) DoubleBar	5) DoubleBar	41	15) Single 7	16) –	15) Single 7
10	5) DoubleBar	5) DoubleBar	5) DoubleBar	42	16) –	17) SingleBar	16) –
11	5) DoubleBar	5) DoubleBar	5) DoubleBar	43	16) –	17) SingleBar	16) –
12	5) DoubleBar	5) DoubleBar	5) DoubleBar	44	17) SingleBar	17) SingleBar	17) SingleBar
13	5) DoubleBar	5) DoubleBar	5) DoubleBar	45	17) SingleBar	17) SingleBar	17) SingleBar
14	5) DoubleBar	5) DoubleBar	6) –	46	17) SingleBar	17) SingleBar	17) SingleBar
15	5) DoubleBar	6) –	6) –	47	17) SingleBar	17) SingleBar	17) SingleBar
16	6) –	6) –	6) –	48	17) SingleBar	18) –	17) SingleBar
17	6) –	6) –	7) Single 7	49	17) SingleBar	18) –	17) SingleBar
18	6) –	6) –	7) Single 7	50	17) SingleBar	18) –	17) SingleBar
19	6) –	7) Double 7	8)–	51	17) SingleBar	18) –	17) SingleBar
20	7) Double 7	8)–	8)–	52	18) –	19) Double 7	18)–
21	8) –	8) –	8) –	53	18) –	20) –	18)–
22	8) –	8) –	9) TripleBar	54	18) –	20) –	18)–
23	8) –	8) –	9) TripleBar	55	18) –	20) –	18)–
24	8) –	9) Triple Bar	9) TripleBar	56	19) Double 7	20) –	18)–
25	9) TripleBar	9) Triple Bar	9) TripleBar	57	20) –	21) TripleBar	19) Double 7
26	9) TripleBar	9) Triple Bar	9) TripleBar	58	20) –	21) TripleBar	20)–
27	9) TripleBar	10) –	10) –	59	20) –	21) TripleBar	20)–
28	10) –	10) –	10) –	60	20) –	21) TripleBar	20)–
29	10) –	11) Single 7	11) Double 7	61	21) TripleBar	21) TripleBar	20)–
30	11) Single 7	12) –	11) Double 7	62	21) TripleBar	21) TripleBar	20)–
31	12) –	12) –	12) –	63	21) TripleBar	21) TripleBar	21) TripleBar
32	12) –	13) SingleBar	12) –	64	22) –	22) –	22) –

Virtual reel mapping

The main point of this section is to show what the actual pay table is for this sample slot machine, so that we can compare the true payback percentage with the fact that the

physical reels would indicate that the player, on average, makes money on this sample slot machine.

A now-expired US patent, called the Telnaes patent (Telnaes, 1984), provides the foundational algorithm for how modern slot machines use a computer to determine the outcome and then display the result using the physical reels on the slot machine. In the background of the invention section of his patent, Telnaes states, "it is important to make a machine that is perceived to present greater chances of payoff than it actually has within the legal limitations that games of chance must operate." Before its expiry, the Telnaes patent was owned by the slot machine manufacturer International Game Technology (Wilson, 2004a, p. 19) and was licensed to other manufacturers. In his patent, Telnaes did not use the term "virtual reel mapping," but this is the term used now to describe his algorithm.

Maida (1997, p. 45) describes the Telnaes patent as follows:

> This method alters the odds of hitting any particular combination. The virtual reel may have any range of numbers from one to infinity. (As a practical manner, numbers greater than 512 have not been attempted.) Each number of the range is "mapped" to a range of 1 to 22—the number of symbols on the physical reel.
>
> The random-number generator chooses one number for each reel and then "maps" it to the physical reel. The reel spins to that position, and the machine evaluates the ending stop positions to determine whether a win or a loss has occurred.
>
> This method dominates the technology currently used in industry: more than 80% of spinning-reel slot machines use this algorithm.

In his articles, Wilson first describes in detail the concept of virtual reel mapping (2004a). In his subsequent papers, Wilson documents many aspects of slot machines using a sample slot machine game that he made up (2004b, 2004c, 2004d, 2004e, 2004f). Wilson's sample slot machine game has 64 virtual stops per reel (Table 3). Since the physical reel has only 22 stops, the virtual reel has to be mapped to the physical reel, with the game designers choosing the mapping. In Table 3, column one is the number of the virtual stop. Column two shows for reel 1 the physical stop position and the symbol at that stop position. For example, on reel 1, physical stop 1 is the double bar, physical stop 2 is a blank, physical stop 3 is a single 7, and so on until physical stop 22, which is a blank.

Looking at reel 1 in Table 3, we see that virtual stops 1 to 3 are mapped to physical stop 1, virtual stops 4 and 5 are mapped to physical stop 2, virtual stop 6 is mapped to physical stop 3, and so on until all 64 virtual stops are mapped to all 22 physical stops. Reels 2 and 3 each have their own mapping, as shown in Table 3. It was noted earlier that the three

physical reels on our sample slot machine are identical, but Table 3 shows that the virtual reels underlying them are not identical.

A comparison of the virtual reels and the physical reels is shown in Table 4. On all three physical reels the highest-paying symbol, double 7, occurs 9% of the time (2 out of 22), whereas on virtual reels one and two double 7s occur 3% of the time (2 out of 64) and on virtual reel three double 7s occur 4.7% of the time (3 out of 64). Thus, for reel 1, comparing the virtual stops with the physical stops shows that double 7 occurs 291% more often on the physical reel than on the virtual reel (2 out of 22 (9%) versus 2 out of 64 (3%)).

Conversely, we see that lower-paying symbols occur on the virtual reels more often than they appear on the physical reels. The lowest-paying symbol is single bar. It occurs 9% of the time on each of the three physical reels (2 out of 22), whereas it appears 22% of the time on virtual reel 1 (14 out of 64). Thus, for reel 1 the single bar occurs on the virtual reel only 42% of the times that it occurs on the physical reel (2 out of 22 (9%) versus 14 out of 64 (22%)).

Table 4

Comparison of virtual reels and physical reels

Symbol	Virtual reels			All three physical reels	Distortion		
	Reel 1	Reel 2	Reel 3		Reel 1	Reel 2	Reel 3
–	29	29	28	11	110%	110%	114%
Double 7	2	2	3	2	291%	291%	194%
Single 7	3	3	4	3	291%	291%	218%
Triple Bar	6	10	6	2	97%	58%	97%
Double Bar	10	9	9	2	58%	65%	65%
Single Bar	14	11	14	2	42%	53%	42%
Total Stops	64	64	64	22			

To determine the true payback percentage for this game, we must do the same calculations that were done in Table 2 in the PRDF section, but instead of using the 22 stops on the physical reels in the calculations we use the 64 stops on the virtual reels. The calculations and results for the virtual reels are shown in Table 5.

Table 5

Pay table (using the virtual reels)

	Pays per coin			Occurrences			Hits	Credits		
				Per reel						
	1	2	3	1	2	3		1 Coin	2 Coins	3 Coins
3 Double 7s	500	1,000	6,000	2	2	3	12	6,000	12,000	72,000
3 Single 7s	200	400	600	3	3	4	36	7,200	14,400	21,600
Any 3 7s	75	150	225	5	5	7	127	9,525	19,050	28,575
3 Triple Bar	40	80	120	6	10	6	360	14,400	28,800	43,200
3 Double Bar	20	40	60	10	9	9	810	16,200	32,400	48,600
3 Single Bar	10	20	30	14	11	14	2,156	21,560	43,120	64,680
Any 3 Bars	5	10	15	30	30	29	22,774	113,870	227,740	341,610
Any 3 Symbols	2	4	6	35	35	36	17,825	35,650	71,300	106,950
Total reel combinations				64	64	64	262,144			
Total wagered over the 262,144 reel combinations								262,144	524,288	786,432
Payback over the 262,144 reel combinations								224,405	448,810	727,215
Payback percentage								85.6%	85.6%	92.5%

Table 5 shows that the true payback percentage for this slot machine is 85.6% if one or two coins are played and 92.5% if three coins are played. Our results are the same as Wilson's (2004c), as we are discussing his slot machine game. This is within the regulated payback percentage range for slot machines in many jurisdictions in North America. The 92.5% payout means that, on average, for each play the casino makes 7.5%—what is called the hold (100% – 92.5%). Stated from the player's perspective, the player loses, on average, 7.5% of his or her bet on each play.

Summary of this section

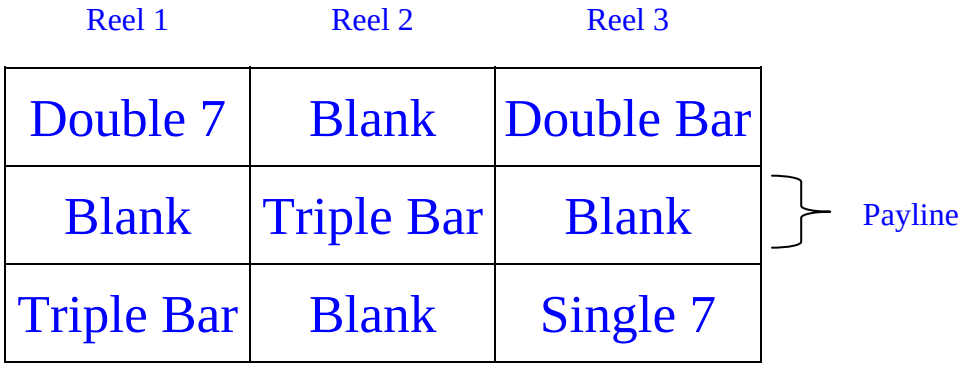
Many variations of slot machine games are on the market (thousands have been approved in North America), so it is impossible to say anything about a particular slot machine without having access to its pay table. However, earlier it was shown that, using the physical reels with one or two coins, the sample slot machine would pay out, on average, 1.85 credits for every credit that was wagered, and, for a maximum bet of three coins, it would pay out, on average, 2.97 credits for every credit wagered. The true odds show that it pays out on average 0.856 credits for every credit wagered with one or two coins and 0.925 credits when three coins are wagered. This means that the payback percentage indicated using the physical reels is more than two and three times higher than the true payback percentage (i.e., 185%/85.6% equals 2.16 and 297%/92.5% equals 3.21).

PWDF

This section discusses the difference between the true payback percentage and what the player sees just above or just below the payline in the payline window. The issue is first discussed and then the sample slot machine from Wilson (2004b, 2004c, 2004d, 2004e, 2004f) is used in an analysis of the difference between the payback percentages.

When a player plays a slot machine, he or she either wins or loses on each play, and the results are displayed on the payline. This section concerns itself with what three symbols are displayed in the payline window just above and just below the payline. Figure 1 shows a sample of a payline window on a slot machine. On the payline are the symbols or blanks (in this case, blank on reel 1, triple bar on reel 2, and blank on reel 3). Also typical, as can be seen in Figure 1, is that above and below the payline the player can see one or two symbols on each reel for a total of three to five symbols on each reel (i.e., one symbol on the payline, one or two symbols above the payline, and one or two symbols below the payline). This total area of view is called the payline window. What we are seeing in Figure 1 is physical stops 19 to 21 on reel 1, physical stops 8 to 10 on reel 2, and physical stops 1 to 3 on reel 3.

Figure 1. Sample payline window.



Manufacturers can design the game so that the symbols just above and just below the payline are unequally distributed so that (a) higher-paying symbols appear more often just above or just below the payline than they would by chance and, conversely, (b) lower-paying symbols appear less often than they would by chance. We can see how this is done by examining in more detail the virtual reel in Table 3. For this discussion we will assume that we can see three symbols in the payline window for each reel—one symbol on the payline, one above the payline, and one below the payline—although this is a design that can vary from machine to machine. The overall issues of how and why the

PWDFs are designed into games are similar for all games that include a PWDF regardless of how many symbols can be seen in the payline window. The results of the mathematical analysis will vary but the overall issues are the same.

In Table 3 we see that on reel 1 the virtual stops 16 to 19 are blanks and are all mapped to the physical stop 6. Virtual stop 20 is a double 7 and is mapped to physical stop 7. Virtual stops 21 to 24 are blanks and are all mapped to physical stop 8. Only two double 7 symbols are on reel 1. The other is at virtual stop 56. It is also similarly surrounded by eight blanks on the virtual reel (i.e., virtual stops 52 to 55 and 57 to 60).

We know from Table 3 that double 7 occurs on the payline two times (i.e., virtual stops 20 and 56) out of a possible 64; this is a 3.1% chance of occurring. We can see in Table 6 that because of the mapping of the virtual reel, double 7 will appear just above the payline 8 out of 64 times (12.5%) because the double 7 in virtual stop 20 (i.e., physical stop 7) will occur just above the payline every time virtual stops 21 to 24 (i.e., physical stop 8) appear on the payline and the double 7 in virtual stop 56 (i.e., physical stop 19) will appear just above the payline every time virtual stops 57 to 60 (i.e., physical stop 20) appear on the payline.

Table 6 shows for each symbol on reel 1 the number of times it will appear just above the payline. It is important to note in Table 6 that column one is showing the virtual stop that is on the payline, whereas column two is showing what is just above the payline. We see from the table that on reel 1, when virtual stops 1 to 3 are on the payline, then a blank will be just above the payline; when virtual stops 4 and 5 are on the payline, the double bar will be just above the payline; and so on to see what is just above the payline when each of the 64 stops is on the payline. Table 6 can be cross-referenced to Table 3, as column one in both tables is referring to the virtual stops. The difference between the two tables is that columns two to four in Table 3 are referring to what is on the payline, which is shown in the articles by Wilson (2004b, 2004c, 2004d, 2004e, 2004f), whereas Table 6 is unique to this paper, and column two in Table 6 is referring to what is just above the payline.

For higher-paying symbols, such as double 7, the number of times the symbols appear just above the payline is greater than it would be by chance alone, whereas for the lower-paying symbols, such as single bar, the chances of that symbol appearing just above the payline are lower than they would be by chance alone.

Table 7 shows the results of an analysis to determine the payback percentage for the three symbols occurring just above the payline as if those symbols were used to determine the game outcome. Observing the three symbols just above the payline would indicate that the slot machine has a payback percentage of 193.0% on one and two coins and a payback percentage of 485.9% on three coins.

Table 6

Layout of the 64 symbols just above the payline on Reel 1

#	Reel 1		#	Reel 1
1	1) –		33	13) –
2	1) –		34	13) –
3	1) –		35	13) –
4	2) DoubleBar		36	13) –
5	2) DoubleBar		37	13) –
6	3) –		38	13) –
7	4) Single 7		39	14) SingleBar
8	4) Single 7		40	14) SingleBar
9	5) –		41	15) –
10	5) –		42	16) Single 7
11	5) –		43	16) Single 7
12	5) –		44	17) –
13	5) –		45	17) –
14	5) –		46	17) –
15	5) –		47	17) –
16	6) DoubleBar		48	17) –
17	6) DoubleBar		49	17) –
18	6) DoubleBar		50	17) –
19	6) DoubleBar		51	17) –
20	7) –		52	18) SingleBar
21	8) Double 7		53	18) SingleBar
22	8) Double 7		54	18) SingleBar
23	8) Double 7		55	18) SingleBar
24	8) Double 7		56	19) –
25	9) –		57	20) Double 7
26	9) –		58	20) Double 7
27	9) –		59	20) Double 7
28	10) TripleBar		60	20) Double 7
29	10) TripleBar		61	21) –
30	11) –		62	21) –
31	12) Single 7		63	21) –
32	12) Single 7		64	22) TripleBar

Table 7

Pay table (symbols just above the payline)

	Pays per coin			Occurrences			Hits	Credits		
				Per reel						
	1	2	3	1	2	3		1 Coin	2 Coins	3 Coins
3 Double 7s	500	1,000	6,000	8	8	8	512	256,000	512,000	3,072,000
3 Single 7s	200	400	600	6	6	6	216	43,200	86,400	129,600
Any 3 7s	75	150	225	14	14	14	2,016	151,200	302,400	453,600
3 Triple Bar	40	80	120	3	3	3	27	1,080	2,160	3,240
3 Double Bar	20	40	60	6	6	4	144	2,880	5,760	8,640
3 Single Bar	10	20	30	6	6	7	252	2,520	5,040	7,560
Any 3 Bars	5	10	15	15	15	14	2,727	13,635	27,270	40,905
Any 3 Symbols	2	4	6	29	29	28	17,654	35,308	70,616	105,924
Total reel combinations				64	64	64	262,144			
Total wagered over the 262,144 reel combinations								262,144	524,288	786,432
Payback over the 262,144 reel combinations								505,823	1,011,646	3,821,469
Payback percentage								193.0%	193.0%	485.9%

A detailed analysis is not shown here for just below the payline, but those calculations have been done and the results are that observing the three symbols just below the payline would indicate that the slot machine has a payback percentage of 191.5% on one and two coins and a payback percentage of 484.5% on three coins.

Summary of this section

As discussed earlier, observing the physical reels does not reveal to the player anything about the actual odds, as the odds are designed into the virtual reel mapping. What this section has shown is that not only does virtual reel mapping obscure the odds, but also the mapping itself intentionally increases the probability that the winning combinations will appear disproportionately higher just above and just below the payline.

The following section will discuss the PRDF and PWDFs relative to gaming regulations and problem gambling.

Discussion of gaming regulations and problem gambling

Table 8 includes a summary of the distortions that have been presented in separate sections in this paper. The slot player can see the physical reels as they scroll by but cannot see the virtual reels. The player cannot see the algorithm that is used to determine

Table 8

Summary of payback percentages

Method used to calculate the odds	Payback percentage		
	1 Coin	2 Coins	3 Coins
True odds as determined by the computer	85.6%	85.6%	92.5%
PRDF	184.5%	184.5%	297.2%
PWDFa	193.0%	193.0%	485.9%
PWDFb	191.5%	191.5%	484.5%

the result, so the player has no way of knowing that the results just above and just below the payline are intentionally distorted so that in nonwinning plays the higher-paying symbols appear more often than they would by chance alone. Conversely, the lower-paying symbols appear less often than they would by chance alone.

Gaming regulations

Games such as the one described in this paper have been approved by regulators and independent gaming labs and are widely used in jurisdictions in North America. The main Nevada Gaming Regulation (Nevada Gaming Commission, 2006) that relates to PRDFs and PWDFs is Regulation 14, which states in part in section 14.040:

> [2](b) For gaming devices that are representative of live gambling games, the mathematical probability of a symbol or other element appearing in a game outcome must be equal to the mathematical probability of that symbol or element occurring in the live gambling game. For other gaming devices, the mathematical probability of a symbol appearing in a position in any game outcome must be constant.
> 3. Must display an accurate representation of the game outcome. After selection of the game outcome, the gaming device must not make a variable secondary decision which affects the result shown to the player.

It is important to note that Regulation 14.040 (2b and 3) is referring to gaming devices in general and is not specific to slot machines. It is the responsibility of regulators to interpret the regulations for any given gaming device. For slot machines, the regulators must be aware of the distortions described in this paper, as the design of the distortions is in the par sheets, and the regulators have decided that these distortions are acceptable within Regulation 14.040 (2b and 3).

Thus the regulators are interpreting the regulations to mean that games that include the PRDFs and PWDFs do meet the requirement in 14.040(3) that the game "Must display an accurate representation of the game outcome."

An issue that arises is whether slot machines that have distortions as described in this paper should be legal. This paper does not address this issue directly. Rather, the intent of this paper is to document the distortions, and the corresponding regulations, so that problem gambling researchers may study such distortions to determine if slot machines with such distortions increase the likelihood of problem gambling and should be banned by (a) modifying and/or (b) reinterpreting the existing regulations.

Problem gambling

Some gamblers may gamble without ever having a gambling problem, while others may develop a gambling problem. The Ontario Problem Gambling Research Centre's (OPGRC) problem gambling framework can be used to explain or contextualize a dynamic environment in which gamblers may move between low risk and high risk and also move between the presence of gambling problems and not (OPGRC, 2006). The OPGRC framework aligns the entire population in a continuum defined by risks and problems. It shows that all gamblers have direct and indirect risk factors and any given gamblers may or may not have a gambling problem at any given time. An important aspect of the framework is that it expresses risk and prevalence as percentages on a continuum. Any individual gambler has a probability of experiencing a problem, and that probability increases as the number of risk factors increases.

The OPGRC framework encapsulates the Pathways Model (Blaszczynski, 2000; Blaszczynski & Nower, 2002), which stresses that a large number of factors are important to be able to predict whether a gambler will develop a problem. The larger the number of risk factors that exist for an individual, the higher is the probability that the individual will develop a problem.

The OPGRC framework separates direct risk into (a) risk practices and (b) risk cognitions. Risk practices include items such as regularly spending more time and money gambling than intended, whereas risk cognitions are "serious misunderstandings about the nature of probability and randomness" (OPGRC, 2006). According to the OPGRC framework, risk cognitions "are thoughts and beliefs held by gamblers that support the adoption and maintenance of risk practices" (OPGRC, 2006). Although not stated specifically in the OPGRC framework, we believe that various EGM structural characteristics, such as near misses, function as indirect risk factors and may lead to faulty risk cognitions.

One aspect that deserves attention is what characteristics of a game's design increase risk cognitions. Griffiths (1993, 1995, 1999) uses the term "structural characteristics" to refer to the characteristics of gambling technologies. Structural characteristics of slot machines

include colour, sounds, and speed. Cornish (1978) states that structural characteristics of a particular gambling activity are responsible for reinforcement, may satisfy gambler's needs, and may actually facilitate excessive gambling. Griffith (1995, p. 196) elaborates on Cornish:

> By identifying the particular structural characteristics it may be possible to see how (a) needs are identified; (b) information about gambling is presented (or perhaps misrepresented), and (c) cognitions are influenced and distorted. Showing the existence of such relationships has great practical importance. Not only could potentially "dangerous" forms of gambling be identified, but effective and selective legislation could be formulated.

A slot machine structural characteristic that has been given attention by problem gambling researchers is the "near miss," which *Webster's Third New International Dictionary* (1993) broadly defines as "something that falls just short of success" and Griffiths defines as "failures that are close to being successful" (1995, p. 23). In discussing the frequent occurrence of higher-paying symbols above and below the payline in his sample game described in this paper, Wilson said, "With this design the 7's will be either on the pay line or slightly above or below it most of the time. While this gives the illusion that the 7's have almost lined up on the pay line, it's the virtual reel that tells the truth." (Wilson, 2004a, p. 21). Although Wilson does not use the term "near miss," it is clear from the two definitions above and the quote from Wilson that the frequent occurrence of higher-paying symbols just above and just below the payline produces "failures that are close to being successful" (i.e., near misses).

Several studies have investigated slot machine near misses. Strickland and Grote (1967) and Reid (1986) studied near misses on the payline. The results of their controlled experiments showed that near misses on the payline led to significantly longer playing times. Cote, Caron, Aubert, and Ladouceur (2003) use the term "near win" rather than near miss, and the results of their study of near wins on the payline show that "near wins can be added to the list of factors that may motivate people to gambling" (p. 433). In a controlled experiment reported by Kassinove and Schare (2001), the near miss had a statistically significant effect on the number of games played (which they termed persistence). No studies have been published that have specifically examined PWDF (a & b) and PRDF distortions.

Currently, electronic gambling machines make up a large percentage of gaming industry profits. Studies also show that among gamblers seeking treatment, use of electronic gambling machines tends to be the most common form of gambling (Rush, Moxam Shaw, & Urbanoski, 2002; Becoña, Labrador, Echeburúa, & Ochoa, 1995; Wiebe & Cox, 2001).

Problem gamblers often exhibit misunderstandings about their chances of winning (Wagenaar, 1988; Gaboury & Ladouceur, 1989). The results of the current study suggest that the machines themselves may be a source of some of their erroneous beliefs. Further laboratory and field research is needed, focusing on the extent to which PWDF (a & b) and PRDF may contribute to problematic gambling.

References

Becoña, E., Labrador, F., Echeburúa, E., & Ochoa, E. (1995). Slot machine gambling in Spain: An important and new social problem. *Journal of Gambling Studies, 11,* 265–286.

Blaszczynski, A. (2000). Pathways to pathological gambling: Identifying typologies. *Electronic Journal of Gambling Issues: eGambling, 1.* Available at http://www.camh.net/egambling/issue1/feature/index.html

Blaszczynski, A., & Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction, 97,* 487–499.

Cornish, D.B. (1978). *Gambling: A review of the literature and its implications for policy and research.* London: HMSO.

Cote, D., Caron, A., Aubert, J., & Ladouceur, R. (2003). Near wins prolong gambling on a video lottery terminal. *Journal of Gambling Studies, 19,* 380–407.

Gaboury, A., & Ladouceur, R. (1989). Erroneous perceptions and gambling. *Journal of Social Behavior and Personality, 4,* 411–420.

Griffiths, M. (1993). Fruit machine gambling: The importance of structural characteristics. *Journal of Gambling Studies, 9,* 101–120.

Griffiths, M. (1995). *Adolescent gambling.* London and New York: Routledge.

Griffiths, M. (1999). Gambling technologies: Prospects for problem gambling. *Journal of Gambling Studies, 15,* 265–283.

Kassinove, J., & Schare, M. (2001). Effects of the "near miss" and the "big win" at persistence in slot machine gambling. *Psychology of Addictive Behaviors, 15,* 155–158.

Ladouceur, R., & Sevigny, S. (2006). The impact of video lottery game speed on gamblers. *Journal of Gambling Issues, 17.* Available at http://www.camh.net/egambling/issue17/ladouceur.html

Locke, K. (2001, August). Above PAR. *Slot Tech Magazine,* 4–8.

Maida, J.R. (1997, July). From the laboratory: No more near misses. *International Gaming & Wagering Business, p. 45*.

Nevada Gaming Commission. Regulations of the Nevada Gaming Commission and State Gaming Control Board. Regulation 14. Manufacturers, distributors, operators, of inter-casino linked systems, gaming devices, new games inter-casino linked systems and associated equipment. 14.040 (March, 2006).

Ontario Lottery and Gaming Corporation (2006a). *Annual Report 2004–2005*. Retrieved April 28, 2006, from http://www.olg.ca/assets/documents/annual_report/annual_report_04-05.pdf

Ontario Lottery and Gaming Corporation (2006b). *Fact Sheets*. Retrieved June 12, 2006 from http://www.olg.ca/about/media/facts.jsp.

Ontario Problem Gambling Research Centre (2006). *Problem Gambling Framework*. Retrieved October 23, 2006 from http://www.gamblingresearch.org/framework.sz

Reid, R.L. (1986). The psychology of the near miss. *Journal of Gambling Behavior, 2,* 32–39.

Rush, B., Moxam Shaw, R., & Urbanoski, K. (2002). Characteristics of people seeking help from specialized programs for the treatment of problem gambling in Ontario. *Electronic Journal of Gambling Issues: eGambling, 6.* Retrieved December 19, 2006, from http://www.camh.net/egambling/issue6/research/index.html

Sack, I. (2005a). New Ontario gaming strategy. *Canadian Gaming News, 130,* 1–2.

Sack, I. (2005b). Revenue and attendance statistics. *Canadian Gaming News, 130,* 15.

Saxton, J.C. (1978). U.S. Patent No. 4,095,795. Washington, DC: U.S. Patent and Trademark Office.

Strickland, L.H., & Grote, F. W. (1967). Temporal presentation of winning symbols and slot machine playing. *Journal of Experimental Psychology, 74,* 10–13.

Telnaes, I.S. (1984). *U.S. Patent No. 4,448,419*. Washington, DC: U.S. Patent and Trademark Office.

Turner, N., & Horbay, R. (2004). How do slot machines and other electronic gambling machines really work? *Journal of Gambling Issues, 11*. Available at http://www.camh.net/egambling/issue11/jgi_11_turner_horbay.html

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

Webster's Third New International Dictionary (unabridged) (1993). Springfield, MA: Merriam-Webster Inc.

Wiebe, J.M.D., & Cox, B.J. (2001). A profile of Canadian adults seeking treatment for gambling problems and comparisons with adults entering an alcohol treatment program. *Canadian Journal of Psychiatry, 46*, 418–421.

Wilson, J. (2003, December). Slot machine volatility index. *Slot Tech Magazine*, 10–17.

Wilson, J. (2004a, January). Virtual reels? Physical reels? Just the real truth. *Slot Tech Magazine*, 18–22.

Wilson, J. (2004b, February). PAR excellence: Improve your edge. *Slot Tech Magazine*, 16–23.

Wilson, J. (2004c, March). PAR excellence: Part 2. *Slot Tech Magazine*, 16–21.

Wilson, J. (2004d, April). PAR excellence: Part 3. *Slot Tech Magazine*, 20–26.

Wilson, J. (2004e, May). PAR excellence – Improving your game – Part IV. *Slot Tech Magazine*, 21–24.

Wilson, J. (2004f, June). PAR excellence – Part V: The end is here! *Slot Tech Magazine*, 24–29.

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Why do Internet gamblers prefer online versus land-based venues? Some preliminary findings and implications

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Abstract

At a time when land-based gambling opportunities are widely available, why might some people choose or prefer to gamble on the Internet? We investigate this question using qualitative and quantitative data collected from an Internet-based survey of 1,920 Internet gamblers. The primary reasons people gave for preferring Internet gambling were (a) the relative convenience, comfort, and ease of Internet gambling; (b) an aversion to the atmosphere and clientele of land-based venues; (c) a preference for the pace and nature of online game-play; and (d) the potential for higher wins and lower overall expenditures when gambling online. Findings suggest that online venues may offer their clientele a range of experiences and benefits that are perceived to be unavailable at land-based venues. The authors recommend research into whether a competitive edge exists between different aspects of the gambling market, including Internet venues versus land-based gambling establishments.

Keywords: gambling, Internet, online, electronic, survey, preference, convenience, expenditures

Introduction

Since the beginning of the widespread introduction of Internet access into homes and workplaces in the early 1990s, Internet gambling opportunities have expanded at an astonishingly rapid rate, and more and more people are apt to gamble their money online. In 1995, there were only 24 Internet gambling sites accessible online (Watson, Liddell Jr., Moore, & Eshee Jr., 2004). Just over a decade later, in 2006, that number has increased to over 100 times that, to more than 2,500 Internet gambling Web sites, consisting of 1,083 online casinos, 592 sports and race-books, 532 poker rooms, 224 online bingos, 49 skill game sites, 30 betting exchanges, 25 lottery sites, and 17 backgammon sites (Casino City, 2006).[1]

It is difficult to determine the actual number of people who gamble online, as it is certainly a figure that has changed relatively quickly over the past decade. Current industry estimates suggest that the worldwide number of Internet gamblers is at least 14 million and possibly as high as 23 million (American Gaming Association, 2006a; RSe Consulting, 2006), although these figures have not been investigated or confirmed by rigorous academic research. Researchers have, however, attempted to assess the overall

Internet gambling prevalence rate among the general population in particular jurisdictions. Observed rates have been consistently low, with most studies conducted in the late 1990s and early 2000s finding prevalence rates below 2% (e.g., Amey, 2001; Azmier, 2000; Canadian Partnership for Responsible Gambling, 2004; Brown, Patton, Dhaliwal, Pankratz, & Broszeit, 2002; Griffiths, 2001; Petry & Mallya, 2004; Smith & Wynne, 2002; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2002). When examining more recent studies, we have reason to believe that the rate of Internet gambling is increasing in many societies. The most recent surveys of the general U.S. adult population in 2006, for example, have found rates of 3% (Rasmussen Reports, 2006) and 4% (Luntz, Maslansky Strategic Research, 2006). The most recent Canada-wide study has found rates of 2.3% to 3.6%, with the higher estimate including high-risk stocks and day trading, and the lower estimate excluding these (Wood & Williams, 2006).

Given the relatively low prevalence rates of Internet gambling, it is no surprise that little is reported in the academic literature about the demographic characteristics of Internet gamblers and how they may systematically differ from nongamblers and land-based gamblers. Recent studies, however, are beginning to shed at least some light on the issue, suggesting that participation in Internet gambling is indicative of a "digital divide," with Internet gambling occurring at higher rates among skilled professionals, whose jobs rely upon familiarity with and competent use of the Internet (Howard, Rainie, & Jones, 2001; Woolley, 2003). Studies of Internet gambling conducted in Australia, in 2001 and 2002, partly confirm this digital divide argument, finding that rates of Internet gambling are higher among men, younger adults, people with professional or managerial occupations, and people who earn above-average incomes (Woolley, 2003; McMillen & Woolley, 2003). Largely confirming these results, another online study of 552 Internet gamblers commissioned by the American Gaming Association, in 2006, found that 68% were male, 70% were under 40 years old, 61% had at least a college degree, 41% earned more than $75,000 a year, almost all of them used the Internet for other activities, and 70% had only begun gambling online in the past 2 years (American Gaming Association, 2006b). In addition to these demographic characteristics, a number of studies suggest that Internet gamblers, relative to others, are much more likely to be problem or pathological gamblers (Griffiths, Wood, & Parke, 2006; Ladd & Petry, 2002; Wood & Williams, 2007b).

Another issue that has received relatively little attention, and the one that is most important for the present article, is the reasons that people might choose to gamble online. Indeed, in most jurisdictions, land-based venues have become far more prolific and easily accessible. Why then would someone choose to gamble on the Internet instead of, or in addition to, gambling at a land-based venue? Presumably, for some gamblers, the Internet affords them an overall experience that they prefer and that land-based venues cannot provide. A recent American Gaming Association (2006b) study found that the main reasons people gave for gambling online were convenience (48%); fun/excitement/entertainment (24%); greater comfort, not having to drive (24%); ability to win money (9%); and enjoyment of the anonymity and privacy (6%). In another recent

study, Derevensky, Gupta, & McBride (2006) found that "boredom" and "for excitement" were the most common reasons cited by Internet-gambling youth and young adults, aged 12 to 24. Recently, Griffiths (2006) has also identified multilingual service, faster play speed, and the ability to pretend to be the opposite sex as significant advantages afforded by Internet versus land-based gambling.[2] Wood & Williams (2007b) add that some people may gravitate toward Internet gambling due to their perceptions that online venues offer better payout rates.

It is encouraging to see studies emerging that investigate the characteristics and motivations of the growing population of Internet gamblers. Clearly, however, this population is still lamentably understudied, and substantially more research needs to be conducted on a wide range of topics and issues related to Internet gambling. The present study seeks to contribute to this much-needed body of literature by investigating the characteristics of people who prefer Internet to land-based gambling, as well as the reasons they provide for gambling on the Internet. This study is largely exploratory in nature and seeks to establish at least a small foundation from which future, more comprehensive, studies may proceed.

Methodology

The present investigation stems from a broader survey-based study of Internet gambling conducted by two of the present authors in 2003 and 2004. This larger study explored the characteristics of North American Internet gamblers, their gambling behaviour, and their propensity for problem gambling (see Wood & Williams, 2007b).[3] Additionally, and of importance to the present investigation, respondents were asked about their preferences for Internet versus land-based gambling, and they were afforded an opportunity to explain the reasons for their preference for Internet gambling.

Respondents were recruited using prominent banner advertisements placed at three online gambling portals, to which we have offered anonymity, based in the United States. A portal is a type of filter site that offers links to and information about thousands of Internet gambling venues, such as casinos, bingos, and sports books. Portal sites, however, are not actual gambling sites insofar as they do not host games or betting services (they simply provide information and links). Clicking the banner advertisement immediately linked potential respondents to an online questionnaire. As a participation incentive, respondents were offered a gift valued at $5 U.S. The gift was a hand-sized plastic coin/token scooper, which is used for scooping coins or tokens out of the trough of a slot machine or similar gaming machine. Before being linked into the actual survey, all respondents encountered a home page containing information about the goals of the study, the voluntary and anonymous nature of their participation, and the contact information for the primary researcher. This recruitment strategy generated completed surveys from 1,920 Internet gamblers and was highly demographically diverse (which we discuss in a forthcoming section). Recruitment and data collection began at the beginning of October 2003 and finished at the end of January 2004.

Although our sample was large and diverse, the sample is also self-selected. Thus, it is not possible to ensure that it is representative of the broader population of Internet gamblers. Unfortunately, this is simply one of the current pitfalls of research into Internet gambling. A highly representative sample would perhaps more likely be achieved using random-digit-dialling (RDD) techniques. However, given the low prevalence rate of Internet gambling, tens of thousands of screening interviews would be required to generate even a small sample of only a few hundred (see Wood & Williams, 2007a). Such an endeavour is potentially cost prohibitive and was certainly beyond the resources available for the present study. In contrast, our online recruitment technique allowed us to generate a fairly sizeable sample at substantially lower cost, albeit with some potential compromise to representation. Thus, we ask readers to bear this potential limitation in mind when assessing our findings, and we strongly encourage future research into issues associated with recruiting sufficiently large and representative samples of Internet gamblers.

In addition to assessing demographic characteristics and gambling behaviour, the survey included a question asking respondents to report whether they preferred online gambling as opposed to gambling at land-based venues. 73.8% of the sample claimed that they preferred Internet gambling, and these people were prompted to explain why they preferred gambling online by typing an answer in a text-field box. This question yielded 770 open-ended explanations from 536 gamblers (individual gamblers were able to provide multiple reasons). Critics might observe that this is a relatively low response rate, with explanations provided by only 38% of all participants who claimed to prefer Internet gambling. Future studies might achieve a higher response rate by providing both fixed-choice categories (so respondents pick the reasons for their preference from a list of choices) and open-ended text fields. Indeed, the inclusion of fixed choices might, for some participants, reduce the perceived amount of effort involved in providing a rationale for their preference.

All open-ended responses were content-analyzed using both open and axial coding. Open coding is a qualitative coding phase whereby we intensively read the 770 open-ended responses for common themes, patterns, and issues, which we organized and labelled into preference categories. Twenty distinct preference categories emerged from several phases of open coding, with an additional "other" category for a small proportion of idiosyncratic responses (see Table 1). We then used these 21 categories to construct a coding frame and tally sheet for subsequent phases of axial, or "focussed," coding of the data. Axial coding entailed revisiting the data, this time using a coding frame to systematically categorize each respondent's reasons for preferring Internet gambling and a tally sheet to numerically assess the frequency of each preference. Axial coding was conducted separately by two of the three authors. Both parties identically coded 746 of the 770 responses, yielding a strong reliability coefficient of 0.97.[4]

Table 1.

Reasons for preferring Internet gambling versus gambling at a land-based venue.

Reason	Percentage of all reasons given by respondents*
Convenience	12.9%
Ease	12.2%
Comfort	11.7%
Distance from casino	10.0%
Privacy	9.8%
Dislike land-based clientele	5.1%
Dislike crowds	4.7%
Dislike noise	4.1%
Dislike smoke	3.9%
High speed of game play	3.8%
Leisurely pace of game play	3.1%
Lower overall expenditure	3.0%
More fun	3.0%
Preference for Internet interface	2.5%
Higher potential wins	1.8%
Safety concerns	1.6%
Lower secondary costs	1.0%
Aversion to casino atmosphere	0.7%
Land-based gambling illegal	0.5%
Disability	0.4%
Other	4.3%

*Respondents could offer multiple reasons.

Findings

Sample characteristics

Our sample was highly diverse in terms of its demographic composition (see Table 2 for a detailed overview). 56% percent of respondents were men and 44% were women. This suggests that Internet gambling is becoming a less gendered phenomenon than has been speculated by others. However, further research, with a highly representative sample, needs to be conducted into the gender distribution of Internet gamblers, and particularly into potential gender differences in experiences, perceptions, and behaviour related to Internet gambling. The average age of respondents was 34 years, with a range of 18 to 84 years. Consistent with other studies about the origin of online gamblers (*The Wager*, 1999), 87% of the sample originated from the U.S., 10% from Canada, and only 3% from all other countries combined. This distribution, which seems biased toward North America, is likely partly due to the fact that our survey was only offered in English. Ideally, in future studies, greater international representation would be desirable, although it would require fairly costly translation of whatever survey instruments were used.

On average, respondents reported spending 5 hours per week gambling on the Internet. The median weekly time reported was 2 hours. Only 4.1% claimed to gamble online in excess of 20 hours per week. The online game most often played was slots/VLTs (40.9%), with cards (mostly blackjack) at 33.3%, keno/bingo at 14.4%, sports betting at 6.2%, and dice at 2.7%. A surprising 42.7% of the sample were classified as moderate (22.6%) or severe (20.1%) problem gamblers using the Canadian Problem Gambling Index (CPGI, Ferris & Wynne, 2001).[5] The computer most often used for online gambling was located in their own home for 86.6%, whereas 4.3% claimed that their primary gaming computer was located in their workplace. When asked more specifically about workplace gambling, a total of 16.3% indicated they gamble from the workplace either "once in a while" (13.4%) or "often" (2.9%).

Suggesting that the sample comprises relatively computer-savvy individuals, 71.6% either agreed or strongly agreed with the statement, "I have a good deal of knowledge when it comes to using computers." Furthermore, suggesting a high level of comfort with online transactions, 65.3% either agreed or strongly agreed with the statement, "I feel comfortable buying merchandise or other products on the Internet." Many of the respondents reported having been active in a number of Internet-based activities over the previous month.

Of the 1,920 people who participated in the survey, 73.8% indicated that they preferred Internet gambling over land-based gambling. In order to assess any relationships between

particular demographic characteristics and a preference for Internet gambling, we cross-tabulated demographic characteristics by gambling preference (see Table 2). We conducted chi-square tests to assess the extent to which any observed differences between categories were statistically significant (asymmetric significance, $\alpha = 0.05$). The only differences that were found to be significant were those related to problem gambling, gender, disability, and game preference. Given the limitations of our data set, we can only hypothesize at this time about the reasons for these observed differences. Nonetheless, we offer the following ideas for consideration.

Problem gamblers were significantly less likely than non-problem gamblers to prefer Internet gambling. This suggests that although many problem gamblers may prefer land-based gambling, they may utilize online services when land-based ones are unavailable, closed, or temporarily inaccessible. An alternative explanation may be that problem gamblers simply are likely to access all forms of available gambling, even though some forms may ideally be preferred over others.

Among male respondents, 75.6% reported that they preferred gambling on the Internet versus gambling at a land-based venue. In comparison, 71.5% of women reported the same. While the difference appears to be small, a marginally significant chi-square statistic (0.046) indicated that the difference is a systematic one. It is a fairly well-established fact that Internet use varies according to gender (see Wasserman & Richmond-Abbott, 2005). Thus, it is possible that our findings simply reflect broader gender differences in Internet use and Internet communication. Alternatively, however, these findings might also be reflective of actual gendered experiences while gambling online, suggesting that online gambling sites are somewhat more hospitable for men than for women. In any event, it is crucial that future research delve into the issue of gender differences in the world of Internet gambling.

People identifying themselves as disabled were less likely than nondisabled individuals to prefer Internet gambling. The data do not provide information about the specific nature of respondents' disabilities, so it is difficult to provide a nuanced interpretation of this finding. In cases where peoples' disabilities are physical in nature, one might have expected that potential barriers related to access and transportation might have resulted in a preference for Internet gambling instead. However, if many of these individuals use land-based gambling as an opportunity for social interaction and networking, and if other such opportunities are relatively limited, then this could account for the significant difference in disabled versus nondisabled respondents' preferences. In any case, we encourage other researchers to further investigate this relationship.

Preference for Internet versus land-based gambling also varied significantly by the specific game respondents reported playing most often. Those who most often played VLT or slot-type games, often called electronic gaming machines (EGMs), were the most likely to prefer Internet gambling. Those who most often played keno or bingo were the

Table 2

Preference by demographic characteristics and game played most often.

Category	Percentage of sample	Percentage preferring Internet gambling over land-based gambling
Gender*		
Male	55.8	75.6
Female	44.2	71.5
Age		
18–19	7.5	73.2
20–24	21.1	76.8
25–29	16.0	70.5
30–34	14.5	69.7
35–39	12.2	70.4
40–44	9.8	74.6
45–49	8.2	76.3
50–54	5.4	80.6
55–59	3.0	82.5
60+	2.2	75.0
Country of residence		
U.S.	86.8	74.1
Canada	10.1	75.5
Other	2.8	60.4
Disability status*		
Disabled	12.3	61.7
Not disabled	87.7	75.5
Problem gambling*		
Problem gamblers	42.7	66.6
Non-problem gamblers	57.3	79.1
Game played most often		
Keno/Bingo*	14.4	62.2
Cards	33.3	74.8
Dice	2.7	64.6
Sports betting	6.2	64.9
Slots/VLT*	40.9	76.2

*Indicates significant chi-square statistic (asymmetric significance, $\alpha = 0.05$).

least likely. The relationship between EGMs and preference for Internet gambling may be due to the similarities that online EGMs share with land-based ones. The interfaces are either identical or highly similar, and playing EGMs in either type of venue is likely a fairly solitary or socially insular experience (insofar as EGMs do not promote interaction with other people). Online EGMs, however, may offer added advantages or conveniences (e.g., they never close) that land-based ones do not. The finding that bingo/keno players were less likely to prefer Internet gambling could be a function of the fact that these are traditionally fairly social games, which for some people might even form the basis of a particular subculture (e.g., a bingo subculture). Thus, playing these games at land-based venues may offer some gamblers social benefits not easily available online.

Reasons for preferring Internet gambling

Convenience, ease, and comfort

The reasons respondents gave for preferring Internet gambling were numerous, spanning 20 distinct themes and categories (see Table 1). Percentages reported in the charts and in the text refer to the percentage of all reasons given (536 people provided 770 reasons). The most common reasons pertained to the relative convenience (12.9%), ease (12.2%), and comfort (11.7%) of Internet gambling. Convenience refers to the idea that Internet gambling opportunities are accessible at any time of the day and with minimal effort. Ease is a related concept, but refers to the idea that the sites and games are easy to find, easy to join, and relatively easy to play. Comfort refers to the theme that Internet gambling affords the benefit of playing from the comfort of one's own home. A number of people, for example, referred in colloquial language to the comfort of "being able to gamble in my pyjamas." Another commonly stated reason, which is related to convenience, is the distance that many respondents lived from a land-based gambling venue (10.0%). Thus, a number of people explained how they do not live within a reasonable driving distance of a casino, and so Internet gambling was the most viable option for them. This, however, does not clarify whether these people would still choose to gamble on the Internet if they did indeed live closer to a land-based venue.

Aversion to land-based gambling venues

Other reasons were related to people's perceptions of the ambience and clientele characteristic of land-based venues. A small proportion of people (0.7%) made the very general statement that they simply "don't like casinos." Others, however, were more specific. A sizeable proportion (9.8%) felt that they had far more privacy when gambling online. Others claimed to dislike land-based venues for a number of additional reasons, including an aversion to smoke (3.9%), an aversion to the usual noise (4.1%), and an aversion to crowded environments (4.7%). Still others (5.1%) explicitly claimed to dislike the "sorts of people" one often encounters in casinos and other land-based venues.

On a related theme, 1.6% of respondents claimed to feel unsafe in land-based venues.

Online gaming experience

Other reasons were related to the intrinsic nature of the online gaming experience. These people often mentioned the ability to control or customize the rate of play. 3.8% of respondents, for example, preferred gambling online since it allowed them to play at a relatively fast pace. These people typically referred to the potentially short amount of time between games, spins, and rolls. Others reported a preference for Internet gambling as it afforded a more leisurely pace of play (3.1%). These people typically appreciated being able to "take their time" when gambling online. 2.5% made comments suggesting that they simply "like the Internet," further saying that Internet gambling is more immersing (e.g., they are able to focus better without distractions), as well as conducive to multitasking (e.g., gambling while surfing the Web). A further 3.0% simply claimed that gambling on the Internet is "more fun."

Wins and expenditures

Some observers might be quick to speculate that Internet gamblers are largely attracted by the perception of potentially larger wins and lower overall expenditures when gambling online. Our results, however, would not strongly support such predictions. Only 1.8% of our respondents identified higher potential winnings as their reason for gambling online. Similarly, only 3.0% mentioned smaller losses as the reason. An additional 1.0% referred to lower secondary costs, such as travel and meal expenses, as the reason they gamble online rather than in a land-based venue.

Other reasons

Given the substantial number of respondents who identified themselves as living with a disability (12.3%), we were surprised to find that disability was not often reported as a reason for gambling online, as opposed to gambling at a land-based venue (which could potentially pose problems of access and mobility for some disabled persons). Only three people, or 0.4% of the sample, reported disability as a reason for their online gambling preference.

A very small proportion (0.5%) claimed to gamble online because land-based gambling is illegal and therefore unavailable in their particular jurisdiction. Again, as with people who live long distances from land-based venues, it is unclear whether this 0.5% would prefer to gamble in a land-based venue if one was actually available.

Conclusion

Summary and suggestions for future research

It is clear that the population of Internet gamblers is a relatively demographically diverse group. It is also clear that some characteristics seem to be associated with a higher or lower likelihood of preferring Internet versus land-based opportunities. Disabled individuals were significantly less likely than nondisabled individuals to prefer Internet gambling. Problem gamblers versus non-problem gamblers were likewise less likely to prefer Internet gambling. People who most often played slots or VLTs were significantly more likely than players who preferred other games to prefer Internet over land-based gambling. Finally, men were significantly more likely than women to prefer Internet gambling. Unfortunately, the limitations of our data set (which we explain in the following section of this article) do not allow us to explore conclusively the causes or reasons for these systematic differences. Thus, we offer to future research the task of not only exploring the reasons some people prefer to gamble online but also effecting a more nuanced understanding of how and why those reasons might vary according to demographic categories and preferred game.

When given the opportunity in an open-ended question to explain why they preferred Internet versus land-based gambling, people offered several general types of reasons. Most common was to refer to the greater convenience, ease, and comfort of Internet gambling. Second was an aversion to the atmosphere, crowds, and clientele of land-based venues. Third was a preference for the nature of the online gaming experience. Finally, there were a few people who indicated they gambled on the Internet because of the potential for better odds, higher wins, and smaller losses. Given these stated preferences, Internet gambling sites may be offering clientele a range of potential experiences and benefits that are perceived to be unavailable in land-based venues. It is possible that these unique attributes and advantages help Internet gambling sites carve out a competitive niche that allows them to compete successfully with land-based venues. The present study, however, is not able to determine the extent to which Internet gambling sites are taking business away from land-based venues. It is indeed possible that each sort of opportunity serves a distinct market, and that many Internet gamblers simply would not gamble at all if no Internet-based opportunities were available. In any case, future research should be conducted into competition between Internet and land-based venues.

If Internet gambling does in fact possess a potentially competitive edge, or if it attracts many people who otherwise would not gamble, there may be important and concerning consequences with respect to the prevalence of problem gambling. Recent research suggests that the convenience of Internet gambling, coupled with its immersive qualities, may lead to much higher than normal levels of game-play. This, for some people, may facilitate the emergence of a gambling problem (see Griffiths, 2003; Griffiths, 1999;

Griffiths & Parke, 2002; Griffiths & Wood, 2000; LaRose, Mastro, & Eastin, 2001). Our findings lend some tentative support to such an argument, insofar as a substantial proportion of our sample was classified as having either a moderate (CPGI 3+) or a severe (CPGI 8+) gambling problem. Conversely, however, rather than the Internet creating or facilitating a gambling problem that did not previously exist, it is also possible that many people with preexisting gambling problems simply gravitate to the Internet. In any case, further validating and untangling the dynamics of this potential relationship between problem and Internet gambling also remains the task of future research.

Limitations

There are a number of limitations inherent to the present study, and we feel it is important to clearly acknowledge them, not only to ensure that our study is transparent to the critical observer but also to offer whatever additional lessons we can for future research. The most serious limitation to this study is the potentially nonrepresentative nature of the sample. Indeed, since the sample was self-selected at only a few Internet gambling portals, it is not possible to gauge the extent to which the sample reflects the broader population of Internet gamblers. It is at very least biased toward English-speaking North Americans. Thus, while we feel the study has merit, insofar as it offers some insight into the preferences of Internet gamblers, our results concerning Internet gamblers' demographic and game-play characteristics cannot be generalized to the broader population. Moreover, our typology of the reasons people prefer Internet gambling over land-based gambling is not necessarily exhaustive, insofar as it may be omitting reasons that could have been offered by groups of people who did not select themselves into the sample.

Another limitation is that we did not define "Internet gambling" for our participants, assuming instead that they would understand its meaning. The portals where participants were recruited included links to typical forms of Internet gambling, including casinos, bingos, and sports books. However, most gambling sites offer free demo sessions, during which people can play games without betting real money. It is possible that some of the people who selected themselves into our sample only play the demo or practice versions of games, and so in actuality are not Internet gamblers. It is difficult to know how many, if any, of these false positives are present in our sample, although we would speculate that the proportion is relatively small. In any case, we note that it is wise to clearly define Internet gambling for participants in order to sample only those who actually wager money in the course of their gaming activity.

The final noteworthy limitation is related to the pitfalls we encountered with online survey methodology, and the attendant implications for the depth of analysis we were able to achieve. The survey used for the present study collected both quantitative data (gathered via fixed-choice items) and qualitative data (gathered using text fields where respondents could type a response or a number of responses). Unfortunately, due to

problems and oversights in the programming of the questionnaire, it was not possible to analyze the qualitative responses to the open-ended question about Internet gambling preference in relation to the quantitative demographic and game-play characteristics gathered using the fixed-choice survey items. Thus, we can offer a demographic and game-play profile using the quantitative data, and we can also offer a preference typology using the qualitative data. However, we cannot integrate the two data sets in order to compare the qualitative reasons for preferring Internet gambling offered by one group of people (e.g., men) to the reasons offered by another (e.g., women). We were therefore unable to use our typology in any sort of statistical analysis, which could have given us a more nuanced understanding of how and why reasons for preferring Internet gambling varied among different categories of people.

References

Abbott, M.W., & Volberg, R.A. (1999). *Gambling and problem gambling in the community: An international overview and critique*. Wellington, New Zealand: Department of Internal Affairs.

American Gaming Association. (2006a). *Industry information fact sheets: Internet gambling.* Washington, DC: Author. Available at http://www.americangaming.org/Industry/factsheets/issues_detail.cfv?id=17

American Gaming Association. (2006b). Gambling and the Internet. In *2006 AGA Survey of Casino Entertainment* (pp. 21–27). Washington, DC: Author. Available at http://www.americangaming.org/assets/files/2006_Survey_for_Web.pdf

Amey, B. (2001). *People's participation in and attitudes to gaming, 1985–2000*. Wellington, New Zealand: Department of Internal Affairs.

Auriemma, T.N., & Lahey, W. (1999, September). *Gambling on the Internet: Report to the International Association of Gaming Regulators (IAGR).* Paper presented at the 1999 IAGR Conference, Paradise Island, The Bahamas. Retrieved February 1, 2005, from http://www.iagr.org/iagrwebgpaper.PDF [This link is no longer available. –ed.]

Azmier, J.J. (2000). *Canadian gambling behaviour and attitudes: Summary report*. Calgary, AB: Canada West Foundation.

Basham, P., & White, K. (2002). *Gambling with our future? The costs and benefits of legalized gambling.* Vancouver, BC: Fraser Institute.

Brown, D., Patton, D., Dhaliwal, J., Pankratz, C., & Broszeit, B. (2002, February). *Gambling involvement and problem gambling in Manitoba*. Winnipeg, MB: Addictions Foundation of Manitoba.

Canadian Partnership for Responsible Gambling. (2004). *Canadian gambling digest*. Retrieved September 22, 2005, from http://www.cprg.ca/articles/canadian_gambling_digest_2004.pdf

Casino City. (2006). *Online Casino City*. http://online.casinocity.com/

Derevensky, J.L., Gupta, R., & McBride, J. (2006, August–September). *Internet gambling among youth: A cause for concern*. Paper presented at the Global Remote and E-Gambling Research Institute Conference, Amsterdam, Netherlands.

Ferris, J., & Wynne, H. (2001, February). *The Canadian Problem Gambling Index: Final Report.* Ottawa, ON: Canadian Centre on Substance Abuse. Available at http://www.ccsa.ca/NR/rdonlyres/58BD1AA0-047A-41EC-906E-87F8FF46C91B/0/ccsa0088052001.pdf

Griffiths, M. (1999). Gambling technologies: Prospects for problem gambling. *Journal of Gambling Studies, 15,* 265–283.

Griffiths, M. (2001). Internet gambling: Preliminary results of the first U.K. prevalence study. *Electronic Journal of Gambling Issues: eGambling, 5*. Available at http://www.camh.net/egambling/issue5/research/griffiths_article.html

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

Griffiths, M. (2006, August–September). *Internet gambling: What can the past tell us about the future?* Paper presented at the Global Remote and E-Gambling Research Institute Conference, Amsterdam, Netherlands.

Griffiths, M. D., & Parke, J. (2002). The social impact of Internet gambling. *Social Science Computer Review, 20,* 312–320.

Griffiths, M., & Wood, R. T. A. (2000). Risk factors in adolescence: The case of gambling, videogame playing, and the Internet. *Journal of Gambling Studies, 16,* 199–225.

Griffiths, M., Wood, R.T. A., & Parke, J. (2006, May). *A psychosocial investigation of student online poker players*. Paper presented at the 13th International Conference on Gambling, Lake Tahoe, NV. Available at http://www.unr.edu/gaming/13th_Conference_Web_files/Files/Abstracts/index.htm

Hammer, R. D. (2001). Does Internet gambling strengthen the U.S. economy? Don't bet on it. *Federal Communications Law Journal, 54* (1), 103–128.

Howard, P.E.N., Rainie, L., & Jones, S. (2001). Days and nights on the Internet: The impact of a diffusing technology. *American Behavioral Scientist, 45,* 383–404.

Kelly, R., Todosichuk, P., & Azmier, J. (2001). *Gambling at home: Internet gambling in Canada.* Calgary, AB: Canada West Foundation.

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.

LaRose, R., Mastro, D., & Eastin, M. S. (2001). Understanding Internet usage: A social-cognitive approach to uses and gratifications. *Social Science Computer Review, 19,* 395–413.

Luntz, Maslansky Strategic Research. (2006). *Online Gambling Survey results: Feb. 28–Mar. 5, 2006.* Washington, DC: American Gaming Association.

McMillen, J., & Woolley, R. (2003, February). *Australian online gambling policy: A lost opportunity?* Paper presented at Pacific Conference on I-Gaming, Alice Springs, Australia.

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

Rasmussen Reports. (2006, October). *A Virtual roll of the dice. Survey of 1,000 adults Sept 16–17, 2006*. Available at http://www.rasmussenreports.com/public_content/lifestyle/a_virtual_roll_of_the_dice

RSe Consulting. (2006, October). *A literature review and survey of statistical sources on remote gambling. Final report*. London, U.K.: Author. Available at http://www.culture.gov.uk/NR/rdonlyres/E0A395C1-35CC-4717-BF00-B1F6BD3A6B76/0/RemoteGambling_RSeReport.pdf

Smith, G., & Wynne, H. (2002). *Measuring problem gambling in Alberta using the Canadian Problem Gambling Index*. Edmonton, AB: Alberta Gaming Research Institute.

Turner, N. (2002). Internet gambling. *Electronic Journal of Gambling Issues: eGambling: 6*. Available at http://www.camh.net/egambling/issue6/first_person/index.html

The Wager (1999, May). Online casinos: A closer look. *The Wager, 4* (20). Available at http://www.basisonline.org/backissues/1999/vol4pdf/w420.pdf

Wasserman, I.M., & Richmond-Abbott, M. (2005). Gender and the Internet: Causes of variation in access, level, and scope of use. *Social Science Quarterly, 86* (1), 252–270.

Watson, S., Liddell Jr., P., Moore, R. S., & Eshee Jr., W. D. (2004). The legalization of Internet gambling: A consumer protection perspective. *Journal of Public Policy and Marketing, 23* (2), 209–213.

Welte, J.W., Barnes, G.M., Wieczorek, W.F., Tidwell, M., & Parker, J. (2002). Gambling participation in the U.S.—Results from a national survey, *Journal of Gambling Studies, 18,* 313–337.

Wood, R.T., & Williams, R.J. (2006). *Internet gambling: Prevalence, demographics, and behavior.* [Study in progress, funded by the Ontario Problem Gambling Research Centre.]

Wood, R.T. & Williams, R.J. (2007a). Internet gambling: Patterns, characteristics, and emerging issues. In G. Smith, D. Hodgins, & R. Williams (Eds.), *Research and measurement issues in gambling studies* (pp.486-502). Toronto: Elsevier Publishing.

Wood, R.T., & Williams, R.J. (2007 b). Problem gambling on the Internet: Implications for Internet gambling policy in North America. *New Media & Society*, *9* (3), 520-542.

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

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[1] Past studies, when examined chronologically, offer a more detailed picture of the expansion of Internet gambling Web sites. In 1995, there were only 24 Internet gambling sites accessible online (Watson et al., 2004). By May 1998, that figure had increased to 190, including 90 online casinos, 39 lotteries, 8 online bingos, and 53 sports books (Basham & White, 2002). Within a single year, those figures had more than doubled, with 250 online casinos, 64 lotteries, 20 bingos, and 139 sports books (Auriemma & Lahey, 1999; Basham & White, 2002). In 2001, it was estimated that hundreds of millions of people had convenient Internet access to upward of 1,400 different online gambling sites (Kelly, Todosichuk, & Azmier, 2001). By 2002, the number of accessible Internet gambling sites was estimated to be approximately 2,000 in total (Watson et al., 2004), confirming experts' earlier predictions of a continued rapid increase in the number of gambling Web sites (Abbot & Volberg, 1999; Hammer, 2001; Turner, 2002). In October, 2006, there were over 2,500 Internet gambling Web sites owned by 465 different companies listed at http://www.online.casinocity.com.

[2] Studies conducted in 2006 were not available when the present study was being designed. Thus, findings of these studies were not used to construct categories or questions in the survey the present authors used to assess gambling preference.

[3] An in-depth presentation of our findings related to problem gambling may be accessed in this alternative publication.

[4] Following standard procedure in social scientific research, the coefficient of reliability was computed simply by dividing the number of identically coded units by the total number of units.

[5] Moderate problem gamblers are people who score between 3 and 7 on the CPGI. Severe problem gamblers are people who score 8+ on the CPGI.

Recall of electronic gaming machine signs: A static versus a dynamic mode of presentation

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Abstract

This study compared differences in rates of free and cued recall for messages displayed on electronic gaming machines (EGMs) delivered in one of two display modes: static or dynamic. Rates of recall were investigated in a laboratory setting using 92 university students (75.0% female) with a mean age of 19.3 years (*SD* = 2.4 years). The static mode consisted of a fixed government-mandated message placed on the frame of an EGM directly next to the gaming buttons. In the dynamic mode, an identical message was presented in the form of a translucent display scrolling across the screen during play.

Results showed that significantly more of the information presented in dynamic mode was recalled, and with greater accuracy, in both free recall and cued recall conditions compared with static government-mandated messages. It was concluded that the method of displaying signs influences awareness and recall of harm minimization messages.

Keywords: electronic gaming machines, gambling, responsible gaming signage, cued recall, free recall

Introduction

In response to the major public health issue of problem gambling, governments have introduced a range of responsible gambling strategies and harm minimization interventions (Korn & Shaffer, 1999; National Research Council, 1999; Productivity Commission, 1999). Extending the findings and the framework offered by various health and behavioural decision-making theoretical models (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Janz & Becker, 1984; Ladouceur & Walker, 1996 Langer, 1983; Prochaska & DiClemente, 1982, 1983; Rosenstock, Strecher, & Becker, 1988), regulatory agencies and the gaming industry have focused heavily on initiatives designed to educate and promote informed choice among players (Blaszczynski, Ladouceur, Nower, & Shaffer, 2005). These initiatives include the provision of signs, messages, brochures, and booklets within venues describing the potential risks associated with gambling, odds and probabilities of winning, and resources available for access in response to problems that emerge, as well as the incorporation of course segments on gambling or probabilities in school curricula.

The principle underlying this focus is derived from the argument that the ultimate decision on whether or not to commence or continue to gamble remains with the individual and represents a choice, but that to properly make such an informed choice requires sufficient, necessary, and timely information (Blaszczynski, Ladouceur, & Shaffer, 2004). This position is consistent with trade practice legislation and forms the foundation for public health campaigns relevant to other consumer products: food, tobacco, alcohol, and medications.

From a cognitive behavioural etiological model of problem gambling, irrational beliefs, erroneous perceptions, and misunderstood concepts of randomness and the mutual independence of chance events contribute to illusions of control, illusory correlations, illusions of predictability, and biased evaluations that cause gamblers to overestimate chances of winning and ultimately to foster persistence in continued gambling behaviour (Ladouceur & Walker, 1996; Langer, 1983; Myers, 2002; Walker, 1992).

As empirically demonstrated by clinical (Echeburua, Baez, & Fernandez-Montalvo, 1996; Ladouceur, Sylvain, Boutin, & Doucet, 2002; Sylvain, Ladouceur, & Boisvert, 1997) and laboratory studies (Dixon, 2000), information leading to the correction of cognitive errors is effective in improving the accuracy of estimates of winning and reducing excessive gambling behaviours, although the true functional relationship between cognitive changes and gambling behavioural outcomes remains to be established.

Electronic gaming machines (EGMs) is a term applied to any form of gambling offered via terminal screens and typically includes slot machines or its variants (video lottery terminals, poker machines, and fruit machines), keno, video draw-poker and blackjack, and electronic roulette. These forms of gambling in aggregate account for the largest proportion of gambling revenue and are the primary form of activity reported by treatment-seeking problem gamblers (Productivity Commission, 1999). Accordingly, government agencies and industry operators have acted to introduce primary and secondary information campaigns specifically targeting EGMs. One important initiative relates to the requirement to display "responsible gaming" messages on, or in close proximity to, EGMs that describe probabilities of winning major prizes, as well as to display warnings of the potential addictiveness and harm risk that gambling may produce (Australian Gaming Council, 2001; NSW Gaming Machines Regulation Act, 2002; Schrans, Schellinck, & Grace, 2004). The provision of such signs should improve knowledge and accurate estimates of the probability of winning and, through the facilitation of awareness and informed choice, subsequently modify gambling behaviour.
Studies show that individuals are aware of, and recall messages currently displayed on, EGMs in venue settings (Hing, 2003, 2004). In a survey designed to assess member awareness, perceived adequacy, and perceived effectiveness of responsible gambling strategies in Sydney clubs, over 67% of respondents indicated they had noticed signs

relating to chances of winning major prizes on EGMs. However, despite recognition of responsible gambling measures in respondents, these messages were shown to be generally ineffective in that results revealed that, for all of the responsible gambling easures implemented in clubs, changes were made in only 44% of players' thinking patterns and 12% of players' feelings about gambling, with 18% of players reducing frequency of gambling, 17% reducing duration of gambling, and 19% reducing amount of money spent (Hing, 2003, 2004). Furthermore, the extent and accuracy of such recalled information was not evaluated, leaving open the possibility of demand characteristics and leading respondents to report awareness without being fully cognizant of the specific content of messages displayed. These results indicate that mandated responsible gaming strategies have a limited impact on changing gambling-related thoughts and behaviour.

Steenbergh, Whelan, Meyers, May, and Floyd (2004) investigated the impact of warning and brief intervention messages on knowledge of gambling risk, irrational beliefs, and behaviour by comparing control subjects with those who received a brief audio-visual message prior to a session of play explaining the odds of winning roulette and the risks associated with gaming. These authors found that audio-visual messages increased participants' ability to nominate the correct response from a selection of possible answers regarding odds and risks associated with gambling when questioned immediately after play, but did not produce significant cognitive or behavioural changes. Although this study provides some support for using informative messages targeting incorrect beliefs to correct erroneous perceptions, thereby reducing the initiation of further gaming sessions and prolonged play, further empirical studies are necessary.

Accordingly, there is a need to determine the optimal mode of delivery of text messages in gambling research. There are a number of options available with respect to gaming machines: placement of static messages on machines, "pop-up" dialogue boxes, or translucent messages that scroll across the screen. Research on the effective design for warning labels has yielded some empirically based guidelines. For example, to have any impact, messages must attract attention, be resistant to the effects of habituation, be relevant to the targeted activity, and be comprehendible (Malouff, Schutte, Wiener, Brancazio, & Fish, 1993; Stewart & Martin, 1994).

Dynamic as opposed to static messages appear to meet these requirements. Dynamic messages are capable of attracting attention in the presence of competing visual stimuli (Johnston & Dark, 1990), interrupting attention to primary tasks (gambling) by captivating attentional focus to the sign, and affecting performance on the primary task over a longer duration; in addition, dynamic messages have a longer lasting effect on cognitions (Bailey, Konstan, & Carlis, 2001). Motion cues appear to outperform static representations with regard to speed and accuracy of responses to displays in a screen's periphery (Bartram, Ware, & Calvert, 2001), and studies have demonstrated that signs placed in central locations where they attract attention increased recall and distracted consumers from processing surrounding product information (Clark & Brock, 1994; Laughery, Young, Vaubel, & Brelsford, 1993). Additionally, attentional shifts can be

enhanced through the use of several techniques, including large, bold print; high contrast; colour; borders; and special effects such as flashing lights (Wogalter, Conzola, & Smith-Jackson, 2002).

A vital element of informational displays is comprehension, which is being able to remember and understand information that is conveyed. Comprehension in a multi-line paragraph format was found to be not significantly different from rapid serial presentations of constantly changing textual displays (Juola, Ward, & McNamara, 1982). Additionally, secondary animated displays in a dual-task situation did not significantly interrupt users from a primary task but still effectively communicated information (McCrickard, Catrambone, Chewar, & Stasko, 2003). To be an effective harm-minimization strategy, allowing informed choice in gambling-related decisions, signage must communicate information to the player. However, as harm-minimization strategies aim to reduce possible harm caused to the individual and the community by problem gambling without reducing recreational gambling, a dynamic display allowing comprehension without disturbing play achieves this goal.

The aim of the current study was to investigate the differential extent to which gamblers recall informative and dynamic signs as compared with government-mandated messages on EGMs. The specific objective was to determine the extent to which gamblers can recall information freely and in response to prompted cues and to determine whether modifying the mode of delivery of information contained in signs leads to improved recall.

The following hypotheses were tested:
1. Dynamic translucent scrolling as compared with static messages during play will result in greater free and cued recall of information contained in the message.
2. Exposure to dynamic messages will be associated with greater accuracy of recall.

Method

Participants

Participants were 100 undergraduate psychology students from the University of Sydney. Data from 8 subjects were excluded from analysis because of a malfunction in one machine that invalidated play, leaving a final sample of 92 participants**.** All participants spoke fluent English and received credit in their psychology course for participation. Of the sample, 75.0% were female, and ages ranged from 18 to 33 years (M = 19.3, SD = 2.4). Slightly less than half (47.8%) of the participants reported EGM play in the past year.

The University of Sydney's Ethics Committee approved this study under a group application for research involving first-year psychology students. Participants were ecruited using the School of Psychology's on-line system, Experimetrix.

Procedure

Two Mk VI Series 2 EGMs provided by Aristocrat Leisure Industries were used in the study. The NSW Liquor Administration Board (LAB) approved the use of these EGMs for research purposes under section 8(2) (b) of the NSW Gaming Machines Regulation Act (2002). The EGMs were standard configuration machines with graphic designs displaying payout schedules. One machine displayed a static message and the other machine displayed a modified sign according to the experimental conditions described below. The procedure took place in a laboratory setting within the Department of Psychology. Participants were randomly allocated to one of the two following conditions:
1. *Static standard message* (*n* = 45): Standard unmodified static sign containing information on the chance of winning in the text, the size of wording mandated by the NSW Gaming Machines Regulation Act of 2002, section 21: "Your chance of winning the maximum prize on a gaming machine is generally no better than one in a million." The message was printed on a sticker fixed to the left of the screen, written in bold black font on a white background containing a red BetSafe logo, as displayed in Figure 1.
2. *Dynamic standard message* (*n* = 47): A translucent display designed to scroll across the middle of the screen from right to left at intervals of 3 min that included the same information and wording as the standard static sign. The design of the display was based on empirically established guidelines for effective warning messages and was not intended to replicate the mandated message, but rather to enhance the capacity of the sign to attract attention and facilitate comprehension. The message, as shown in Figure 2, appeared in a white-bordered box, which took up approximately 7% of the total area of the screen, in bold yellow letters on a translucent grey background in the middle of the screen. It took 15 s to scroll across the screen, allowing normal play to continue throughout its progression across the screen.

Participants were requested to play an EGM for a session lasting 10 min. Machines were preloaded with credit points, given that money was not to be used under the condition of approval prohibiting the use of machines for purposes of gaming imposed by the LAB.

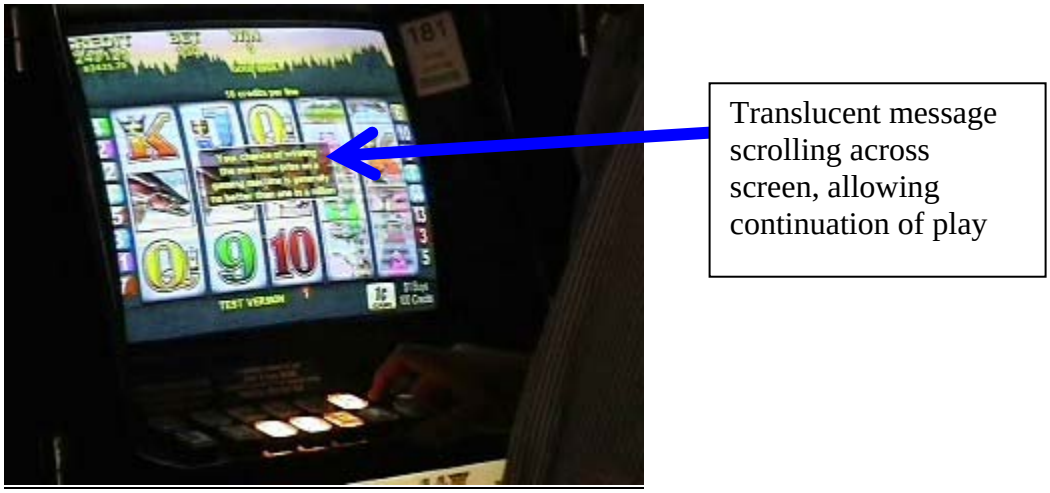
Condition 1: Free recall of information
Participants were requested to freely recall and record all information that they remembered was displayed on EGM screens and machines during the session of play and were given 2 min to record their responses on a blank piece of paper. No prompts or hints were given related to what information was to be recalled. Responses received a score of 2 if participants recorded responses that indicated full awareness of the content, judged as responses replicating the exact wording of the message; 1 for partial information, judged as responses indicating correct knowledge of the content of the message without replicating the exact wording; and 0 for no or erroneous information.

Figure 1. Location and size of static sign on standard electronic gaming machine as used in study.

Condition 2: Cued recall of information

Participants were then asked to complete a memory and awareness task in a questionnaire format designed to specifically target the harm-minimization message displayed on the EGM and to assess the extent to which that information was recalled by participants. Participants were cued by a question asking if they recalled a sign relating to outcomes of play or chances of winning and indicated yes or no before being asked to write down the exact content of the message. This step allowed a measure of claimed recall as compared with accuracy of recall. Similar to the free recall condition, participants were allocated a score of 0 for no or erroneous information recognized, 1 for partial recognition, and 2 for accurate recognition of information. Participants were also asked to indicate on a 0-to-100 scale their level of confidence in remembering accurately the information displayed in the messages.

Figure 2. Dynamic message scrolling from right to left on standard electronic gaming machine as used in the study.



Statistical analyses

The dependent variables were free and cued recall, accuracy, and confidence of recall of message content. The independent variable manipulated between subjects was the mode of presentation. Independent sample *t* tests were used to determine significant differences between groups. To test the hypotheses that dynamic messages scrolled across the screen during play would result in greater recall of messages than would static messages, the mean scores for free and cued recall and accuracy of recall for the dynamic condition were compared with mean scores for these variables in the static condition, using independent sample *t* tests.

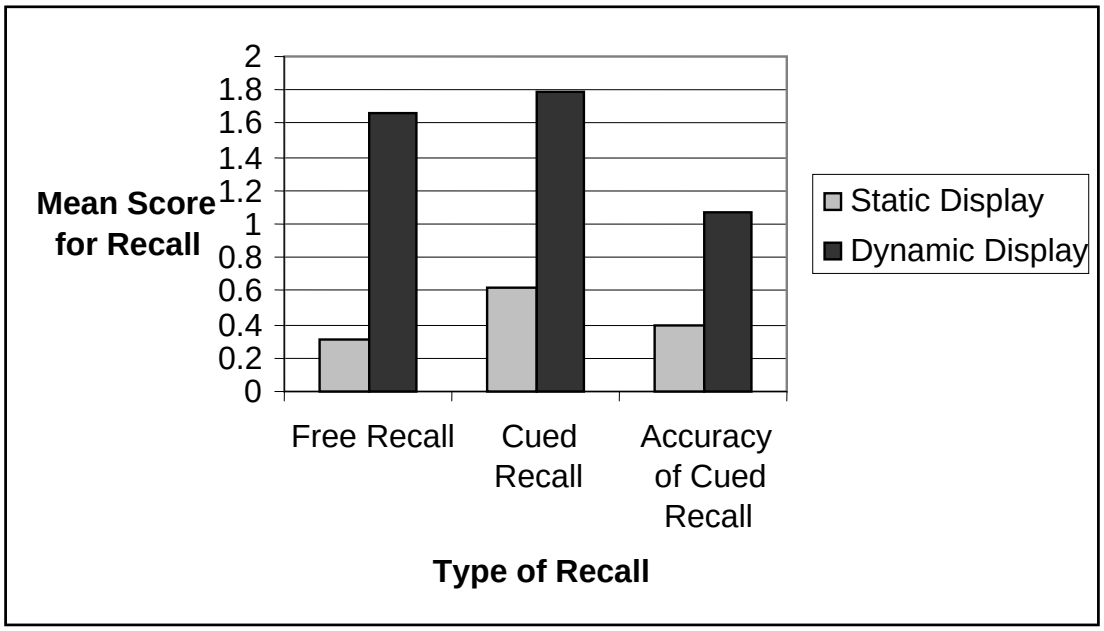
Results

Display mode and recall

As shown graphically in Figure 3, the dynamic mode of delivery resulted in significantly more of the messages being recalled under conditions of free, cued, and estimated confidence of accuracy as compared with static message displays.

Participants in the dynamic condition were able to freely recall messages to a significantly greater extent (M = 1.66, SD = 0.76) compared with those exposed to the static condition (M = 0.31, SD = 0.73; $t(90)$ = -8.66, p = 0.01). The proportion of participants who freely recalled the dynamic message was 83.0% (n = 47), compared with 15.6% (n = 45) of those who saw the static message.

Figure 3. Mean score for free recall, cued recall, and accuracy of cued recall for n = 92 undergraduate psychology students, under conditions of static and dynamic modes of message displays on electronic gaming machines.



Cued recall associated with the dynamic condition (M = 1.79, SD = 0.55) was also significantly greater than that found under the static condition (M = 0.62, SD = 0.86; $t(90)$ = -7.78, p = 0.01), with 85.1% (n = 47) of participants in the dynamic condition recalling messages compared with 24.4% (n = 45) of those in the static condition.

Information was recalled significantly more accurately when presented in dynamic (M=1.06, SD=0.53) as compared with static mode (M = 0.40, SD = 0.65, $t(90)$ = -5.37, p = 0.01).

Participants demonstrated significantly greater confidence in their recollection of the message content for the dynamic (M = 75.78, SD = 29.34) compared with static modes (M = 26.80, SD = 33.53, $t(90)$ = -7.46, p = 0.001).

Effects of previous gaming experience on recall

A chi-square analysis failed to detect any significant differences in the distribution of experienced and inexperienced players between groups, suggesting that differences in results were not caused by pre-existing differences in player experience. An analysis of data revealed that all differences in recall scores for inexperienced and experienced players were non-significant.

Effect of gender on recall

A chi-square analysis failed to reveal a significant difference in the distribution of gender across conditions. Furthermore, there were no significant differences in recall scores for males and females.

Discussion

Consistent with the hypothesis proposed, the results of the present study indicate that significantly greater free and cued recall and accuracy of cued recall, as well as confidence in cued recall, is associated with dynamic modes of presentation, in contrast with static displays of messages. Dynamic displays appear to attract and absorb the attention of players in the presence of multiple sources of competing audio and visual stimuli more effectively than static signs, as shown by players' capacity to accurately and confidently recall the information, and therefore represent a more effective mode through which information influencing rates of EGM play may be presented to players. Rates of free and cued recall tasks, as well as increased accuracy of and confidence in recall, following play with dynamic modes imply that this method has significant advantages in capturing and retaining attention, as well as in efficiently communicating information to players, which results in greater comprehension.

The responsible gaming messages and mode of delivery used in this study conform with the Productivity Commission (1999) recommendations on the need to provide accurate and easily accessible information to players and is designed to increase knowledge and awareness of risks and probabilities associated with gaming. The low mean recall scores for static messages indicate that this mode of delivery fails to generate any strong awareness of information contained in displayed messages.

However, it is important to bear in mind that responsible gaming messages, as in other public health initiatives, including smoking and alcohol consumption (Krugman, Fox, Fletcher, & Rojas, 1994; Parker, Saltz, & Hennessy, 1994), may not effectively modify actual gambling-related cognitions or behaviours. Disconcertingly, for all conditions, the average accuracy of cued recall was relatively low despite participant's positive response indicating cued recall, suggesting that although participants become aware of the content of messages to some extent, not all relevant information is retained.

Compared with the rate reported by Hing (2003, 2004) for awareness of signs displayed in club venues in Sydney, Australia, rates in the current study were lower for static but higher for dynamic modes of delivery. This result suggests the possibility that static signs are initially associated with low immediate recall, with such recall increasing following repeated exposure associated with regular play. In contrast, the high number of participants in this study immediately recalling dynamic signs suggests that this mode of

presentation has a far greater capacity to draw attention to information during first exposure. Given that recall of static signs may increase over repeated exposure, the same should apply to dynamic signs, suggesting that dynamic signs have the advantage over static signs in attracting attention more rapidly and resulting in greater awareness following repeated exposure in comparison to static signs. If replicated, this is a significant finding, as the dynamic signs represent a more effective means of rapidly informing players of the risks and probabilities of gambling to foster informed choice.

Conclusions drawn from this study are limited by several methodological difficulties. Pursuant to section 8(2) (b) of the NSW Gambling Machines Regulation Act (2002), approval for use for research purposes prohibited players from using their own money to play. Although considered not to have had a major effect on attention and recall of information, the use of money may have affected cognitions and style of play. Participants were not using their own money and therefore unconcerned about losses and unmotivated to play in a rational manner. This attitude may have resulted in information contained in signs to be ignored or considered irrelevant.

Furthermore, although subjects chose to participate in this study, their goal was to gain credit for their psychology course and consequently they may not have been interested in attending to perceived ancillary aspects of the study's environment. This possibility would have the effect of causing participants to not pay attention during play or place efforts on the recall of information. However, the majority of participants gave positive feedback and indicated they enjoyed the experience, expressing interest in the research outcomes, suggesting that disinterest may not have been a great source of contamination.

The use of laboratory rather than in vivo settings limits the extent of findings and conclusions drawn, particularly with respect to habituation and long-term changes in recall. Longitudinal empirical investigation for in vivo settings with regular gamblers is required to effectively determine the impact of variable modes of information delivery and retention of information. Substantially, it is imperative that longitudinal studies are conducted to determine the link between effective attention to, and retention of, information presented to players and changes in actual gambling behaviour. Participants' successes at free and cued recall tasks, as well as increased accuracy of and confidence in recall following play with dynamic messages, imply that the sign made significant improvements in capturing and maintaining attention as well as in efficiently communicating information, resulting in greater comprehension of the message. These highly significant findings establish that dynamic displays may provide an effective mechanism for allowing informed choice in responsible gambling strategies.

This study may inform policy decision makers and key stakeholders, as it established that dynamic messages increase the extent to which EGM players can recall information freely and in response to prompted cues compared with government-mandated static signs. Although future research is needed regarding the most suitable content of

messages, this study highlights the importance of using a dynamic mode of display to maximize the effectiveness of responsible gambling messages.

References

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice Hall.

Australian Gaming Council. (2001). *Responsible gaming code.* Retrieved March 28, 2004, from http://www.austgamingcouncil.org.au/images/pdf/eLibrary/3220.pdf

Bailey, B., Konstan, J., & Carlis, J. (2001). The effects of interruptions on task performance, annoyance, and anxiety in the user interface. In M. Hirose (Ed.), *Human-Computer Interaction: INTERACT '01* (pp. 593–601). Amsterdam, The Netherlands: IOS Press.

Bartram, L., Ware, C., & Calvert, T. (2001) Moving icons: Detection, distraction and task. In M. Hirose (Ed.), *Human-Computer Interaction: INTERACT '01* (pp. 157–165). Amsterdam, The Netherlands: IOS Press.

Blaszczynski, A., Ladouceur, R., Nower, L., & Shaffer, H. (2005). Informed choice and gambling: Principles for consumer protection. Melbourne, Australia: Australian Gaming Council.

Blaszczynski, A., Ladouceur, R., & Shaffer, H. (2004). A science-based framework for responsible gambling: The Reno model. *Journal of Gambling Studies, 20,* 301–317.

Clark, E., & Brock, T. (1994). Warning label location, advertising, and cognitive responding. In E. Clark, T. Brock, & D. Stewart (Eds.), *Attention, attitude, and affect in responding to advertising.* Hillsdale, NJ: Erlbaum, pp. 287–299.

Dixon, M. (2000). Manipulating the illusion of control: Variations in gambling as a function of perceived control over chance outcomes. *The Psychological Record, 50,* 705–720.

Echeburua, E., Baez, C., & Fernandez-Montalvo, J. (1996). Comparative effectiveness of three therapeutic modalities in the psychological treatment of pathological gambling: Long-term outcome. *Behavioural and Cognitive Psychotherapy, 24,* 51–72.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behaviour: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Hing, N. (2003). An assessment of member awareness, perceived adequacy and perceived effectiveness of responsible gambling strategies in Sydney clubs. Retrieved May 16, 2004, from http://www.dgr.nsw.gov.au

Hing, N. (2004). The efficacy of responsible gambling measures in NSW clubs: The gambler's perspective. *Gambling Research, 16,* 32–47.

Janz, N.K., & Becker, M.H. (1984). The health belief model: A decade later. *Health Education Quarterly, 11,* 1–47.

Johnston, W., & Dark, V. (1990). Selective attention. *Annual Review of Psychology, 36,* 43–75.

Juola, J., Ward, N., & McNamara, T. (1982). Visual search and reading of rapid serial presentations of letter strings, words, and text. *Journal of Experimental Psychology: General, 111,* 208–227.

Korn, D., & Shaffer, H. (1999). Gambling and the health of the public: Adopting a public health perspective. *Journal of Gambling Studies, 15,* 289–365.

Krugman, D., Fox, R., Fletcher, J., & Rojas, T. (1994). Do adolescents attend to warnings in cigarette advertising? An eye tracking approach. *Journal of Advertising Research, 34,* 39–52.

Ladouceur, R., Sylvain, C., Boutin, C., & Doucet, C. (2002). *Understanding and treating pathological gamblers.* London: Wiley.

Ladouceur, R., & Walker, M. (1996). A cognitive perspective on gambling. In P.M. Salkovskis (Ed.), *Trends in cognitive and behavioural therapies* (pp. 89–120). Oxford: John Wiley and Sons.

Langer, E.J. (1983). *The psychology of control.* Beverly Hills, CA: Sage.

Laughery, K., Young, S., Vaubel K., & Brelsford, J. (1993). The noticeability of warnings on alcoholic beverage containers. *Journal of Public Policy Market, 12,* 38–56.

Malouff, J., Schutte, N., Wiener, K., Brancazio, C., & Fish, D. (1993). Important characteristics of warning displays on alcohol containers. *Journal of Studies on Alcohol, 54,* 457–461.

McCrickard, S., Catrambone, R., Chewar, S., & Stasko, J. (2003). Establishing tradeoffs that leverage attention for utility: Empirically evaluating information display in notification systems. *International Journal of Human-Computer Studies, 58,* 547–582.

Myers, D.G. (2002). *Intuition: Its perils and powers.* New Haven, CT: Yale University Press.

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

NSW Gaming Machines Regulation Act (2002). Retrieved May 16, 2004, from http://www.dgr.nsw.gov.au

Parker, R., Saltz, R., & Hennessy, M. (1994).The impact of alcohol beverage container warning labels on alcohol impaired drivers, drinking drivers and the general population in northern California. *Addiction, 89,* 1639–1651.

Prochaska, J.O., & DiClemente, C.C. (1982). Transtheoretical therapy: Toward a more integrative theory of change. *Psychotherapy: Theory, Research and Practice, 19,* 276–288.

Prochaska, J.O., & DiClemente, C.C. (1983). Stages and process of self-change of smoking: Toward an integrative model of change. *Journal of Clinical and Consulting Psychology, 51,* 390–395.

Productivity Commission. (1999). *Australia's gambling industries* (Report No. 10). Canberra, Australia: Ausinfo.

Rosenstock, I.M., Strecher, V.J., & Becker, M.H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly, 15,* 175–183.

Schrans, T., Schellinck, T., & Grace, J. (2004) *Nova Scotia VLT self exclusion program process test: Final report.* Halifax, Nova Scotia: Focal Research.

Steenbergh, T., Whelan, J., Meyers, A., May, R., & Floyd, K. (2004). Impact of warning and brief intervention messages on knowledge of gambling risk, irrational beliefs and behaviour. *International Gambling Studies, 4,* 3–16.

Stewart, D., & Martin, I. (1994). Intended and unintended consequences of warning messages: A review and synthesis of empirical research. *Journal of Public Policy and Marketing, 13,* 1–19.

Sylvain, C., Ladouceur, R., & Boisvert, J.-M. (1997). Cognitive and behavioural treatment of pathological gambling: A controlled study. *Journal of Consulting and Clinical Psychology, 65,* 727–732.

Walker, M.B. (1992). *The psychology of gambling.* Oxford, England: Pergamon Press.

Wogalter, M., Conzola, V., & Smith-Jackson, T. (2002). Research-based guidelines for warning design and evaluation. *Applied Ergonomics, 33,* 219–230.

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Interactive television quizzes as gambling: A cause for concern?

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Abstract

Recently, there has been a significant increase in the number of UK television shows in which viewers call into the show using a premium-rate telephone service. At one level it could be argued that in these instances viewers are participating in a lottery. Viewers are typically asked to call a premium-rate telephone line to answer a simple question. Winners are then chosen from all those viewers with the correct answer. It could also be argued that the viewer is staking money (i.e., the cost of the premium-rate telephone call) on the outcome of a future event (i.e., whether they will get the correct answer). This again could be defined as a form of gambling. Interactive television quiz shows share many of the dimensions of interactive television gambling and also raise the same concerns about vulnerable and susceptible populations. These concerns are discussed.
Keywords: gambling, interactive television, premium-rate telephone lines, lotteries

Background

Interactive television (i-TV) services are increasingly being linked to actual television programmes (Griffiths, 2006). Over the last few years in the UK, there has been a significant increase in the number of television shows raising revenue through the use of interactive programming. One of the most popular methods has viewers call into the television show using a premium-rate telephone service to either answer simple quiz questions or vote somebody out of a reality TV show. The television programmers clearly see this as a way of raising extra revenue. There are also those who argue that this form of television programming is gambling in another guise. Whether this television phenomenon is a bona fide type of gambling is debatable, but, as outlined later in this paper, some elements certainly resemble gambling.

This innovative form of interactive viewing experience raises many questions about whether viewers are being exploited or whether such programming is just another enjoyment-enhancing dimension of the viewing experience. However, there is a fine line between customer enhancement and customer exploitation (Griffiths, 2003). Programmers will argue that when viewers 'put their money where their mouth is' the viewing experience is enhanced. This is very similar to the gambling industry's maxim that 'it matters more when there's money on it'. However, callers are charged at a premium rate (usually between 75p and £1.50 per call) even if they fail to get through to register their answer. Typically, on failing to connect, callers get a recorded message saying, 'Even though you haven't got through this time, we still want you to be a winner'.

Many may argue that this type of practice is exploitative. Furthermore (and beyond the scope of this paper), there may be issues surrounding those individuals who begin to feel part of the show by continually ringing in and starting to build pseudorelationships with the presenters.

The similarities of i-TV quizzes to gambling experiences have not gone unnoticed by those of us in the UK who do research in the gambling field. Interactive quiz shows and the opportunity to gamble tend to increase television viewers' interest in the event they are watching. They also have the added advantage of boosting ratings for the television companies. So why be concerned? In the UK alone there have been increasing numbers of media stories from people who feel they have been exploited by television companies and from politicians calling for increased legislation and/or consumer protection relating to i-TV games. If media reports are to be believed, some individuals are certainly in financial crisis as a result of i-TV games. However, there are (as yet) no statistics on what portion of gambling helpline calls, credit counselling caseload, and use of other such services can be linked to such games.

Before we examine this issue further, note that no empirical research has been carried out in this area and that the role of this paper is to raise some potential issues of concern based on what we know about other forms of remote gambling. The paper is not about trying to create a 'moral panic' but attempts to explore issues surrounding the psychosocial impact of i-TV's links with gambling and gambling-type games.

I-TV's gaming and gambling

In the UK, uptake of interactive digital television is crucial to government plans for universal Internet access and for turning off the analogue signal by 2010, and i-TV gaming and gambling (including pseudogambling experiences such as i-TV quiz shows) are likely to flourish (Griffiths, 2006). It should also be noted that there are two possible routes that i-TV gambling/gaming can take. Firstly, there is television quiz show participation, which may feature gambling and/or gambling-like experiences. Secondly, there is the option of using the television as a medium on which to gamble. Although the emphasis in this paper will be on television quiz show participation, it is clear that issues surrounding psychosocial impact on users and social responsibility of the industry appear to apply to both equally.

To grow fast in an evolving digital landscape, television companies are formulating strategies for targeting particular segments of the industry. Platform operators appear to be deploying consumer-driven applications such as gaming (including both i-TV participation quizzes and more traditional forms of gambling via the medium of television). An environment has been created where content originators and channel operators can innovate and profitably create interactive broadband content. I-TV is seen

as a way of rapidly expanding gaming and gambling because of its naturalness and ease of use. I-TV gaming can span a wide range of activities. This includes nongambling activities such as playing video games like *Tetris* on the television, playing along with game shows like *Who Wants to Be a Millionaire?* via television remote control, and directly gambling on sports events such as horse racing and football via television remote control. Lots of companies have done well financially in Europe and Asia, where more than 30% of television shows have an interactive element (Griffiths, 2006).

Through the television remote control, UK television viewers can already gamble at the push of a few buttons. Such income streams are likely to grow rapidly, with many interested parties hoping to cash in (e.g., the gaming industry, television programmers, sports rights holders). Merrill Lynch predicts the global remote gambling industry will be worth £125 billion by 2015 and that i-TV gambling is likely to account for 50% of the income. This would be more than 10% of the overall world gambling industry (estimated at £600 billion). In addition, *Datamonitor* published a report, 'iTV games and gambling in Europe' (2003; cited in Griffiths (2004)), noting that games (including interactive quiz participation shows) and gambling are two of the most profitable revenue streams for i-TV. The report also noted that 'pay-per-play' business models would dominate i-TV games service provision, accounting for over 60% of revenues by 2007 (Griffiths, 2004).

Are i-TV quiz shows a form of gambling?

I-TV quiz shows share many of the dimensions of i-TV gambling and also raise the same concerns when talking about vulnerable and susceptible populations. The combination of gambling's impulsive nature, the general public's appetite for quiz trivia, and the ubiquity of television may prove hard to resist for many viewers. There are two main reasons why i-TV quiz shows could be viewed as a form of gambling.

Firstly, at a very simple level it could be argued that in many i-TV quizzes, viewers are participating in a lottery. For instance, viewers are typically asked to call a premium-rate telephone line to answer a very simple question (e.g., 'Rearrange the following letters to make the name of a top rock group—STOLLING RONES'). A winner is then chosen from all those viewers with the correct answer. This, to all intents and purposes, is a lottery. However, unlike lotteries, those participating do not know what their probability of winning is.

Secondly, it could also be argued that viewers are staking money (through the cost of the premium-rate telephone call) on the outcome of a future event (i.e., whether they will get the correct answer). Such a scenario could be defined as a form of gambling. It is clear that the gambling-like analogy is present, as the newly formed UK Gambling Commission is already examining these types of quiz shows and is likely to make regulatory recommendations for them to be included within the gambling legislation. The UK telephone watchdog, the Independent Committee for the Supervision of Standards of

the Telephone Information Services, is also investigating whether such practices constitute a form of gambling. Ultimately, it will be the job of UK government regulators and politicians to determine (in this case) the line between a contest and a gamble. Participation in i-TV quiz shows is a good example of how the definition of gambling is being blurred.

Vulnerable populations

Whether i-TV quiz participation is a bona fide form of gambling or not, there are a number of reasons why the social impact of i-TV quizzes should be monitored. For instance, i-TV quiz shows appear to be being introduced with little concern for the psychosocial implications that may affect a small percentage of the population. Bringing such activities to a television set in the home carries with it a special social responsibility. For instance, there are issues about consumer protection for vulnerable populations, e.g., adolescents, problem gamblers, and the intoxicated (Griffiths & Parke, 2002).

It could be argued that the viewers who participate in late-night and 'through-the-night' interactive quiz programming (like *The Mint*, *Make Your Play*, *Quiz Call*, *The Great British Quiz*) may be some of the most vulnerable and susceptible. These viewers are more likely to be those who do not work and therefore are on low incomes and can least afford to participate (e.g., the unemployed, the retired and elderly). Viewers may also be making decisions to play in an intoxicated state (as these programmes typically start just as people get in from an evening's drinking) and/or in a state where they are not fully alert (i.e., at 3 in the morning). They may also be participating because they think their chances of winning are better in the belief that there are very few other people awake at 4 a.m. In fact, this latter point highlights the fact that no-one participating has any idea what the odds are of winning.

There may also be issues surrounding the type of payment used to participate. When viewers spend money participating in i-TV quizzes, they are using a form of electronic credit payment that eventually ends up on their monthly telephone bill. In effect, viewers are 'gambling' with virtual representations of money. Psychologically, this is akin to chips being used in casinos and tokens being used on some slot machines. In essence, chips and tokens disguise the money's true value (i.e., decrease the psychological value of the money to be gambled) (Griffiths, 2003). Tokens and chips are often regambled without hesitation, as the psychological value is much less than the real value. For most gamblers, it is very likely that the psychological value of virtual money or electronic credit used to pay for i-TV quizzes is less than that of 'real' cash (and similar to the value of chips or tokens in other gambling situations). Gambling with virtual representations of money may lead to a 'suspension of judgment' (Griffiths, 2003). The suspension of judgement refers to a structural characteristic that temporarily disrupts the gambler's financial value system and potentially stimulates further gambling. This is well known by those in both

commerce (i.e., people typically spend more on credit and debit cards because it is easier to spend money using plastic) and the gaming industry. Anecdotal evidence appears to suggest that people gamble more using virtual money than they would with real money (Parke & Griffiths, 2007).

Remote media, spending, and trust

It has been suggested that people may spend more money on particular kinds of remote media. For instance, Griffiths (2003) describes the Internet as a 'lean forward' medium. This means that users (who are usually alone) take an active role in determining what they do. Computers are better at displaying text than television and have a wider range of fine-tuning controls through the mouse and keyboard. This makes them more suitable for complex tasks such as obtaining insurance quotations or travel itineraries. In contrast, Griffiths (2003) describes the television as a 'lean back' medium, where the viewer (often as part of a group) is more passive and seeks less control over what is going on. The television is better at displaying moving images than the computer. This may have implications for the types of spending done in particular media. In short, people are more likely to spend money when they are in a relaxed state of mind and sitting in comfort.

Social responsibility and i-TV gaming

As there is little to stop innovative developments in i-TV gaming from moving forward, all interested stakeholders must start to think about the potential psychosocial impacts, and all companies (who, in effect, are gaming operators) must have social responsibility codes in place to ensure that viewers are not being exploited, that games are fair, and that there are protective measures in place for vulnerable individuals. I-TV gaming and gambling (including both i-TV quiz participation and more traditional i-TV gambling) are likely to bring about new and more immediate interactive opportunities. Viewers will eventually be able to make spontaneous bets during sporting events, everything from whether someone will score from a penalty in the World Cup final through to whether someone will sink a particular putt in the US Open Golf Championship.

A 2002 'white paper' (*Design guidelines for interactive television gambling*) by Stephen Voller of *TV Compass* (cited in Griffiths (2004)) did at least try to address some of the issues raised by the introduction of interactive gaming services. As Voller notes, when interactive gaming technology is brought into households, the operators have a duty to act responsibly. This applies equally to i-TV quiz participation. Voller has argued that systems that allow gaming access should have a particular requirement to provide controls that reduce the risk of gaming-related social problems. The six broad design criteria are access, reality checks, separate payments, messages, information, and self-exclusion periods.

Access. No-one under 18 years of age should be able to gamble. Therefore, to access the gambling functions, there should be a regularly changing PIN code with only three

attempts before a lockout. Voller also says a physical access device (e.g., token, smart card) should have to be inserted by the adult gambler.
Reality checks. The technology must allow reality checks (such as a built-in pause every 20 minutes to help overcome the engrossing and intensive nature of gambling) to give gamblers time to reflect on their actions.
Separate payments. On opening credit card accounts there should be a customer-led credit limit for a predetermined period of time. It is crucial to separate the setting of credit limits from the gambling process itself so that people cannot just press a button on their remote to raise credit limits.
Messages. During the gambling process there should be socially responsible gambling messages displayed at significant points in the gambling process (e.g., 'Bet with your head, not over it' when first accessing the gambling platform). Further messages could automatically scroll down the screen at regular intervals.
Information. All systems should be able to provide easy access to information such as account details, the amount won or lost in a session, and advice on where to go for help in case of a gambling problem. Furthermore, there should be no encouragement to reinvest winnings or chase losses.
Self-exclusion periods. Households should easily be able to exclude themselves from the gambling process (which may include returning the remote control itself) and not be able to reapply for an agreed-upon minimum period.

Most of these are broadly applicable to those playing i-TV quizzes. Hopefully, social responsibility measures being introduced by operators in relation to television quizzes will help minimize the potential problems brought about by (what is in effect at present) an unregulated form of gambling.

The future of i-TV gaming

In future, television viewers are more likely to participate in a much wider array of events than interactive quizzes and sporting events. This is likely to be via credit payment directly through their digital interactive service. This may include popular UK television events like betting on who will win the Eurovision Song Contest, who will be evicted from the *Big Brother* house, or who will pick up an Oscar. Such nonsport gambling may also bring in new clientele such as female television viewers. The take-up of i-TV quiz participation and/or i-TV gambling may also be very popular with those people who would not dream of going to a casino or betting shop. The use of i-TV quiz participation and/or i-TV gambling may help change people's attitude about gambling by destigmatizing and demasculinizing it. These new types of gambling and gaming experiences could lead to a more social experience shared by clientele across the demographic spectrum.

In the UK, *Sky TV* has made no secret that it wants to earn £400 a year from each of its digital viewers (on top of the basic subscription package). The plan is to recoup the cost

of interactive services through i-TV quiz participation, games, gambling, and broadcast-driven television applications. In an economically uncertain climate, turning viewers into consumers is not easy. However, i-TV quizzes and gaming appear to be *Sky*'s proverbial golden goose. For digital service providers to make a profit, viewers will have to have an incentive for them to interact and will expect more from a set-top box than linear broadcast. Interactive quiz shows and gambling at least offer the chance for viewers to win some money. Whether i-TV will be an effective revenue model remains to be seen, but television commerce, premium-rate telephony, games, and gambling are likely to provide a commercial remedy. However, this must not be done at the expense of exploiting potentially vulnerable viewers.

Final thoughts

The issue of i-TV quiz participation can also be framed more widely in a contemporary society that is increasingly governed by virtual processes. The kind of manipulation that is involved in getting people to respond to an event, even if they have to pay to respond, is achieved by offering a prize that the individual is very unlikely to win. In getting people to respond through this kind of process, the entrepreneurial operators are assured that they will have increased financial revenue through the money they raise by facilitating people to voluntarily behave in these ways. This opens up a discourse examining the ways that people are intentionally manipulated to behave in ways that cost while promising an improbable outcome. This may help us construct useful models which could help us understand and provide insight into gambling behaviours. It also invites discussion of what policies should inform the ways that media such as television and the Internet engage and prime people who have become 'enchanted' by a theatrical experience to behave in ways that, if not inevitable, are statistically predictable. There may even be factors of vulnerability that correlate with the likelihood that people will act that way.

References

Griffiths, M.D., & Parke, J. (2002). The social impact of Internet gambling. *Social Science Computer Review, 20,* 312–320.

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

Griffiths, M.D. (2004). Interactive television gambling: Should we be concerned? *World Online Gambling Law Report, 3* (3), 11–12.

Griffiths, M.D. (2006). Interactive television and gaming. *World Online Gambling Law Report, 5* (2), 12–13.

Parke, J., & Griffiths, M.D. (2007). The role of structural characteristics in gambling. In G. Smith, D. Hodgins, & R. Williams (Eds.), *Research and measurement issues in gambling studies* (pp. 211–243). New York: Elsevier.

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Counselling for Problem Gambling: Person-Centred Dialogues

By Richard Bryant-Jefferies. (2005). Oxford, UK: Radcliffe Publishing, xiii, 177 pp., ISBN 1-85775-740-8 (paperback only). Price: $38.00 USD.

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Currently, there are several different types of psychotherapeutic approaches that can be used with problem gamblers. Those most commonly used are cognitive-behavioral therapy (CBT), psychodynamic therapy, motivational interviewing, and supportive psychotherapy. Research into the effectiveness of each of these therapies is just now beginning. Demand for treatment services, however, is rising quickly in every developed country. Coupled with the fact that only a limited body of evidence supports pharmacotherapy for problem gambling is a pressing need for ongoing training and supervision in the therapy of problem gamblers. For instance, in the state of California, there are relatively few gambling-certified specialists and there is no formalized network of clinical supervisors.

To address this gap in training and need for supervision, Richard Bryant-Jefferies has written *Counselling for Problem Gambling: Person-Centred Dialogues*. (The author has written a series of "Person-centred Dialgues" books.) This text is designed to demonstrate the person-centered approach to counseling problem gamblers. It takes the reader through a series of dialogues, from the first therapy session. The book is geared toward those who treat problem gamblers, primarily therapists and counselors.

The book describes the details of the therapy as it is applied to two patients with problematic gambling behaviors. Max, a slot machine and Internet gambler, initiates treatment, while Rob, a horsetrack bettor, is compelled to come to treatment at the request of his wife. Their counselors, Clive and Pat, utilize the same approach but have different counseling styles.

Each counseling session is presented in dialogue format, giving the reader the sense of being present in the room. Most interesting are the highlighted boxes within session texts that summarize what is happening therapeutically with patient and therapist. Each chapter closes with a set of discussion questions that engage the reader to reflect further on that session. In addition to the patient dialogues, the book also has sections on supervision and sections that focus on the counselor's therapeutic techniques. The latter is a feature unique to this book, as it demonstrates that therapy for problem gamblers is not always unidirectional and that therapists also bring their own conceptions, distortions, and expectations about gambling to the therapy sessions.

Bryant-Jefferies presents the person-centered approach, otherwise known as client-centered therapy. This was developed by Carl Rogers in the 1940s and 1950s as a way for therapists to have a more personal relationship with patients and to help patients realize that they can help themselves. Change in behaviors is facilitated by recognizing the core themes of congruence, having positive regard for the client, and utilizing empathy as a way to move the patient toward personal growth.

The strength of this book comes from the personal and explicit dialogues presented between patient and therapists. The book reads as if the reader were watching a video, and because the techniques are highlighted well, the reader is left with a clear understanding of how to provide this type of therapy for problem gamblers. Common mistakes made by therapists are highlighted and discussed, and the types of patients described within the book are reflective of the types who present to treatment. Furthermore, the book is timely, including updates on dealing with Internet gambling and current treatment resources. Therapists who are just beginning to treat problem gamblers or who are looking to try a different therapeutic approach will benefit most from this book. Even those who have been treating problem gamblers for a long time will appreciate this book because of the details of the sessions that are presented.

One criticism of this book is that it lacks empirical evidence for the effectiveness of this approach to treating problem gambling. A recent meta-analysis of psychological treatments for problem gambling showed a large effect size of favorable outcomes (Pallesen, Mitsem, Kvale, Johnsen, & Molde, 2005). The majority of these treatments, however, were CBT or eclectic and not specifically the person-centered approach. Despite this, the clinical experience of the author and of this approach cannot be denied. The techniques that are presented within are practical, commonly used, and easily mastered. Additional books in this format that describe other forms of psychotherapy, such as cognitive-behavioral and psychodynamic, would be quite helpful, particularly in highlighting the differences and similarities between therapeutic approaches. I would also like to see more closure with the cases, including how many sessions are needed, and also an examination of whether these changes are lasting once the therapy stops. Finally, the two cases are both male; the book would be strengthened by having a section on other gambling populations, including women, the elderly, and adolescents.

In sum, this is a highly recommended book for therapists with any level of experience with problem gamblers. Because of the dialogue format, this is a quick read and is likely to stimulate more discussion about treatment approaches and what may or may not work.

Reference

Pallesen, S., Mitsem, M., Kvale, G., Johnsen, B.H., & Molde, H. (2005). Outcome of psychological treatments of pathological gambling: A review and meta-analysis. *Addiction, 100,* 1412–1422.

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