

## Adolescent gambling on the internet: A review

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**Abstract:** Internet gambling is a relatively under-researched area. While our current knowledge remains in its infancy and the prevalence rates are relatively low, researchers and clinicians are predicting greater involvement among youth. A comprehensive search of the relevant literature was undertaken. The resulting relevant literature was classified into four areas. These were (a) the empirical studies on adolescent internet gambling, (b) online gambling-like experiences in adolescence, (c) adolescent gambling via social networking sites, and (d) adolescent gambling via online penny auction sites. Age verification in relation to prevention and regulation is also examined. It is concluded that young people appear to be very proficient in using and accessing new media and are likely to be increasingly exposed to remote gambling opportunities. These young people will therefore require education and guidance to enable them to cope with the challenges of convenience gambling in all its guises.

**Keywords:** Adolescence, gambling, problem gambling, internet

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**Submitted:** May 15, 2009. **Revised:** August 10, 2009. **Accepted:** August 11, 2009.

### INTRODUCTION

Gambling is not immune to technological advance and many new forms of gambling are continually evolving (1). Furthermore, it has been argued that many of these new forms of gambling are likely to appeal to techno-savvy youth given the relative ease with which online gambling sites can be accessed (2). Early studies indicated that many online gambling sites failed to provide stringent age checks and/or age verification procedures (3), although the current situation has improved considerably. Nevertheless, gambling opportunities for adolescents are ever growing. It has been noted that the distinction between gambling and video gaming is becoming ever more blurred and that gaming convergence is widespread (4-

6). For example, many gaming sites offer rewards in the form of 'tokens' or 'credits' where gamblers can swap the tokens or credits for a monetary prize.

A national internet gambling prevalence survey of 2098 people in the UK by Griffiths (7) included data from 119 adolescents (aged 15 to 19 years). Although at that time no teenagers reported gambling on the internet, 4% of teenage respondents said they would like to try online gambling. Another study in Canada suggested at least a quarter of young people with serious gambling problems may be gambling on the internet using 'free play' sites (for 'practice' and 'demonstration' purposes) (8). It could be the case that the internet presents a particular danger for those who already

have gambling problems as such findings have been found in nationally representative adult surveys (9), and children are commonly thought to be more susceptible and vulnerable in terms of developing a gambling problem (10). While our current knowledge remains in its infancy and the prevalence rates are relatively low, researchers and clinicians are predicting greater involvement among youth as well as other high-risk groups including seniors and pathological gamblers.

#### METHODS

In order to fulfill the specifications of this review, a comprehensive search of the relevant literature was undertaken. The collection of this literature was carried out in two concurrent phases, comprising a search of online electronic databases and a search of specialist web-based libraries.

Online databases: A search of the following online databases was conducted to find any potentially relevant literature: *Academic Search Elite; Business Source Premier; Ingentaconnect; ISI Web of Knowledge; PsycArticles; PsycInfo, Science Direct*. The searches were performed during July 2009 using the following key words:

- (Adolescent) and (gambling or gaming) and (internet)
- (Adolescent) and (gambling or gaming) and (online)
- (Youth) and (gambling or gaming) and (internet)
- (Youth) and (gambling or gaming) and (online)

Each search on each database produced varying numbers of titles and abstracts, with varying degrees of overlap between each database. Full lists of titles and abstracts were viewed, and for those articles that appeared relevant to this review, full texts were accessed and downloaded.

Specialist libraries: A search of the following online libraries was conducted during July 2009, using the same search terms as outlined above. These libraries are specialist collections put together by governments from jurisdictions worldwide, and by gambling-related organizations. Any material that appeared relevant to this review was accessed and downloaded.

- Electronic Journal of Gambling Issues: [www.camh.net/egambling/](http://www.camh.net/egambling/)
- Gambling Research Australia Secretariat: [www.gamblingresearch.org.au](http://www.gamblingresearch.org.au)
- New Zealand Ministry of Health: [www.moh.govt.nz](http://www.moh.govt.nz)
- Ontario Problem Gambling Research Centre: [www.gamblingresearch.org](http://www.gamblingresearch.org)
- Responsible Gambling Council: [www.responsiblegambling.org](http://www.responsiblegambling.org)

The resulting relevant literature was classified into four areas: (a) the empirical studies on adolescent internet gambling, (b) online gambling-like experiences in adolescence, (c) adolescent gambling via social networking sites, and (d) adolescent gambling via online penny auction sites. Age verification in relation to prevention and regulation is also examined.

#### EMPIRICAL STUDIES

Gendron and her colleagues (11-14) carried out a study comparing the profiles of young non-gamblers, gamblers, and internet gamblers in relation to severity of substances use in Quebec (using the DEP-ADO (15) and impulsiveness/risk taking. The authors surveyed 1,876 high-school students (46% male; 54% female) aged 14 to 18 years (mean = 15.4 years), and reported that 93.5% of participants (95% male; 92% female) had gambled in the previous 12 months, and that 8% (13% males; 3% females) had gambled on the internet in the previous 12

Table 1. *Substance use by gamblers, internet gamblers and non-gamblers (n=1,876) adapted from Brunelle et al (12)*

Type of substance use	Non-gambler (%)	Gambler (%)	Lifetime Internet gambler (%)
Alcohol**	76.9	91.3	96.3
Tobacco**	26.3	42.6	51.5
Cannabis**	26.8	40.6	55.1
Hallucinogens**	5.4	10.0	12.5
Speed	6.3	13.1	19.9
Cocaine**	1.0	3.8	5.9
Solvents	0.2	1.0	1.5
Heroin*	0.6	1.0	3.7

(Comparison between gamblers and non-gamblers: \*  $p < .05$ ; \*\*  $p < .001$ )

months. Gendron also reported that 35% of youth (49% males; 21% females) had played on the 'free play'/'demo' mode on internet gambling sites. Males were significantly more likely than females to gamble in general, gamble on the internet, and play the 'free play' modes on internet gambling sites. Using the DSM-IV-J, the investigators reported that 3% of their participants were problem gamblers and also found that significantly more internet gamblers (11%) were likely to be problem gamblers than those who did not gamble on the internet (1.5%). However, there were no gender differences for any type of problem gambling. Further findings revealed that nearly 7% of the participants had a substance use problem and that those with problematic substance use were also more likely to be internet gamblers (4% non-gamblers; 8% gamblers; 18% internet gamblers) (see table 1). In relation to impulsivity, internet gamblers and non-internet gamblers had significantly higher impulsivity and risk-taking scores than non-gamblers. Problem gamblers also had significantly higher scores on impulsivity and risk taking than non-problem gamblers.

Using the same data set, Brunelle and colleagues (14) examined some of the contextual elements surrounding internet gambling among adolescents. The authors examined the types of games played on the internet, internet gambling initiation contexts, and internet gambling contexts in general (e.g., when, where, with whom, how long, etc.). Of the 137 internet gamblers identified in the sample of 1,876 high school students, only 0.8% had regularly played for money at an online casino and only 1.9% had regularly played for money in online poker (see table 2). The 'play for free' modes were played more regularly in both online casinos (8.9%) and online poker (13.8%) (see table 2). The results also showed that 37% of online gambling was done mainly with friends, 34% with the immediate family, 23% with other family members, 2% alone, and 4% with others.

Brunelle and colleagues (11) also interviewed 37 adolescent online gamblers, and reported that the main types of online gambling carried out were poker, blackjack electronic gambling (slot) machines, bingo and sports betting. Most of this activity was

Table 2. *Types of internet games played in the last 12 months (n=137) adapted from Brunelle et al (11)*

Type of game	Never (%)	Once (%)	Occasionally (%)	Regularly (%)
Internet Casino (for money)	95.4	2.3	1.5	0.8
Internet casino ('free play' mode)	75.2	8.5	7.4	8.9
Internet poker (for money)	94.7	1.7	1.7	1.9
Internet poker ('free play mode')	71.9	8.0	8.0	13.8

carried out either at home or in school, although most played in the evening so it is unlikely that playing at school was highly prevalent. Those who played for more than two hours at a time were most likely to do this on their own whereas playing socially with others was more likely to be done for much less time per session. Most online gamblers found the atmosphere exciting and pleasant (rather than stressful or serious). Brunelle et al (11) concluded that (a) poker was the most popular form of online gambling, (b) adolescent online gamblers were more likely to be problem gamblers than those who did not gamble online, (c) most initiation of online gambling took place with family members, (d) most adolescent online gamblers began by playing in the 'free play' mode, and (e) for many adolescents, online gambling was a way to make money, occupied them when they had nothing else to do, and allowed them to socialize.

Olason (16) reported two studies examining gambling behavior among Icelandic adolescents that included questions relating to internet gambling. The first study carried out in school classes

comprised 1,513 adolescents aged 16 to 18 years (730 males; 783 females). The second study carried also carried out in school classes comprised 1,537 adolescents aged 13 to 18 years (768 males; 747 females). The surveys included questions relating to gambling on Icelandic internet websites (lotto, sports pools, sports betting) and on foreign websites (poker, casino games, sports betting, and 'free play' modes). Students also completed the DSM-IV-MR-J (17), a gambling screen assessing severity of gambling and gambling-related problems.

In relation to participation, Olason reported that in the first study, 62% of the participants had gambled, 11% were regular gamblers, 20% had gambled on the internet, and just under 4% were regular internet gamblers. In the second study, 57% of the participants had gambled, 8% were regular gamblers, 24% had gambled on the internet, and just over 4% were regular internet gamblers. Table 3 outlines in more detail the findings in relation to internet gambling more specifically. In both studies, males were significantly more likely than females to gamble on the internet (32% boys vs. 9% girls in study I; 37% boys vs. 11.5% girls in

Table 3. *Types of games played on the internet by Icelandic adolescents adapted from Olason (16)*

Type of game	Study 1: (n = 1513)		Study 2: (n=1537)	
	Regular Gamblers	Total Gamblers	Regular Gamblers	Total Gamblers
<i>Icelandic websites</i>				
Lotto	0.6	2.4	0.5	8.7
Sports pools	0.7	3.4	0.9	8.5
Sports betting	0.8	2.9	1.2	6.2
<i>Foreign websites</i>				
Online poker	0.6	1.9	1.8	6.5
Casino games	2.2	15.8	1.8	12.3
Sports betting	-	-	0.5	1.9
'Free play' Modes	3.3	28	-	-

study II). The results in relation to problem gambling showed that the prevalence of problem gambling among gamblers was 3% in the first study and 2.2% in the second study. However, among those who had gambled on the internet, the respective problem gambling prevalence rates were significantly higher at 10.1% and 7.5%. Results also revealed that 11.5% had used their own credit card, 23.1% had used their own debit card, 15.4% had used one of the parents' credit cards, and 50% had used some other method (e.g., brother's credit card, friends paying and then paying them back, electronic cash, PayPal, Neteller, with bonus money, etc.).

Griffiths and Wood (18), in the United Kingdom, surveyed 8,017 young people aged between 12 and 15 years of age about their internet gambling behavior. Like the Olason studies, their survey used the DSM-IV-MR-J screen to identify whether respondents who gambled were problem or social gamblers. The study examined remote gambling in relation to use of the National Lottery products online. In order

to ascertain their experience of gambling on the internet, adolescents were asked 'Have you ever played any National Lottery game on the internet?' Those who had done so were also asked 'Which, if any, of the following games have you played in the past 7 days?' and were presented with the following options: (i) instant win games for money, (ii) free instant win games, (iii) lotto, and (iv) one of the other lottery draw games. Those who had experience of gambling online were also asked how they played National Lottery games on the internet, and presented with the options: (i) the system let me register, (ii) I played along with my parents, (iii) another adult let me play, (v) I used my parent's/guardian's online National Lottery account with their permission, (v) I used my parent's/guardian's online National Lottery account without their permission, and (vi) played free games.

The results showed that approximately one in twelve young people aged 12 to 15 years (8%) said they had played a National Lottery game on the internet. Boys were

more likely than girls to say they have played National Lottery games on the internet (10% vs. 6%), as were young people who were Asian and black. Not surprisingly, young people identified as 'problem gamblers' were more likely than 'social gamblers' to have played a National Lottery game on the internet (37% compared with 9%). Of those who had gambled on the internet, a quarter of the adolescents said they had played free instant win games on the internet (24%), nearly one in five had played instant win games for money (19%) or Lotto (18%), and 10% had played one of the other draw games. Problem gamblers were more likely to have played every game in the past week, compared with social gamblers who were less likely to remember what games they had played in the last week. Young people with parents who approve of young people gambling were more likely to have played online instant win games for money, Lotto, or other draw games (35% compared with 19%; 40% compared with 15%; 22% compared with 6% respectively). The results suggest parental consent or help in gaining access to the games via the internet.

When asked which of a series of statements best describes how they played National Lottery games on the internet, nearly three in ten adolescents who played online reported playing free games (29%), one in six reported that the system let them register (18%), slightly fewer played along with their parents (16%), and one in ten used their parent's online National Lottery account either with their permission (10%) or without it (7%). However, it should be noted that a third of online players said they 'couldn't remember' (35%). Overall, among all young people (and not just players), 2% played National Lottery games online with their parents or with their permission and 2% have played independently or without their

parents. Those who had played independently were most likely to have played free games, with just 0.3% of young people having played National Lottery games on their own for money.

Welte, Barnes, Tidwell and Hoffman (19) assessed the relationship between specific types of gambling and the extent of problem gambling reported by American adolescents and young adults using data from the National Survey of Youth and Gambling, with 2,274 youth aged 14 to 21 years. The study found that 2% of respondents (3% males; 0% females) reported gambling online in the twelve months preceding the interview. The authors also reported that these respondents gambled online an average of 48 days per year, the highest average of any kind of gambling reported in the survey. The study also found that 65% of respondents who gambled on the internet reported having at least one symptom of the South Oaks Gambling Screen Revised for Adolescents (SOGS-RA) (20), which again was the highest of the 15 forms of gambling being considered. Statistical analyses revealed that when participation in other forms of gambling were controlled for, the link between internet gambling and problem gambling among youth was no longer significant. In other words, they concluded that young internet gamblers were likely to experience more problem gambling symptoms by virtue of gambling on more forms of gambling, as opposed to the properties of internet gambling itself. Indeed, this was supported in part by the data, with internet gamblers engaging with an average of 6.9 different types of gambling within the last 12 months, the highest level of gambling versatility reported by players of any of the 15 gambling activities.

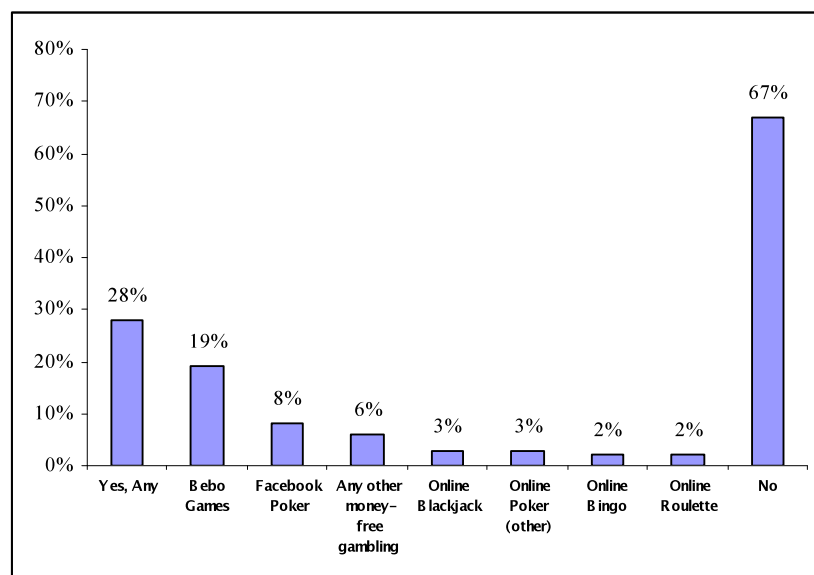
Ipsos MORI (21) in the United Kingdom surveyed 8,598 pupils (4,466 males; 4,447 females; 45 not stated), from

201 schools. Two different class levels (curriculum years 8 and 10) were surveyed within each school which resulted in the sample consisting of 11-15-year olds. The questionnaires included items relating demographic and socioeconomic information; gambling attitudes and behavior (online and offline) and a youth-adapted problem gambling screen (DSM-IV-MR-J)(17). Overall, 1% reported gambling on the internet for money in the seven days prior to the survey. The children reported that they were most likely to spend their money on the internet during this time frame on clothes, music, video games and DVDs (10%, 9%, 8% and 5%, respectively) with 68% not spending any of their own money online within that period. Children were also asked about ‘gambling-like experiences’ which included play-for free or practice modes of real gambling sites and gambling-type games for play money or points on social networking sites. As

demonstrated in figure 1, just over a quarter of adolescents had played in ‘money-free mode’ in the week preceding the survey, with opportunities on the social networking sites four or five times more popular than those presented on real gambling sites.

Using statistical modeling to further examine the same data, Forrest, McHale and Parke (22) reported that gambling in money-free mode was the single most important predictor of whether the child had gambled for money and one of the most important predictors of children’s problem gambling. However, it should be noted that this relationship is correlational and not causal. The possibility and extent to which money-free gambling is responsible for real gambling participation and gambling-related risk and harm could only be confirmed using longitudinal data.

A study by Byrne [23; cited by Derevensky & Gupta (24)] in Canada of 2,087 adolescents and young adults (43%



**Fig. 1:** Money-free gambling in the last 7 days (n=8,598) adapted from Ipsos MORI (21)

males; 57% females) reported some data on youth internet gambling. The study found that more individuals under the age of 18 years than 18 to 24 years played 'free play' games on internet gambling sites (43% vs. 33% for males; 42% vs. 29% for females). The most popular form of 'free play' activity for those both under and over the age of 18 years was card playing (poker and blackjack), with less frequent gamblers (i.e., those gambling less than once per month) playing slot machines or other forms of online gambling machines.

Over the past year, almost one in twenty (4.6%) of the participants (7.8% males; 2.3% females) had gambled online with their own money. When examined by age, those under 18 years were more likely to be male (8.6%; over 18 years 6.8%) than female (3.2%; over 18 years 1.3%). The two most popular forms of internet gambling for both those under 18 years and over 18 years were card playing (online poker) and sports betting. For those who gambled online for money, Byrne reported that many did so with a family member (i.e., parent or older sibling). For those who gambled on the internet, the prevalence rate of problem gambling was almost 19%. Although very high, similar rates of problem gambling prevalence among self-selected samples have been reported by other research studies on student gambling (25-28). Byrne reported no significant gender differences but did note that the younger the person gambling online, the more likely they were to exhibit problem gambling.

In addition to the study of Byrne, there have also been some smaller more locally based studies done in various parts of Canada. For instance, Meerkamper (29) reported that more than one in twenty teenagers in Nova Scotia aged 15 to 17 years reported playing online poker for

money. Poulin and Elliot (30) reported that in the past year, 4.2% of adolescents had gambled for money online in Atlantic Canada, and in Montreal, almost one in ten teenagers (9%) reported as having gambled online for money (24).

#### **ONLINE GAMBLING-LIKE EXPERIENCES**

Over the last decade, a number of papers have been published examining gambling-like experiences engaged in by adolescents including instant win games in children's snacks like crisps and chocolate (31) and money-free gambling which could include 'free play', 'practice' and 'demo' games on internet gambling sites (18). As noted above, Ipsos MORI (21) reported that 28% of their sample of 8,598 children had participated in money-free gambling of some description in the week preceding the survey. The study also found that those children who reported: being male; having a black or white ethnic background; earning or receiving £30 in the last week; and that their parents were gamblers were all significantly more likely to have gambled in money-free mode in the specified time period.

Some clinical researchers have asserted that youth gambling in money-free mode may be a cause for concern (18,24,32-34). For example, a number of North American studies have reported that anywhere between 25% to 50% of teenagers have played 'free play' games via internet gambling sites (24,30,35). It has been alleged that such opportunities encourage teenagers to practice before 'graduating' to playing for money games at online casinos (36) and that a 'precautionary principle' should be applied which prevents adolescents from being exposed to gambling-like experiences. However, the specific impact of money-free play remains



unclear. Despite the strong correlation of money-free play with both gambling participation and problem gambling (22) and there is currently no conclusive evidence to suggest that money-free play causes individuals to start gambling for actual money or to be more at risk of experiencing gambling related harm, although there is a growing body of correlational evidence.

The use of 'free play' sites is not the only type of online gambling-like experience that adolescents can now engage in. Griffiths, King and Delfabbro (37) identified other types of gambling-like experience including (i) gambling via social networking sites and (ii) gambling via online penny auction sites. These are briefly examined below.

#### **GAMBLING VIA SOCIAL NETWORK SITES**

Across the world, the social networking phenomenon has spread rapidly. Despite the minimum age for most major social networking sites usually being 13 years (and 14 years on MySpace), a study by the Office of Communications (38) in the United Kingdom reported that just over a quarter (27%) of 8 to 11 year olds who are aware of social networking sites said that they had a profile on a social networking site. The most popular social networking site used by children was *Bebo* (63%). Recently, Downs (39) noted that content-generated risks from this new leisure activity have not been investigated in any detail, yet young people using these sites are able to gain access to gambling.

Downs claimed that the potential of social networking sites to 'normalize' gambling behaviors may change social understandings of the role of gambling amongst young people. For example, while socially responsible gambling emphasizes

that money spent gambling may not offer a return other than the pleasure gained from the game the social networking utilities can present gambling as a viable route for the acquisition of scarce virtual goods. According to Downs' pilot research there were 25 Poker applications on *Bebo* (and over 500 separate poker groups) and in excess of 100 poker applications on *Facebook* (and over 1,000 separate poker groups). These poker sites featured some with real prizes, some with cash-play options, and all easily downloadable by those under 18 years along with many free trial games. The largest of these poker groups had over several thousand members and in one group surveyed, 15% of those in the group declared they were under the age of 18 years. Furthermore, gambling applications typically contain sidebar advertisements and hyperlinks to real gambling sites.

Downs also reported a type of pseudo-gambling among '*Fluff Friends*' that has over 100,000 active users per month. In this social networking forum, users (typically young girls) create '*Fluff Art*'. To do this they have to earn 'munny' (sic)—a type of virtual money through pet racing. Pet racing costs 1-point per race and winnings can be up to 4000 points. Clearly no money is changing hands, but young children are learning the mechanics of gambling and Downs asserts there are serious questions about whether gambling with virtual money encourages positive attitudes toward gambling in young people. For instance, does gambling with virtual money lead to an increased prevalence of actual gambling? She also asks to what extent are gambling-related groups on social networking sites being used by those under 18 years of age, and whether membership of such a groups facilitates access to commercial gambling sites? It also seems natural for youth to question whether they should game on

internet sites if they are winning 'play money'.

#### **GAMBLING VIA ONLINE PENNY AUCTION SITES**

Another gambling-like activity is the participation in online penny auctions such as *'Madbid'*, *'Swoopo'*, *'Bid Boogie'*, *'Rapid Bargain'* and *'Budson'* (40). In order to participate in an online penny auction, the person needs to place a bid in an ongoing auction. Bids can be made only in one penny (or one Euro cent) increments. The participants can do this by (a) placing a bid by sending a text message from their mobile phone (at £1.50 or €1.50 a bid plus operator's costs) or (b) placing a bid through the creation of an online account where the person purchases a 'bundle' of bids (at 75 pence/75 cents to £1.40/€1.40 a bid, depending on how big a bundle they buy in advance). To bid by text message, a person sends a message with the code for the specific product that they want to bid on. There is no limit to how many bids that can be submitted on the same auction product or on how many different products can be bid on at any one time

For example, here is an example of a real winning bid outlined by Griffiths (40). A *PlayStation* videogame console (retail price of £310) was won in a penny auction for £8.34. To the winner of the auction this was won at a hugely discounted price. However, what this really means is that there were 834 separate bids for this item all costing up to £1.50 per bid (depending whether it was done online or via mobile phone). Looking at the 'bid history', most of the final 50 bids were made by just two individuals who at a minimum spent at least £30 in those final bids trying to secure the item. Although one person won the console, the other person spent a considerable amount of money and received nothing in return. Griffiths (40) has argued that this is

internet gambling under another name. Anyone with a mobile phone (e.g., the vast majority of teenagers) can participate in such an activity and it could be argued that many of the items in the auctions appeal particularly to teenage audiences (video game consoles, MP3 players, laptops, etc.). To what extent this very new form of online activity with gambling-like experiences is affecting the youth population is as yet undetermined but this is one area where further research is needed.

#### **AGE VERIFICATION: PREVENTION AND REGULATION**

Given the cross-border nature of internet gambling, the conceptualization and evaluation of regulatory issues regarding underage internet gambling is a difficult task. Age verification can take a variety of forms with cross-referencing with official data sources (e.g., electoral register) fast becoming one of the most common. Additionally, operators may ask for the initial deposit to be made using a credit card (given that credit can only be enforced for individuals aged 18 years and over) in order to verify age and then permit the customer to revert to debit card as a payment method on subsequent transactions.

The British Gambling Commission (41) recently reported the findings of an online mystery shopping exercise which was designed to assess the effectiveness of underage gambling prevention protocols of internet gambling operators who are licensed in the United Kingdom, and those operators who may be regulated overseas, but who advertise their products to the United Kingdom market. The Gambling Commission used 16-year old volunteers (with parental consent) and a category of bank account which is available to customers under the age of 18 years. Volunteers registered their details and a

false date of birth and continued to try to gamble and withdraw funds. Of the 37 license holders tested, 13 (accounting for 2.2% of active customer accounts) were identified as having weaknesses which could permit underage internet gambling. In other words, while just over one in three were identified as having problems with underage prevention protocols, these were operators with a relatively small customer base (together accounting for just over 2% of active player population).

Although these results represent a potential cause for concern, they compare favorably with an offline mystery shopping exercise undertaken by the Gambling Commission testing all major betting operators in Great Britain. Initial findings indicate that an underage individual was permitted to place a bet in 98 out of the 100 betting shops visited (42). Of course, the circumstances and protocols for age verification and prevention of underage gambling are different between offline and online operations (e.g., checks may be limited to the first visit in an online environment, but must be attempted on every visit to an offline operator). Nevertheless, these findings do suggest that access to online relative to offline gambling opportunities is more difficult to gain for would-be underage customers.

#### **DISCUSSION**

Although there is some variation in the participation rates reported in the studies considered in this review, the small number of surveys showed that a small but significant minority of adolescents can and do gamble on the internet. Several studies reported a past year internet gambling prevalence rate of around 4% (23,29,30). However, some reported a lower figure (19) and others report the rate as being considerably higher (12,24) e.g., 8% (12),

9% (24) and 20%-24% (16). Interestingly, lower rates of participation were found for the United States and English speaking Canadian provinces, with higher rates being reported for Quebec and Europe.

Adolescent internet gamblers were also found significantly more likely to be problem gamblers (12,16). Possibly, problem gamblers are more susceptible and/or vulnerable to gambling online, and because the internet provides convenience gambling it is a cause for concern in this particular sub-group of gamblers. However, it may also be that adolescent problem gamblers gravitate to the internet, adding it as an additional mode of gambling to their general repertoire of gambling behaviors (as suggested by Wood and Williams (46) in relation to their large sample of adult gamblers). Consistent with findings reported in this review, Wood and Williams reported (46) a higher rate of problem gambling among the internet gamblers compared with non-internet gamblers. Importantly, the authors noted that as other modes of gambling (other than internet) were reported by participants as the main cause of their gambling problems, it was most likely that internet gamblers were already heavy gamblers to begin with and this was simply a new mode of play to compliment their existing gambling activities. This is also consistent with initial conclusions by Welte and colleagues (19) who suggested the increased risk to be the consequence of wide-ranging participation in gambling activities rather than a direct causal link between internet gambling and problem gambling.

Given the complexity of the available evidence, the role of internet gambling in creating adolescent problem gamblers should be treated with caution. However, it is clear that research that can help to identify the impact of internet gambling on either creating or facilitating gambling-

related harm among adolescents should be made a research priority. Such research should consider the potentially different roles that internet gambling may play in creating new forms of harm and in exacerbating current forms of harm.

Another interesting theme to emerge from this review was that friends and family were reported to play an important role in the online gambling experience among adolescents. For example, Brunelle et al (12) reported that only 2% of internet gambling was done with the adolescent playing alone. That 57% of the gambling was done with a family member and 37% done with friends emphasizes the social nature of internet gambling among adolescents, an activity that has been traditionally noted as being an asocial activity. Similar findings were also reported by Griffiths and Wood (18). These figures appear to be significantly different to trends among adults with one study reporting that 59% of adult respondents reported that they always gambled alone (45). There are two potential implications of these findings. Firstly, future research must explore the nature and the specific impact of the social processes in adolescent internet gambling. The role of family may be particularly important in this regard. Secondly, parents need to be educated about gambling (and its potential problems) in the same way as other potentially addictive behaviors (for example, drinking, smoking, drug taking, etc.).

In terms of regulation, there seem to be significant developments in preventing underage individuals gambling online with clear licensing conditions and codes of practice being implemented and regular compliance checks being performed (for example, see guidelines by the *Global Gambling Guidance Group* [G4; <http://www.gx4.com/>], or *e-Commerce Online Gaming Regulation and Assurance* [e-

*COGRA*; <http://www.ecogra.org/>}). Yet, with at least one in three regulated sites still permitting access to underage players it is clear that there is still much work to do. Some operations must tighten their age verification systems by using more cross-referencing options and stricter criteria, even at the risk of losing customers aged 18 years and over. Also, even though there is some evidence, at least in the United Kingdom, that access to gambling online may prove more difficult relative to securing offline access, underage internet gamblers may only need to get through the hurdles once. In other words, once an adolescent has managed to get through age verification systems and register, they can gamble again repeatedly. This differs from offline facilities, where adolescents would have to deceive the 'gatekeepers' on each separate visit.

We should emphasize that regulatory performance and compliance is only one aspect of preventing underage internet gambling. It seems that with only 23% of underage internet gamblers using their own debit cards to register and pay for their gambling, most are being assisted in some way with their payment (i.e. using friends, family or sponsored credit cards). In one survey (18), 17% of those that had played the lottery on the internet had accessed their parents' accounts (either with or without their permission). This places a significant level of responsibility with older friends and family members, either in terms of refusing assistance in accessing real gambling opportunities or in closely monitoring the use of credit cards for which they have ultimate responsibility.

There appears to be two challenges here in relation to parents preventing underage internet gambling. Firstly, parents must have the appropriate attitudes, awareness, and intentions to prevent underage

gambling. Although parents may have the ability to prevent underage gambling online, they may permit or assist their child as result of viewing such behavior as harmless and/or as a fun activity. Secondly, even if parents are motivated to prevent underage internet gambling, they must be prepared to monitor their child's behavior, and where made available, children's spending on credit and debit cards and other forms of account should be monitored. Educating parents should be one of the key components of any strategy aimed at preventing or minimizing underage internet gambling. Innovative anti-gambling software has been developed and in some jurisdictions has been offered without costs (for example, the *BetStopper* program in Nova Scotia).

The issue of payment is perhaps one of the most important areas for further research. More work is needed to explore the relationship between underage payment mechanisms and the development of problem gambling. For example, if an adolescent is gambling using someone else's credit or debit card, and they are not winning or losing their own money, will this have the same implications for developing or facilitating problem gambling? Factors that have been linked to the development and facilitation of problem gambling (e.g., the big win; chasing; arousal) could be argued to be dependent on the extent to which a gambler is winning or losing their own money.

Finally, evidence suggests that 'money free' gambling plays an important role for adolescents in conceptualizing and experiencing internet gambling. Over one in three adolescents have been reported to gamble in money-free mode (12,23) with Ipsos MORI (21) reporting that 28% of 11- to 15-year olds in a United Kingdom sample had done so within the last week. It

is argued that it is through money-free gambling (using social networking sites or 'demo' modes of real gambling sites) that children are being introduced to the principles and excitement of gambling without experiencing the consequences of losing money. Early research has shown it is significantly more commonplace to win while "gambling" on the first few goes on a 'demo' or 'free play' game (43), although this is not the case for all games (e.g., UK National Lottery games). The same study also reported that it was commonplace for gamblers to have extended winning streaks during prolonged periods while playing in the 'demo' modes. However, there have been significant regulatory developments in recent years with improved codes of practice requiring that age verification also applies to 'demo modes' and that such modes should be an accurate representation of the real playing experience including the chances of winning and the rate of return to the player (for an example, see Gambling Commission) (44).

Based on the available literature, it may be important to distinguish between the different types of money-free gambling being made available—namely social networking modes and 'demo' or 'free play' modes. Initial considerations suggest that these may be different both in nature and in impact. For example, as Downs (39) argues, players gambling in social networking modes may experience a different type and level of reinforcement than those gambling in 'demo' mode. For example, on some social networking sites the accumulation of 'play money' or 'points' may have implications for buying virtual goods or services or being eligible for certain privileges. This may increase the value and meaning of the gambling event to the individual. Secondly, when considering the 'flow' and intention of individuals

accessing such sites, it could be argued that individuals accessing money free gambling through social networking sites may be more likely to be induced or persuaded to play given that these web-site visitors' primary intention may have been social interaction (i.e., the primary function of the website) as opposed to those playing in 'demo' mode where gambling is the primary function of the website. Interestingly, four or five times more children reporting money free gambling on social networking sites compared to 'demo' or 'free play' modes on gambling websites. It is suggested that nature and impact of various forms of money free gambling should be the subject of further research and empirical investigation.

Some experts claim that "the exposure of children to gambling-like activities, games of chance with fake money, and play with materials of potential financial value should be seen as risks that need to be controlled" (p. 203; 47). However, to date, such individuals have failed to give an adequate explanation for the underlying reasons. No evidence or speculation are provided regarding the process by which gambling-like experiences may increase risk as opposed to moderating the risk or having no effect on potential risk.

### CONCLUSIONS

In conclusion, the rise and challenges of internet gambling cannot be seen in isolation, particularly as there is ever-increasing multi-media integration between the internet, mobile phones, and interactive television. Furthermore, young people appear to be very proficient in using and accessing these media and are likely to be increasingly exposed to remote gambling opportunities. These young people will therefore require education and guidance to enable them to cope with the challenges of

convenience gambling in all its guises. The same information also must be made aware to parents, teachers, health professionals and other practitioners.

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