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*Publication date:*  
2008

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Kristiansen, S., & Frederiksen, A. (2008). *Internet Gambling among Danish Adolescents*. Institut for Sociologi, Socialt Arbejde og Organisation, Aalborg Universitet.

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# **Internet Gambling among Danish Adolescents**

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## **Summary**

Internet gambling is a rapidly growing activity among children and adolescents throughout the industrialized world. This paper analyzes data from a national survey on adolescent money gambling in Denmark. 1180 young Danes aged 16-25 years completed an on-line questionnaire on their gambling habits including internet gambling. Findings indicated that both gambling at land-based venues and internet gambling among Danish adolescents is widespread. Fifty-eight percent report to be engaged in money gambling and thirty-four percent report having gambled on the internet. Some gender differences in gambling participation and gambling behaviours were observed. Internet gambling is more popular among males compared to females. Female gamblers tend to prefer chance-based gambling activities whereas male gamblers tend to prefer knowledge-based gambling. Compared to non-internet gamblers, internet gamblers were more likely to be males, to play more games and to experience more gambling problems.

## **Introduction and review of literature**

Technological changes and innovations affect society and human life in a variety of ways. As far as gambling is concerned new technologies and advancements in internet and tele communication have caused a rapid growth in the number of online internet gambling operators, the number of internet gamblers and also, of course, in gambling revenues. The first online gambling site was launched in 1995 and estimations suggest that more than 2000 internet gambling sites are now (2007) accessible on line (American Gaming Association 2007a). According to Casino City who monitors and ranks all accessible internet gambling sites there is currently 2.116 online gaming sites and among these are 786 online casinos, 510 online poker rooms, 282 online bingo sites and 15 online backgammon sites (Casino City 2007). According to Turner (2002) there are basically four types of gambling sites on the World Wide Web: (1) On-line lotteries where people can buy lottery tickets, (2) sport and race books. In these games one can place bets on the outcome of sport events or various kinds of race, (3) on-line casinos which includes the most traditional casino games such as roulette, blackjack, craps, poker etc. and (4) electronic stock-trading sites.

As has been commented by several authors internet gambling is far from a well researched area (McBride 2006, Ladd & Petry 2002, Wood, Williams & Lawton 2007). A recent database search (PsycInfo) reported in The Wager (2007) yielded 24 peer-reviewed papers addressing internet gambling and among these only 11 articles reported original research. Some of the existing body of scientific literature deals with the prevalence of internet gambling primarily in adult populations. From these studies it appears that internet gambling rates in the UK, US and Canada vary between 0.2 and 5.3%. According to the American Gaming Association 3% of the adult population reported to have been gambling on the internet in 2006 (American Gaming Association 2007b).

Since the general body of scientific literature on internet gambling in the general populations is sparse it is not surprising that we know even less about internet gambling among demographic sub types of the populations. Apparently only a handful of studies on internet gambling among adolescents have been published so far. A 2002 report from

Addictions Foundation of Manitoba (Patton et al 2002) reported the findings from two separate surveys conducted in 2001, one of 4500 Manitobian high school students and one of 3.000 adults from the Manitoba Province. Respondents indicated internet gambling as the least common gambling activity with lifetime internet gambling rates ranging from 0.2 to 0.6% across the four provinces and the overall lifetime internet gambling rate of 0.35%. Comparing the various age groups it appeared that young people (18-24 years) report the highest internet gambling rate (1.1%). Similar internet gambling rates among youths have been found by Mackay, Patton & Broszeit (2005).

In the Scandinavian countries some studies involving adolescent gambling have been carried out and a small proportion of these report on internet gambling. In a survey among 178 Swedish male adolescents (aged 16 – 18 years) Gerdner & Svensson (2003) found that only 1.7% of this population had gambled on the internet, however 1.1% reported daily internet gambling. A survey among 12.000 Norwegian youths (aged 13-19) conducted by Rossow & Hansen (2003) internet gambling was observed in a relatively small proportion of the population. No more than 6.7% reported to have gambled on the internet during the last year and 1.4% had gambled on-line once or more within the last week.

So far the number of Danish research projects on adolescent gambling is limited. A couple of general surveys among the adult population have been conducted, a few national studies focusing on youth gambling have been conducted and so far and a small handful of projects are ongoing including a national prevalence study. The Danish National Centre for Social Research in Denmark conducted a survey among 8153 Danish adults aged 18-74 years (Bonke & Borregaard 2006) focusing on the prevalence of pathological gambling and gambling motives. Of particular relevance for this study, the largest proportion of lifetime internet gamblers was found among the younger groups (Bonke & Borregaard 2006).

Two Danish surveys on adolescent gambling were conducted in 2005 and 2006. Three Danish agencies conducted an on-line survey of gaming and gambling habits among 3857 Danish children aged 11-15 years. Internet gambling experience was found to

relative widespread with 12% of respondents having wagered money on on-line football tip or Lotto and 10% reported having bet money on poker or casino sites less than once a month (The Media Council for Children and Young People, Børns Vilkår & Center for Ludomania 2005). Another study among Danish youths was conducted by Instant Answer in 2006. 1181 Danish adolescents aged 16 to 25 years completed on-line questionnaires regarding their gambling involvement and activities (Kring 2006). Findings and further information on this study are reported later in this paper.

As have been pointed out by some authors (e.g. Ladd & Petry 2002, Wood, Williams & Lawton 2007) there are very few studies reporting on the demographic and socio-economic characteristics of internet gamblers compared to non-internet gamblers and land-based gamblers. This may, of course, come as no surprise since prevalence rates of internet gambling still are relatively low (Wood, William & Lawton 2007). Another understudied area related to internet gambling is gambling participation and preferred types of gambling activities. So far we have limited knowledge of the gambling patterns of internet gamblers.

Internet gambling among adolescents deserves attention for several reasons. First, as mentioned above, there is little knowledge on this particular gambling form among the adolescent population throughout the world. Second, since gambling habits often develop early in life (Griffiths 1990) and since easy accessible games (such as internet games) tend to be popular among young people (Ladouceur & Mirault 1988, Ide-Smith & Lea 1988, Volberg 2003) internet gambling among adolescents may constitute a major future problem for society. According to Volberg (2003) internet gambling is reported twice as often for adolescents compared to adult populations. It need be mentioned though, as has been noted by Griffiths & Parke in 2002, that the question of whether the internet gambling inhibits or exacerbates problem gambling is unanswered and this is still the case. Due to a lack of empirical research, especially longitudinal studies, we are still left to speculations in terms of the impact of internet gambling on the overall gambling patterns. However, as more and more gambling providers find their way into the world wide web, as more and more youths are connected to the internet, and as more and more practice sites are offered there seem good reason to

anticipate that a growing number of people will be engage in money gambling on the internet which might increase the number of potential problem gamblers throughout the world.

This investigation contributes to the existing pool of scientific knowledge in two ways. First it focuses on internet gambling participation and type of gambling activities among a demographic subtype of the population, adolescents, in one of the Nordic countries. So far no studies have been published focusing specifically on adolescent internet gambling in the Nordic countries and accordingly none in Denmark. One national youth gambling survey touching on internet gambling is under way but results have not yet been published. Second we examine various differences between internet gamblers and non-internet gamblers in order to produce a demographic profile of young internet gamblers. This knowledge will add to the few studies that have compared internet to non-internet gamblers. The overall purpose of this investigation is to conduct empirical investigations of the nature of the gambling activities among Danish adolescents with a special focus on internet gambling. The findings presented here are to be considered preliminary but hopefully they may add to the grounds on which more comprehensive and empirical research on internet gambling can be based.

### **Gambling in Denmark**

Although hazard gambling is illegal in Denmark certain kinds of money gambling have been offered on legal grounds for decades. There is a special legal framework authorizing private and public actors the rights to offer a number of specified games. A special unit (Spillemyndigheden) under the Danish Tax Department monitors and controls the national gambling market. The Danish gambling market is dominated by one by actor 'Danske Spil' (founded in 1948). The Danish state holds the majority of shares (80%) in this company, while two National Sports and Gymnastics Associations each hold 10%. Danske spil has two daughter companys DanToto and Dansk Automatspil and together this constellation almost holds a monopoly on the Danish Gambling market, except from six private casinos and slot machine arcades run by various private actors. Casino-gambling was legalized in Denmark in 2001.



At present there are 26 gambling Cafés and 164 gambling arcades run by Dansk Automatspil (<http://www.danskespil.dk/>). Danske Spil offers a variety of both chance-based games (such as Lotto and various scratchcards) and games of skill (such as Oddset and Football Tip). As in many other European countries internet gambling is legalized in Denmark and since 2002 a number of these games have been available on the internet, at present Danske Spil provides 9 different internet based games (Oddset, Football Tip, DanToto, Lotto, Keno, Boxen, Quick, Bingo and Quiz). Historically the Danish state have had a liberal policy towards foreign gambling companies, however during the latest years the government sought to protect Danish control over the Danish gambling market. Lately, however, this restrictive tendency have come under pressure from the European Commission who demands competition on the gambling market (Örnberg 2006:20).

As most other countries in the Western world Denmark has experienced a rapid growth in both gambling activities and gambling turnovers during the last decade. Danske Spil has expanded the number of available gambling types (both land-based and on-line) considerably and from 2000 to 2006 the total turnover increased from 6.2 billion Dkr. (approx. 830 mill. Euro) to 10.6 billion Dkr. (approx. 1400 Euro). Spillemyndigheden has estimated the total turnover from money gambling in Denmark (Danske spil including private slot machines, lotteries and casinos) in 2005 to 21.5 billion Dkr (3 billion euro) (Bonke & Borregaard 2006:25). These estimations do not include turnover of private actors on the Danish gambling market including the cross-border gambling provided by foreign gambling operates and illegal gambling.

The introduction of online gambling via the internet have caused national concern regarding the potential increase of people with gambling problems. The convenience and easy access of on-line gambling may lead more and more people into gambling and thus more and more into problematic gambling behaviour. In Denmark internet use is relatively widespread. Children and adolescents have access to the internet via computers in school or at home and a great proportion of the workforce have internet access on the job. The percentage of the Danish population that have access to the internet either at home or elsewhere have increased significantly over the latest years. In

2007 86% of the population (older than 16 years) were connected to the internet, in 2001 this percentage was 73 (Statistics Denmark 2008).

## **Method**

This study analyses data collected by Instant Answer for one of the major labour unions in Denmark (LO). Instant Answer (now Analyse Danmark) is a private market research institute founded in 1997 specializing in online data collection and analysis. The main purposes of the original study was to estimate the number of young gamblers, the types of games played on the internet versus land-based venues, the types of payment used by gamblers, the amount of money wagered and chasing behaviours. A total of 1179 representatively selected young Danes (aged 16 to 25) completed on-line questionnaires consisting of questions regarding demographic data and questions relating to gambling involvement and participation and with a special focus on internet gambling activity. Data were collected from January 3<sup>rd</sup> through January 10<sup>th</sup> 2006.

The questionnaire contained no traditional gambling screen but a number of questions on various gambling related problems. Internet gambling was defined as betting money on-line via the world wide web. Respondents were asked which types of on-line games they engage in, how often they gamble on different types of games, which on-line services they use and which means of payment are used. Mean age of respondents was 22.8 years. Data was analyzed with respect to differences in type of gambling activities (internet gambling vs gambling at land-based venues) preferred by males compared to females. Comparisons on demographic variables between respondents with internet gambling experience and respondents with no internet gambling experience were also made. Statistical analyses of differences were made using chi-square test for categorical data and gamma tests for ordinal and/or binary data.

## **Results**

### *Demographic characteristics*

Among the adolescents surveyed a majority of 58.4% reported to be engaged in money gambling whereas 41.6% did not gamble for money neither on the internet nor at land-based venues. Among the gambling group a significant gender difference emerged.

Unsurprisingly males were more likely to bet money on gambling activities (including both land-based venues and internet) than females. 65.8 percent of the male respondents answered 'yes' to the question 'Do you gamble for money?' as compared to 50.7 percent of the females ( $\chi^2 = 27,687$ ,  $df = 1$ ,  $p = .000$ ). Differences also emerged between respondents reporting internet gambling experience and respondents having no such experience. The differences emerged through a statistical test (gamma test) of independence of the distribution of respondents with internet gambling experience and respondents without such experience across various demographic variables. In Table 1 demographic and other characteristics of internet gamblers compared to non-internet gamblers are displayed. A couple of significant differences were found among the two groups. Gender and age differed significantly across gamblers with internet gambling experience compared to gamblers with no internet gambling experience. Males were more likely than females to have internet gambling experience (gamma=-0.543,  $p=0.000$ ) and older respondents (aged 21-25) were more likely to internet gambling experience than younger ones (aged 16-20) (gamma=0.317,  $p=0.000$ ). Differences were also found on annual household income (gamma=-0.105), analysis showed a negative relationship between annual household income and internet gambling: internet gamblers are more likely to be found among the lower income groups compared to higher ones.

**Table 1**  
Demographic characteristics of adolescents (values in percent)

Variable	Internet gambling experience	Without internet gambling experience	Total sample	Test of independence ( $\chi^2$ )	p- value
N	34.6 (409)	65.2 (770)	1179		
Age (mean/st. deviation)	23.32/2.710	22.46/2.894	22.8/2.9	32.348	0.001
<b>Gender :</b>					
<i>Males</i>	47.7 (286)	52.3 (314)	100 (600)	90.803	0.000
<i>Females</i>	21.2 (123)	78.8 (456)	100 (579)		
<i>Total</i>			100 (1179)		
<b>Annual income</b>					
<b>(household):</b>	34.2 (123)	65.8 (237)	100 (360)	35.875	0.000
<i>0-199.999</i>	44.5 (73)	55.5 (91)	100 (164)		
<i>200.000-299.999</i>	31.5 (29)	68.5 (63)	100 (92)		
<i>300.000-399.999</i>	47.2 (34)	52.8 (38)	100 (72)		
<i>400.000-499.999</i>	52.7 (29)	47.3 (26)	100 (55)		
<i>500.000-599.999</i>	37.8 (14)	62.2 (23)	100 (37)		
<i>600.000-699.999</i>	37.7 (20)	62.3 (33)	100 (53)		
<i>≥ 700.000</i>	24.7 (85)	75.3 (259)	100 (344)		
<i>Do not know</i>			100 (1177)		
<i>Total</i>					
<b>Residence:</b>				14.929	0.002
<i>Living with Partner</i>	36.9 (137)	63.1 (234)	100 (371)		
<i>Living with friend</i>	41.9 (26)	58.1 (36)	100 (62)		
<i>Living alone</i>	38.5 (151)	61.5 (421)	100 (392)		
<i>Other</i>	26.6 (94)	73.4 (259)	100 (353)		
<i>Total</i>			100 (1178)		
<b>Education/employment</b>				10.103	0.018
<i>-employment</i>	32.2 (232)	67.8 (489)	100 (721)		
<i>-school</i>	41.0 (144)	59.0 (207)	100 (351)		
<i>-unemployed</i>	34.2 (25)	65.8 (48)	100 (73)		
<i>-Other</i>	23.5 (8)	76.5 (26)	100 (34)		
<i>-Total</i>			100 (1179)		

### *Gambling participation and gambling activities*

As displayed in Table 2 Lotto, football tip and scractcard were the most popular games played in the physical world. Close to fourty percent of adolescent surveyed engage in

these types of games. Other popular games in the physical world are poker, Oddset and games provided by bookmakers. Some significant gender differences were observed in terms of the preferred type of game at land-based venues and chi-square tests were conducted to determine if the observed gender differences were significant for the four most popular games: Males were more likely than females to engage in lotto, football tip and scratchcard ( $\chi^2=12.649$ ,  $df=1$ ,  $p=0.000$ ) poker ( $\chi^2=126.798$ ,  $df=1$ ,  $p=0.000$ ), Oddset ( $\chi^2=111.060$ ,  $df=1$ ,  $p=0.000$ ) and Casino ( $\chi^2=22.179$ ,  $df=1$ ,  $p=0.000$ ) while females are more likely to engage in lotto this difference was, however, not statistically significant ( $\chi^2=2.859$ ,  $df=1$ ,  $p=0.091$ ), Overall, males engaged more often in seven specific gambling activities while females engaging more often in one type of gambling. In addition to these gender patterns a significant age difference was found. Lotto is more widespread among older respondents (21-25 years) compared to younger ones (16-20 years) ( $\chi^2=12.603$ ,  $df=1$ ,  $p=0.000$ ). This pattern holds for casino gambling as well ( $\chi^2=1.337$ ,  $df=1$ ,  $p=0.248$ ), however the difference is non-significant. No significant age differences were found in the gambling frequency on poker and Oddset.

**Table 2**

Percents of adolescents engaging in different land-bases games by gender

No		Males	Females	All	Test of independence ( $\chi^2$ )	p-value
1	Lotto/Footbal tip/ scratchcard	38.3 (230)	43.1 (250)	40.6 (480)	2.859	0.091
2	Poker	34.1 (205)	7.4 (43)	21.0 (248)	126.798	0.000
3	Oddset/Bookmaker	22.6 (136)	2.2 (13)	12.6 (149)	111.060	0.000
4	Casino	7.8 (47)	1.9 (11)	4.9 (58)	22.179	0.000
5	SMS-games	2.7 (16)	1.7 (10)	2.2 (26)	1.206	0.272
6	Slot machines	5.5 (33)	4.1 (24)	4.8 (57)	1.176	0.278
7	Other games	6.0 (36)	2.4 (14)	4.2 (50)	9.310	0.002
8	Horseracing	1.2 (7)	0.3 (2)	0.8 (9)	2.624	0.105

More than one third of the respondents (34.6%) reported to be engaged regularly in internet gambling. From table 3 it shows that lotto, football tip and scratchcards are the most common internet based gambling activities. Almost twenty-one percent of adolescents are engaged in these types of gambling on the internet. Fifteen percent report to engage in poker, fourteen percent report playing Oddset or games provided by bookmakers on the internet. Other types of internet games are (in descending order by frequency) casino, SMS-based games, slot machines and horseracing. Comparisons between male and female internet gamblers using chi-square tests revealed significant differences for the majority of games. Except from SMS-based games and Other games, males were more likely than females to engage in all types of gambling. The absence of significant gender differences on these two types of gambling may be due to a limited number of counts for each of these categories.

Comparing gambling frequencies for males and females on the four most popular internet games some significant differences were found. Men are the most frequent users of poker ( $\chi^2=90.778$ ,  $df=1$ ,  $p=0.000$ ), Oddset ( $\chi^2=117.692$ ,  $df=1$ ,  $p=0.000$ ) and Casino ( $\chi^2=36.455$ ,  $df=1$ ,  $p=0.010$ ) on the internet. Older respondents (21-25 years) play poker on the internet more frequent compared to younger ones (16-20 years) ( $\chi^2=.476$ ,  $df=1$ ,  $p=0.490$ ) and the same tendency is observed for lotto ( $\chi^2=43.392$ ,  $df=1$ ,  $p=0.000$ ) and Oddset on the internet ( $\chi^2=4.616$ ,  $df=1$ ,  $p=0.032$ ).

**Table 3**

Percents of adolescents engaging in different internet games by gender

No		Males	Females	All	Test of independence ( $\chi^2$ )	p-value
1	Lotto/football tip/ Scratchcard	25.0 (150)	16.6 (96)	20.8 (246)	12.649	0.000
2	Poker	25.5 (153)	5.3 (31)	15.6 (184)	90.778	0.000
3	Oddset/bookmaker	29.4 (150)	2.9 (17)	14.1 (167)	117.692	0.000
4	Casino	9.0 (54)	1.2 (7)	5.2 (61)	36.455	0.000
5	Slot machines	1.8 (11)	0.7 (4)	1.3 (15)	3.051	0.081
6	Other games	0.5 (3)	0.9 (5)	0.7 (8)	0.578	0.447
7	SMS-based games	1.8 (11)	0.9 (5)	1.4 (16)	2.070	0.150
8	Horseracing	0.5 (3)	0.0	0.3 (3)	-	-

At a global level the gambling frequency-pattern for the four most popular games on the internet are very similar to that of gambling in the physical world. However, it is an overall tendency that those respondents who gamble on the internet are more likely to gamble at a weekly basis compared to those who gamble in the physical world. This patterns holds for the four most popular games. The typical internet gambler (person wagering money on the internet compared to persons not gambling on the internet) in this material is: male, 26 years old, living with a friend and attends school. The typical gambler in the physical world (person gambling only in the physical world) is woman, 24 years old and living with her boyfriend or in some other way.

Among the various internet gambling service providers the internet service provided by Danske Spil are the most popular among the respondents. More than twenty percent of all internet gamblers report to use the internet service provided by Danske Spil whereas

thirteen percent use internet casinos and poker sites and eleven percent use international bookmakers (Table 4). Differences in use of different on-line service providers were tested using chi-square test and some systematic gender differences were observed. Although significantly more males than females prefer the internet gambling services provided by Danske Spil, this national on-line service is the most popular internet gambling form for both males and female internet gamblers. However, a significantly higher proportion of the male internet gamblers compared to females use international internet gambling services when gambling on the internet. Thus far less females compared to males use casino and poker sites and off-shore bookmakers.

**Table 4**

**Percents of adolescents using various on-line gambling services by gender**

No		Males	Females	All	Test of independence ( $\chi^2$ )	p-value
1	<b>Tips.dk</b>	<b>26.9 (162)</b>	<b>16.9 (98)</b>	<b>22.0 (260)</b>	<b>17.264</b>	<b>0.000</b>
2	<b>Casino and poker sites</b>	<b>21.3 (128)</b>	<b>4.8 (28)</b>	<b>13.2 (156)</b>	<b>69.840</b>	<b>0.000</b>
3	<b>Off-shore bookmakers</b>	<b>20.8 (125)</b>	<b>1.2 (7)</b>	<b>11.2 (132)</b>	<b>114.117</b>	<b>0.000</b>
4	<b>Other services</b>	<b>2.3 (14)</b>	<b>1.7 (10)</b>	<b>2.0 (24)</b>	<b>0.543</b>	<b>0.461</b>

#### *Problem gambling*

The questionnaire used in this study did not include the full series of items from any of the most used and reliable screening instruments for assessing gambling problems in adolescent populations. However, it is possible to assess levels of problem gambling among respondents by using several items measuring various aspects of gambling involvement. In the questionnaire 3 specific items are relevant. These questions are presented below together with the scoring employed for assessing the level of problem gambling:

1. Do you ever feel a need to wager more money in order to get excited? (Scoring: "yes" = 1 point, "no" = 0 point)



2. Lie about gambling: Have you ever lied about the amount of money lost on gambling? (Scoring: “yes” = 1 point, “no” = 0 point)
3. Chasing: How often do you try to win lost money back? (Scoring: “every time ” or “most of the times”= 1 point, other answers = 0 point)

Question # 1 and # 2 resemble questions from the Lie/bet questionnaire a screening instrument developed by Johnson et al (1997) which has proven effective in differentiating pathological gamblers from non-pathological gamblers. Question #3 resembles the chasing question from the South Oaks Gambling Screen (SOGS) a valid and reliable diagnostic instrument developed by Leisner & Blume (1987). A similar combination of items was employed by Rossow & Hansen (2003). Using this alternative gambling screen respondents were classified as level 0 (score of 0 point), level 1 (score of 1 point), level 2 (score of 2 points) and level 3 (score of 3 points) gamblers with level 3 gamblers defined as adolescents with severe gambling problems.

As pointed out by Rossow & Hansen (2003) these are strict criteria for assessing the proportion of respondents with gambling problems and gives thus a conservative estimate of the percentage of problem gamblers. Of the adolescents surveyed 11.2 % qualified as level 1 gamblers, 3.2 % qualified as level 2 gamblers while 0.4 % were level 3 gamblers/possible pathological gamblers. Using chi-square test some highly significant gender differences were observed ( $\chi^2=42.403$ ,  $df=3$ ,  $p=0.000$ ). Females were more likely than males to score 0 on this scale (92.1% vs. 78.9%) while more males than females qualified as level 1 gamblers (16 % vs. 6.2 %) and level 2 gamblers (4.8 % vs. 1.4 %), Among the level 3 gamblers ( $N=4$ ) there was an equal distribution of males and females (.3 % vs. .3 %) but of course this observation needs some qualification due to the low total number of cases. A significant difference for employment was found with respondents without employment scoring higher on the scale compared to people attending school or being in job ( $\chi^2=16.930$ ,  $df=9$ ,  $p=0.050$ ).

Internet gambling was reported among 76% of level 1 gamblers, 81% of level 2 gamblers and 100% of level 3 gamblers. Comparisons were made in order to determine possible differences between respondents with and without internet gambling

experience. Some highly significant differences were found ( $\chi^2=165.526$ ,  $df=3$ ,  $p=0.000$ ). Among respondents with no internet gambling experience 94.9% were classified as level 0 gamblers while only 67.2% of those with internet gambling experience were level 0 gamblers. More internet gamblers than non-internet gamblers were classified as level 1 (24.5% vs. 4.2%), level 2 (7.4% vs. 0.9%) and level 3 (1% vs. 0.0%) gamblers. These findings indicate that the difference between respondents with and without internet gambling experience increases with the level of gambling problems. Similarly, differences were observed in terms of numbers of different games played between internet and non-internet gamblers. The mean number of different games played by online gamblers were 3.4 ( $SD= 1.97259$ ) while respondents with no internet gambling experience play 1.5 different games ( $SD=0.83133$ ). Among on-line gamblers some (minority) of respondents report to gamble on 12 different games, while the top-scorers among gamblers without internet gambling experience play up to 5 different games. Using chi square test these differences showed to be statistically significant ( $\chi^2=272.622$ ,  $df=11$ ,  $p=0.000$ ).

An interesting pattern emerged when examining gambling levels across respondent's family situation. Among level 0 gamblers approximately one third is living with a partner (32.6%). Among level 1 and level 2 gamblers this share constitutes 28.0 and 21.6%, respectively, while there are no level 3 gamblers living with a partner. Among level 3 gamblers 75% have indicated that they live alone or in some other way (undefined). Among level 2 gamblers there is also a relatively large proportion living alone (45.9%) while only 32.5% of level 0 and 33.3% of level 1 gamblers live alone. Thus, no major differences exist across level 1 and level 2 gamblers while level 3 gamblers differ significantly as the majority in this group live alone. These differences are, however, to be taken with some consideration since there are relatively few level 3 gamblers in the present material. Chi square test thus show no significant differences across the various gambling levels ( $\chi^2=9.079$ ,  $df=9$ ,  $p=0.430$ ). On the employment variable there is a weak significant difference across the three different gambling levels ( $\chi^2=16.930$ ,  $df=9$ ,  $p=0.050$ ) but the pattern here is blurry. There are, for example, no unemployed among the level 3 gamblers, while the largest proportion of this category is found among level 1 gamblers.

## **Discussion**

The primary aim of this study was to investigate adolescent internet gambling in Denmark with a special focus on preferred types of gambling and to examine various differences between internet gamblers and non-internet gamblers. Findings from this study indicate that money gambling - both land based and on-line - among adolescents in Denmark is a widespread phenomenon. This finding has some overall correspondence with other studies of youth gambling assessing gambling participation among adolescents. A strict comparison to other published works on adolescent gambling is, however, difficult as the questionnaire used in this study, does not discriminate between past year and lifetime gambling. This differentiation is utilized in the majority of published gambling research. Since the questions utilized here does not specifically address whether one have gambled within the last year or the entire lifetime there is reason to believe that the overall gambling rate of fifty-eight percent includes some mixture of actual gambling, past year and lifetime gambling.

Due to this lack of methodological consistency with other studies judgements of whether the overall reported gambling rate in this study is to be considered high or low will be mere speculation. It need be mentioned though that the gambling rate reported in this study is far below estimations of lifetime adolescent gamblers both in the Nordic countries, Canada and The United States. In a survey among Norwegian youths (aged 12-18) conducted by Norwegian Gallup (Nedregård 1999) it was found that the percentage of life time gamblers among this population was 93. Among Canadian senior high school students (Govoni et al. 1996) found a lifetime gambling rate of 96.2% while Zitzow (1996) found similar lifetime gambling rates among Indian American adolescents (94%) and non-Indian American adolescents (86%) aged 12-19 years. Comparing findings from 11 studies of juvenile gambling conducted in the U.S. from 1989 to 2002 Jacobs (2004) found that the median level of gambling participation among adolescents was 65% with a range between 49% and 86%.

In the present study we found that Lotto/football tip/scratchcard, poker, Oddset/Bookmaker and Casino were the most common gambling activities at land based venues as well as on the internet. In general males were more likely to participate

in skill-based games compared to females and males engaged more often in the majority of games at both land-based venues and on the internet compared to females. A significant exception was lotto (both land based and on-line) where females engaged more often than males. These findings confirm the general observation that young males gamble on more games than females and the young male gamblers tend to prefer skill and/or knowledge based games whereas young female gamblers seem to be more attracted to games of chance (Jacobs 2004).

The high overall rate of internet gambling reported in this study exceeds findings from most other available gambling studies conducted among adolescents with comparable mean ages. Even if comparisons are made with other reported findings of lifetime internet gamblers, the reported rates in this study still exceeds other published studies significantly. In a recent national study of gambling among Danish adults 21.1% of the younger respondents (aged 18-24 years) reported to have been gambling on the internet in their life time (Bonke & Borregaard 2006). The relatively high internet gambling rate reported in the present study may be explained by several factors. First, it should be considered that on-line data collection via the internet might be responsible for some response bias. Adolescents who are regular internet gamblers might be more likely to participate in on-line surveys. Investigations of internet gambling via the internet thus may produce elevated internet gambling rates. Second, it must be emphasised that internet gambling is a relatively new phenomenon and that comparisons with studies conducted during the late 1990's or early 2000's need some qualification. The availability of internet gambling has grown dramatically over the last years as more and more gambling providers find their way to the world wide web and as more and more persons are connected to internet at home, at school or at the job. Thus it seem reasonable to believe that the relatively low internet gambling rates identified among adolescent subpopulations in the late 1990's would be higher at the present moment due to the more widespread internet use and the explosive growth of internet gambling providers.

Problem gambling was measured with an alternative and apparently conservative gambling screen combining elements from the Lie/Bet questionnaire with a question of

chasing from SOGS. The overall finding of 0.4% problem gamblers is below findings from the few known prevalence studies among juveniles in the Scandinavian countries. In Scandinavia estimations of problem gambling among youth ranges from 1.7% to 3.2% (Johansson and Götestam 2003, Olason et al., 2005, Rossow and Hansen 2003). Meta-analysis of 11 studies among juveniles in the US conducted from 1989 to 2002 reveals that rates of problem/pathological gambling range between 1 and 9% (Jacobs 2004). These findings indicate that the instrument employed in this present study provides a somewhat conservative measure of the rate of pathological gamblers. Taking this into account it is worth mentioning that some of the correlations found in the present study agree with some the existing research on youth gambling. The finding that gambling problems are more prevalent among young males compared to young females agree with the overall tendencies in the academic literature (Jacobs 2004) and with recent research among Norwegian adolescents (Johansson og Götestam 2003, Rossow & Hansen 2003).

The present study found a significant gender gap among internet gamblers, more than twice as many males than females reported regularly internet gambling. This particular finding is consistent with American Gaming Association (2006) while it is partly inconsistent with Adams et al. (2007), Adlaf & Ialomiteanu (2002) and Adolescent Risk Communication Institute (2006) and who found minor and non-significant gender differences among internet gamblers. All of these studies, however, point in the same direction depicting males as the majority of internet gamblers.

Comparison between respondents with internet gambling experience and respondents without such experience revealed significant differences in scores on the alternative gambling screen. 8.4 % of the respondents with internet gambling experience scored high (2 or 3) on the alternative gambling screen whereas only 0.9 % with no internet experience scored high. This particular finding agrees with Ladd & Petry (2002), Wood & Williams (2007) who observes higher rates of problematic gambling behaviors among internet gamblers compared to non-internet gamblers.

### **Limitations and suggestions for future research**

As indicated above some limitations in the present study ought to be mentioned. First the research instrument cause a conflation of current and lifetime gambling rates. Respondents were asked: 'Which types of money gambling games to you play on the internet' and 'How often do you play these money gambling games on the internet'. One can therefore only speculate what proportions of the internet gamblers in this study are current gamblers and life time gamblers. The relatively high rates of gambling reported by respondents might indicate that a great proportion of respondents have perceived the questions as 'lifetime questions'. Second and related to this: The questionnaire employed in this study did not include full series of items from any of the well-established screening instruments hence the estimations of problem gamblers provided in this paper is not easily comparable with other prevalence studies estimating levels of problem gambling among adolescents. It need also be mentioned that the screening instrument used in this study is an alternative and rather simple one. Only one known published study have employed a similar instrument (Rossow and Hansen 2003) and here a higher prevalence rate was found. These differences may reflect actual differences in terms of youth gambling cultures and involvement across the Nordic countries. However, they might also reflect differences in the populations studied (i.e. different age groups). Future research among Scandinavian youths is required to shed light on these issues.

The present study found that a relatively large proportion of Danish adolescents gamble for money on the internet. Clearly more research is needed to determine whether this phenomenon is a reflection of specific youth cultures and that most adolescents mature out of this type kind of gambling or if internet gambling prove to be a more persistent form of gambling that continues in adulthood. Studies from Sweden (i.e. Svensson 2005) suggests that young people's gambling involvement change during the life course but we still know little about the social and personal factors that affect these changes. In order to adress such questions follow-up studies and longitudinal research designs are needed. In addition findings from this study suggests that internet gambling is most prevalent among those adolescents who wager money of several different types of games and therefore it could be hypothesized that internet gambling does not substitute

other land based forms of gambling but extend the gambling portfolio among some of the most active gamblers. Results from another Danish study (Bonke & Borregaard 2006) lend support to such hypothesis. More qualitative research among young internet gamblers is needed to clarify such issues.

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