

# Gambling, violent behaviour and attitudes towards violence among adolescent gamblers in Finland

TIINA RÄSÄNEN & TOMI LINTONEN & SUSANNA RAISAMO & ARJA RIMPELÄ & ANNE KONU

## ABSTRACT

**AIMS** – The purpose of this population-based study was to explore the relationship between gambling and violent behaviour and attitudes towards violence among 14- and 16-year-old adolescents. **DESIGN** – A national survey was conducted in Finland in 2011. The main measures in our study were gambling frequency and number of reported gambling-related harms. Their associations with violent behaviours and attitudes towards violence were studied using multinomial logistic regression and negative binomial regression. **RESULTS** – 47.1% of adolescents had gambled during the past six months and 13.2% of them had experienced gambling-related harms. Both gambling frequency and the number of gambling-related harms were linked to violent behaviour as well as to positive attitudes towards violence. Adolescents who engaged in gambling on a daily basis and/or experienced gambling harms had the highest risk. **CONCLUSIONS** – Health promotion efforts among gamblers should take into account their increased risk for violent behaviour. **KEYWORDS** – adolescence, gambling, harms, violence, problem behaviour, Finland

Submitted 11.03 2015

Final version accepted 25.05 2015

## Introduction

Adolescence is a challenging developmental period in which youths may experiment and engage in problem behaviours such as substance use, delinquency and gambling (Jensen, 2003; Strange & Sorensen, 2008). These behaviours are defined as actions that society disapproves of and which usually cause social sanctions (Jessor, Donovan, & Costa, 1991). Problem behaviours can co-occur among adolescents. This phenomenon is referred to as the problem behaviour syndrome (Jessor & Jessor, 1977). Problem behaviour theory presumes that involvement in one deviant behaviour increases the risk of being involved in another. These links between different problem behaviours may be harmful because they can compromise the successful transition

from adolescence to adulthood and impair health and well-being (Jessor, 1998).

Adolescent gambling is regarded as deviant, because it is illegal for youth younger than 18 to gamble in many countries. Some adolescents have positive perceptions and attitudes towards gambling and do not necessarily feel that way (Calado, Alexandre, & Griffiths, 2014). Also parents' attitudes towards gambling can be seen as positive, as they make gambling possible for their children by purchasing them scratch tickets, lottery draws and sports tickets (Felsher, Derevensky, & Gupta, 2003). Thus gambling is a common pastime among adolescents: 50% to 80% of youth have gambled during the previous year (Abbot, Romild, & Volberg, 2014; Der-

evensky, 2012; Jacobs, 2000; Luder, Berchtold, Akre, Michaud, & Suris, 2010; Splevins, Mireskandari, Clayton, & Blaszczynski, 2010; Ólason, Skarphedinsson, Jonsdottir, Mikaelsson, & Gretarsson, 2006). Additionally, when compared with adult populations, adolescents are more likely to experience gambling problems (Forrest & McHale, 2012; Valentine, 2008), and early initiation of gambling can be associated with more severe psychiatric problems, especially substance use disorders (Lynch, Maciejewski & Potenza, 2004).

Another concern is that adolescent gambling has been shown to co-occur with other problem behaviours. Gambling seems to be associated with substance use (Barnes, Welte, Hoffman, & Tidwell, 2011; Brunelle et al., 2012; Chaumeton, Ramowski, & Nystrom, 2011), early sexual activity (Proimos, DuRant, Piercen & Goodman, 1998), number of sexual partners (Stinchfield, 2000; Langhinrichsen-Rohling Rohde, Seeley, & Rohling, 2004), delinquency (Barnes, Welte, Hoffman, & Dintcheff, 1999, Barnes, Welte, Hoffman, & Dintcheff, 2005; Brunelle et al. 2012) and conduct problems (Barnes et al., 2011; Langhinrichsen-Rohling et al., 2004; Welte, Barnes, Tidwell, & Hoffman, 2009). However, relatively little is known about gambling and its associations with violence. Research tends to focus on the link between gambling and delinquency/conduct problems, which are measures that include violence along with several other behaviours such as theft and vandalism (see above).

Studies on gambling and violence are more common among adults regarded as problem gamblers (Boughton & Falenchuk, 2007; Cunningham-Williams, Abdallah, Callahan, & Cottler, 2007; Pulay

et al., 2008). There is also evidence of a relationship between gambling and intimate partner violence (Affifi, Brownridge, & MacMillan, 2010; Korman et al., 2008) and family violence (Dowling et al., 2014). At the same time, research on gambling and violence among adolescents is scarce. It has been found that severe general violence, severe dating violence and carrying a weapon were significant correlates of gambling frequency among adolescents presenting to an inner-city emergency department. However, this study contained a highly selected group of adolescents, and the results may not generalise to adolescents from the general population (Goldstein, Walton, Cunningham, Resko, & Duan, 2009). Studies conducted in a school context have discovered that at risk and problem gambling are associated with physical fights and carrying a weapon (Potenza et al. 2011; Slavin et al. 2013; Yip et al. 2011). Carrying a weapon and fighting are also linked to past-year and active gambling (Chaumeton, Ramowski, & Nystrom, 2010; Proimos et al. 1998).

While all these studies have used gambling as a dichotomic variable (gambling vs. no gambling) or were interested in problem-gambling severity, in this present study we are examining the level of gambling involvement (i.e. gambling frequency) and number of reported gambling-related harms. This way we can find signs of possible thresholds for harm associated with gambling. Also, all the studies mentioned above have been conducted in North America, and yet there are international differences in delinquency and violent behaviour between European and American countries (Enzmann et al., 2010). Associations between violence

and gambling may thus differ in the European context. Similarly, the availability of gambling products is different in Finland, where gambling games are easily reached. For example, slot machines can be found not only in casinos and bars, but also in public places such as hotels, coffee houses, petrol stations, stores and kiosks. Moreover, when compared with tobacco or alcohol selling, the enforcement of the legal age limit for the slot machine gambling has proved to be much weaker in Finland. (Warpenius, Holmila, & Raitasalo, 2012).

Regarding adolescent gambling prevalence, 44% of adolescents (aged 12 to 18) had gambled during the past six months in Finland (Raisamo, Halme, Murto, & Lintonen, 2013). The minimum legal age for gambling in Finland was 15, until it was reset at 18 in October 2010. After a transition period, the 18-year-old age limit was also applied to slot machines in July 2011. This means that during data collection for the present study in 2011, the age limit was 15 for playing slot machines and 18 for all other gambling forms.

Using a population-based survey of 14- and 16-year-old adolescents, the purpose of our cross-sectional study is to examine associations between adolescents' gambling, violent behaviour and attitudes towards violence. Adolescents' gambling is studied by gambling frequency and by the number of gambling-related harms. To our knowledge, no prior studies to date have examined these associations in a nationally representative population-based sample of European adolescents.

## Materials and methods

We used data from the 2011 Adolescent Health and Lifestyle Survey (AHLS),

which is a nationwide survey conducted every other year. The AHLS monitors the health and health behaviours of Finnish adolescents. Based on particular dates of birth, questionnaires were mailed to nationally representative samples of adolescents aged 12, 14, 16 and 18. Three re-inquiries were sent to non-respondents. In addition to the paper questionnaire, respondents could answer via the Internet with personal usernames and passwords. Samples were obtained from the Population Register Centre and data were collected during February–April. The study protocol was approved by the Ethics Committee of Tampere Region.

In this study we selected 14- and 16-year-old respondents, because we were especially interested in underage gambling, which is a different phenomenon due to its illegal nature. Moreover, the low response rate of 12-year-olds (14.1%) and 18-year-olds (23.8%) and the high possibility of selection bias supported our decision to remove them from the data.

## Measures

Main measures of our study were gambling frequency and number of reported gambling-related harms. We asked about gambling behaviour with the question, "During the past six months, have you gambled for money?" Gambling was defined as follows: "Gambling is gaming in which loss or win equals money. For example, slot machines, lotteries, scratch tickets and sport betting are gambling games. However, using virtual money or attending in games that are free of charge IS NOT gambling." Responses were "no", "yes, daily or almost daily", "a couple of times a week", "a couple of times a month" and "less often".

Adolescents were also asked if they had experienced any harms because of their gambling. The gambling harm items were based on literature reviews from the field. Even though the questions were not validated, they were pilot tested before the actual survey was conducted (Raisamo et al., 2013). Harms were “conflicts with parents”, “conflicts with friends”, “disruptions of daily rhythm”, “disruptions in school/work”, “feeling guilty or shameful”, “I have skipped school/work”, “I couldn’t pay my debts”, and “I have stolen money for gambling”, in which respondents could choose more than one option. Respondents were also asked to report the frequency of experiencing harms separately for each of the harms. Responses were “seldom or not at all”, “about once a month”, “about once a week”, and “daily/almost daily”. Respondents who felt gambling-related harms seldom or not at all were coded as “0” and all others were coded “1”. There was also an open-ended question, “Other; what?” and similarly in this question respondents were asked to report the frequency. The total number of responses to the open-ended question was 21 (0.7%). Frequency of harms ranged from 0 to 9 harms (mode 0). Internal consistency determined with Cronbach’s  $\alpha$  for the complete list of the nine harms was 0.83. Of the 1,325 adolescents who had gambled during the past six months, only 0.9% (12) did not answer the question concerning the number of gambling-related harms.

Questions of violence were based on the second International Self-Report Delinquency Study (ISRD-2) (Enzmann et al., 2010; Enzmann & Podana, 2010). The questions concerning violent behaviours

were: taking part in a fight, carrying a weapon (sharp or blunt objects used as weapons, excluding firearms), extortion (with a weapon or to beat them up), beating someone up, and beating someone up so that the victim needed to see a doctor. We examined relationships for violent behaviour in a simple correlation matrix and found that correlations were low (below 0.30). Also the value of Cronbach  $\alpha$  was low for the scale (0.517). This is why we decided to examine violent behaviours as separate measures. Because there were only a small number of offenders for extortion and beating someone up so that the victim needed to see a doctor, we excluded these questions from the analysis. The scale was “never”, “once” and “two times or more often”. Adolescents who had never taken part in violent acts during the previous year formed the reference group.

Adolescent attitudes toward violence were studied with seven questions: “Violence can be quite fun in real life”; “Violence can be quite fun in games, on TV, movies or internet”; “You have to use violence to deserve respect”; “If someone hits me, I hit back”; “Without violence everything would be more boring”; “It is completely normal that boys should want to prove themselves to others by fighting” and “It is completely normal that girls should want to prove themselves to others by fighting”. Questions concerning positive attitudes toward violence were combined into an aggregated scale. However, one question, “If someone hits me, I hit back”, was removed because of its low correlations with other questions. Also this question had somewhat different content, because of its self-defence nature. When these remaining six questions were used

in principal component analysis (varimax rotation), it gave a one-component model. This supported the view that we could create a sum variable (Cronbach  $\alpha$  0.72). The scale (1–4) was “strongly agree”, “partially agree”, “partially disagree” and “strongly disagree”. From the sum variable we created a dichotomous variable: adolescents who disagreed with these assertions, strongly or partially, formed the reference group. Questions regarding violent behaviour and attitudes towards violence had less than 1% of missing values among all adolescents and among adolescents who had gambled during the past six months.

#### *Data analysis*

The main measure, gambling, was examined by gambling frequency and by the number of gambling-related harms. Gambling frequency and its associations with violence were studied using multinomial logistic regression. This statistical method allows the dependent variable to have more than two categories. Also the relationship between each pair of outcome values does not have to be the same (no proportional odds assumption). Multinomial logistic regression generates estimates called odds ratios (ORs). The odds of an event (in this occasion, gambling) is the ratio of the number of gamblers to the number of those in the reference category. Reference category is the category that all other categories are referred to. Multinomial logistic regression can be used for situations in which you want to classify subjects based on values of a set of predictor variables and facilitate analyses of differences between classes in more detail (Hosmer & Lemeshow, 1989). When studying gambling frequency, the last category

“less often” (less often than monthly), was chosen as the reference category for the analysis. In Model 0, one variable at a time was entered in the model, and sex and age were adjusted. In Model 1, all predictor variables were included at the same time; sex and age were adjusted.

Gambling harms were studied using negative binomial regression. This method can be used for count variables in which there is overdispersion in the outcome. Negative binomial regression produces one odds ratio value, which indicates the risk for a one unit increase (for example from 1 harm to 2 harms) (Long & Freese, 2006).

The statistical analyses were conducted using IBM SPSS Statistics 22. Results are presented as odds ratios (ORs) and their 95% confidence intervals (CIs).

## **Results**

The number of respondents and response rates among 14-year-old boys were 621 and 45% and among 16-year-old boys 566 and 37%. For girls, the corresponding rates were 777 and 60% for 14-year-olds and 868 and 58% for 16-year-olds. Adolescents who had not answered the question concerning gambling frequency ( $n=20$ ) were excluded. The total number of adolescents was thus 2,812, of which 49.2% were 14-year-olds and 50.8% were 16-year-olds; 42% were boys. In the analysis where we examined associations between the number of gambling-related harms and violence, those who had not gambled during the past six months ( $n=1,487$ ) were excluded, because they had not answered the questions concerning gambling-related harms. In this analysis, the total number of adolescents was 1,325, of which 533

**Table 1.** Gambling frequency and number of gambling harms endorsed among 14- and 16-year-old adolescents % (N).

Gambling frequency	14 yrs boys	14 yrs girls	16 yrs boys	16 yrs girls	All 14 & 16 yrs
Daily or almost daily	2.6% (16)	0.6% (5)	6.6% (37)	0.7% (6)	2.3% (64)
A couple of times a week	16.3% (100)	1.6% (12)	28.0% (158)	3.1% (27)	10.6% (297)
A couple of times a month	14.5% (89)	5.2% (40)	25.0% (141)	11.3% (98)	13.1% (368)
Less often	22.1% (136)	17.5% (135)	16.8% (95)	26.6% (230)	21.2% (596)
No gambling the past 6 months	44.5% (273)	75.1% (578)	23.6% (133)	58.2% (503)	52.9% (1487)
<b>Total</b>	100.0% (614)	100.0% (770)	100.0% (564)	100.0% (864)	100.0% (2812)
<b>Gambling harms<sup>1</sup></b>					
1 harm or more	16.0% (54)	11.7% (22)	17.0% (73)	6.7% (24)	13.2% (173)
No harms	84.0% (284)	88.3% (166)	83.0% (357)	93.3% (333)	86.8% (1140)
<b>Total</b>	100.0% (338)	100.0% (188)	100.0% (430)	100.0% (357)	100.0% (1313)

<sup>1</sup> Based on the list of harm items presented in the survey. In analysis harms are used as a number of harms ranging from 0 to 9.

(40.2%) were 14 years old and 792 (59.8%) were 16 years old; 58% of the respondents were boys.

*Gambling frequency and gambling-related harms*

Of all 2,812 adolescents, 47.1% had gambled during the past six months. In both age groups, gambling was more common among boys than girls. Also involvement in gambling increased with age. Of adolescents who had gambled during the past

six months, 13.2% experienced harms because of their gambling. Experiencing gambling harms was more common among boys than among girls (Tables 1 & 2).

*Gambling frequency and violence*

In Model 0, in which predictor variables were entered in the model one at a time and age and sex were adjusted for, the likelihood of violent behaviour increased with the increase in the frequency of gambling. Daily and weekly gamblers were signifi-

**Table 2.** Odds ratios (OR) and their 95% confidence intervals (CIs) for involvement in gambling.

Gambling	% (N)	No gambling	Less often	A couple of times a month	A couple of times a week	Daily or almost daily
14-year-olds <sup>1</sup>	49.2% (1384)	1.60 (1.32–1.94)	Ref.	0.65 (0.49–0.85)	0.73 (0.55–0.96)	0.59 (0.34–1.01)
Boys <sup>2</sup>	41.9% (1178)		Ref.	2.63 (2.01–3.44)	10.45 (7.18–15.21)	7.61 (3.90–14.88)

<sup>1</sup>16-year-olds as reference category, <sup>2</sup>Girls as reference category

**Table 3.** Odds ratios (OR) and their 95% confidence intervals (CIs) for involvement in violent behavior and attitudes towards violence among 14-and 16-year-old adolescents (N=2812) in relation to gambling frequency. The reference category for dependent variable was 'less often'.

Violent behaviour	% (N)	No gambling		Less often	A couple of times a month		A couple of times a week		Daily or almost daily	
		Model 0	Model 1	Ref	Model 0	Model 1	Model 0	Model 1	Model 0	Model 1
Carrying a weapon	4.7 (130)	0.75 (0.44–1.28)	0.91 (0.52–1.59)	Ref	1.46 (0.81–2.64)	1.10 (0.59–2.06)	<b>1.86 (1.04–3.34)</b>	1.24 (0.67–2.31)	<b>4.23 (1.98–9.05)</b>	<b>2.44 (1.06–5.65)</b>
Taking part in a fight	7.9 (220)	<b>0.56 (0.37–0.84)</b>	<b>0.59 (0.38–0.92)</b>	Ref	1.57 (0.99–2.46)	1.24 (0.76–2.02)	<b>2.20 (1.41–3.43)</b>	<b>1.71 (1.06–2.76)</b>	<b>3.28 (1.68–6.40)</b>	1.82 (0.86–3.86)
Beating someone up	2.6 (72)	0.65 (0.31–1.35)	0.84 (0.39–1.82)	Ref	<b>2.61 (1.22–5.59)</b>	2.21 (0.99–4.96)	<b>3.35 (1.50–7.51)</b>	2.14 (0.90–5.09)	<b>7.44 (2.72–20.36)</b>	<b>3.96 (1.31–11.97)</b>
<b>Positive attitudes towards violence</b>	4.2 (119)	0.70 (0.39–1.24)	0.79 (0.43–1.44)	Ref	<b>1.96 (1.04–3.69)</b>	1.61 (0.83–3.13)	<b>2.98 (1.61–5.50)</b>	<b>2.24 (1.17–4.26)</b>	<b>4.19 (1.76–9.97)</b>	2.24 (0.87–5.77)

Bolding if statistically significant

In Model 0, predictor variables were entered to the model one at a time and age and sex were adjusted for.

In Model 1, all predictor variables were included in the Model 1 at the same time. Both sex and age were adjusted.

cantly more likely to carry a weapon, be involved in fighting and beating someone up when compared to those who gambled less than monthly. For example, the odds for fighting were 3.3 times as high among daily gamblers. Also the odds of positive attitudes towards violence were higher among daily, weekly and monthly gamblers when comparing to those who gambled less than monthly. When all predictor variables were included in the model at the same time, and both sex and age were adjusted (Model 1), the odds ratio of fight-

ing remained significant among weekly gamblers. Carrying a weapon and beating someone up remained significant among daily gamblers (Table 3).

#### *Gambling-related harms and violence*

Adolescents who experienced gambling-related harms had higher odds for violent behaviour and positive attitudes towards violence when compared to those who did not endorse any harms. Odds remained significant for all other violent measures except for beating someone up, even af-

**Table 4.** Odds ratios (OR) and their 95% confidence intervals (CIs) for involvement in violent behavior and attitudes towards violence among 14-and 16-year-old adolescents (N=1325) in relation to gambling-related harms. The reference category for dependent variable was 'no harms'.

	% (N)	Model 0	Model 1
<b>Violent behaviour</b>			
Carrying a weapon	4.7% (130)	<b>4.13 (3.00–5.69)</b>	<b>2.62 (1.80–3.80)</b>
Taking part in a fight	7.9% (220)	<b>2.93 (2.21–3.88)</b>	<b>1.83 (1.33–2.52)</b>
Beating someone up	2.6% (72)	<b>3.50 (2.28–5.37)</b>	1.53 (0.93–2.51)
<b>Positive attitudes towards violence</b>	4.2% (119)	<b>3.14 (2.22–4.44)</b>	<b>1.58 (1.05–2.38)</b>

Bolding if statistically significant

In Model 0, predictor variables were entered to the model one at a time and age and sex were adjusted for.

In Model 1, all predictor were included in the Model 1 at the same time. Both sex and age were adjusted.

ter controlling attitudes towards violence, age, sex and all other violent behaviour (Table 4).

## Discussion

This population-based study has explored the relationship between gambling and violent behaviour and attitudes towards violence among 14- and 16-year-old adolescents. Based on our results, gambling frequency is associated with violent behaviour. Risk for violent behaviour increases proportionally to increased gambling frequency. These findings are consistent with Goldstein et al. (2009) and with previous studies demonstrating associations between at risk/problem gambling, carrying a weapon and fighting (Potenza et al. 2011; Slavin et al. 2013; Yip et al. 2011) and links between past-year gambling, carrying a weapon and fighting (Proimos et al. 1998).

Moreover, gambling harms were linked to violent behaviour. For example, one unit increase in gambling harms increased the risk of carrying a weapon and fighting, which suggests positive associations between gambling harms and violent behaviour among adolescents. Similar results have been shown by Proimos et al. (1998), who found that carrying a weapon and fighting were associated with gambling-related problems with family and friends.

Similarly to previous studies (Jacobs 2000; Luder et al. 2010; Ólason et al. 2006; Splevins et al. 2010), our research shows that gambling is quite common among adolescents. Of all 2,812 adolescents, 47.1% had gambled during the past six months. Despite the fact that during data collection for the present study it was illegal for youths younger than 15 to participate in

any type of gambling in Finland, 38.5% of 14-year-old adolescents had gambled. Of 14-year-old adolescents, 19.8% gambled at least monthly. The reason why so many adolescents gamble may be because of the wide variety of gambling games available in Finland. A study conducted in the US supports this point of view (Welte, Barnes, Tidewell, & Hoffman, 2009). Also, removal of slot machines in Norway has shown that overall, frequent gambling, not just slot machine gambling, decreased (Rossow, Hansen, & Storvoll, 2013). Furthermore, adolescents tend to have positive perceptions and attitudes towards gambling (Calado et al. 2014). Gambling has become part of adolescent leisure time with few parents aware of its potential seriousness (Campbell, Derevensky, Meerkamper, & Cutajar, 2011), and when compared with tobacco or alcohol selling, enforcement of the legal age limit for slot machine gambling has proved to be much weaker in Finland (Warpenius et al., 2012).

Adolescents who gambled at least on a weekly basis or had experienced harms had the highest risk for violent behaviour and positive attitudes towards violence. In our study the reasons behind these associations are undetermined. There may be several explanations for these results: problem behaviours may influence one another, there can be common antecedents or possibly because these types of behaviour occur in individuals who have a tendency toward deviant behaviour (Igra & Irwin, 1996). Jessor's problem behaviour theory presumes that proneness for problem behaviour is within the perceived-environment system, the personality system and the behaviour system. Each system contains factors that act like catalysts for

engaging in problem behaviour or have an inhibitory effect for involvement in problem behaviour. (Jessor & Jessor, 1977.) Regardless of the reasons, these links between different problem behaviours can be threatening, especially when they emerge early in life. Violent behaviour had strong associations with gambling frequency and gambling-related harms even after controlling for adolescents' sex, age and attitudes towards violence. These findings support the idea that gambling may be part of a general problem behaviour syndrome (Jessor & Jessor, 1977).

Because the data was produced by adolescent self-reports, we have to consider the possibility of over- or underreporting. Given the illegal nature of many of gambling-related variables (gambling, carrying a weapon, serious violence), participants may have deliberately underestimated their involvement in these behaviours. Because response rates were relatively low among 16-year-old boys, the final sample may not include those who gamble the most and are most likely to be involved in violent behaviour (Pietilä, Rantakallio, & Läärä, 1995). Therefore, the estimates for gambling and violent behaviour and attitudes may be underestimated.

Additionally, the cross-sectional study design prevents us from establishing a direct causation between behaviours. It is possible that engagement in gambling may increase the risk for fighting or vice versa. It is also possible that a common underlying risk factor like impulsivity would explain association between gambling and violence. Earlier studies have found that impulsivity, parental supervision and having deviant peers accounted for proportions of the covariance between the problematic

behaviours (Vitaro, Brendgen, Ladouceur, & Tremblay, 2001; Wannar, Vitaro, Carbonneau, & Tremblay, 2009). Thus, some adolescents may engage in different problem behaviours because of individual dispositions and social influences. Consequently, further research using longitudinal data to determine the temporal relationship between gambling and violence is needed. It would also be interesting to include impulsivity in the analysis.

Considering our limitations, this study has provided evidence of adolescent gambling and its relationship with violence. Because of these significant associations between gambling frequency, gambling-related harms and violence, strategies that take into consideration multiple problem behaviours or strategies that affect underlying risk factors should be considered when reducing adolescent gambling (Vitaro et al., 2001). Our findings also highlight the need for further study of adolescent gambling. Overall, more research is needed on multiple problem behaviours related to gambling and their associated shared risk factors. Information about gambling and related harms should be given to parents, adolescents and also to persons working with youth. Gambling can be a hard problem to detect especially when it is linked with other problem behaviour.

Adolescence is a vulnerable period for engaging in problem behaviours. Over a third of 14-year-old adolescents had taken part in gambling despite its illegality. This highlights the need for legal age limits to be enforced and the responsibilities of gambling providers to be clarified. It is also important to consider the availability of different games when trying to reduce underage gambling.

Gambling appears to be associated with violence and violent attitudes. Thus gambling can be seen as part of a general problem behaviour syndrome. As Derevensky (2012) has pointed out, adolescent gambling is a growing concern that needs to be addressed. Gambling cannot be tackled only by regulation and it should also be considered as an important public health issue.

**Declaration of interest** This study was supported by Finnish Foundation for Alcohol Studies (FFAS). FFAS had no involvement in the study design, data handling, writing or submission of the manuscript. The grants awarded by FFAS for gambling research are based on a government contract for studying gambling-related harm. Tomi Lintonen who works as the Research Director at FFAS had no role in awarding the grant to Tiina Räsänen.

**Tiina Räsänen**, School of Health Sciences  
University of Tampere;  
Department of Adolescent Psychiatry  
Tampere University Hospital

**Tomi Lintonen**, PhD  
Finnish Foundation for Alcohol Studies  
E-mail: tomi.lintonen@uta.fi

**Susanna Raisamo**, PhD  
National Institute for Health and Welfare (THL)  
E-mail: susanna.raisamo@thl.fi

**Arja Rimpelä**, Professor of Public Health  
School of Health Sciences  
University of Tampere;  
Department of Adolescent Psychiatry  
Tampere University Hospital  
E-mail: arja.rimpela@uta.fi

**Anne Konu**, PhD  
School of Health Sciences  
University of Tampere  
E-mail: anne.konu@uta.fi

## REFERENCES

- Abbott, M. W., Romild, U., & Volberg, R. A. (2014). Gambling and problem gambling in Sweden: changes between 1998 and 2009. *Journal of Gambling Studies*, 30(4), 985–999.
- Affi, T. O., Brownridge, D. A., & MacMillan, H. (2010). The relationship of gambling to intimate partner violence and child maltreatment in a nationally representative sample. *Journal of Psychiatric Research*, 44(5), 331–337.
- Barnes, G. M., Welte, J. W., Hoffman, J. H., & Tidwell, M. C. (2011). The co-occurrence of gambling with substance use and conduct disorder among youth in the United States. *American Journal on Addictions*, 20(2), 166–173.
- Barnes, G. M., Welte, J. W., Hoffman, J. H., & Dintcheff, B. A. (2005). Shared predictors of youthful gambling, substance use, and delinquency. *Psychology of Addictive Behaviors*, 19(2), 165–174.
- Barnes, G. M., Welte, J. W., Hoffman, J. H., & Dintcheff, B. A. (1999). Gambling and alcohol use among youth: Influences of demographic, socialization, and individual factors. *Addictive Behaviors*, 24(6), 749–767.
- Boughton, R., & Falenchuk, O. (2007). Vulnerability and comorbidity factors of female problem gambling. *Journal of Gambling Studies*, 23(3), 323–334.
- Brunelle N., Leclerc D., Cousineau M. M., Dufour, M., Gendron, A., & Martin, I. (2012). Internet gambling, substance use, and delinquent behavior: An adolescent deviant behavior involvement pattern. *Psychology of Addictive Behaviors*, 26(2), 364–370.

- Calado, F., Alexandre, J., & Griffiths, M. D. (2014). Mom, dad it's only a game! Perceived gambling and gaming behaviors among adolescents and young adults: An exploratory Study. *International Journal of Mental Health and Addiction*, 12(6), 772–794.
- Campbell, C., Derevensky, J., Meerkamper, E., & Cutajar, J. (2011). Parents' perception of adolescent gambling: A Canadian national study. *Journal of Gambling Issues*, 25, 36–53.
- Chaumeton, N. R., Ramowski, S. K., & Nystrom, R. J. (2011). Correlates of gambling among eighth-grade boys and girls. *Journal of School Health*, 81(7), 374–385.
- Cunningham-Williams, R. M., Abdallah, A. B., Callahan, C., & Cottler, L. (2007). Problem gambling and violence among community-recruited female substance abusers. *Psychology of Addictive Behaviors*, 21(2), 239–243.
- Derevensky, J. (2012). *Teen gambling: Understanding a growing epidemic*. New York: Rowman & Littlefield Publishing.
- Dowling, N. A., Jackson, A. C., Suomi, A., Lavis, T., Thomas, S. A., Patford, J., Harvey, P., Battersby, M., Koziol-McLain, J., Abbott, M., & Bellringer, M. E. (2014). Problem gambling and family violence: Prevalence and patterns in treatment-seekers. *Addictive Behaviors*, 39(12), 1713–1717.
- DuRant, R. H., Altman, D., Wolfson, M., Barkin, S., Kreiter, S., & Krowchuk, D. (2010). Exposure to violence and victimization, depression, substance use, and the use of violence by young adolescents. *Journal of Pediatrics*, 137(5), 707–713.
- Enzmann, D., Marshall, I., Killias, M., Junger-Tas, J., Stekete, M., & Gruszczynska, B. (2010). Self-reported youth delinquency in Europe and beyond: First results of the Second International Self-Report Delinquency Study in the context of police and victimization data. *European Journal of Criminology*, 7(2), 159–183.
- Enzmann, D., & Podana, Z. (2010). Official crime statistics and survey Data: Comparing trends of youth violence between 2000 and 2006 in cities of the Czech Republic, Germany, Poland, Russia, and Slovenia. *European Journal on Criminal Policy and Research*, 16(3), 191–205.
- Felsher, J. R., Derevensky, J. L., & Gupta, R. (2003). Parental influences and social modelling of youth lottery participation. *Journal of Community & Applied Social Psychology*, 13, 361–377.
- Forrest, D., & McHale, I. G. (2012). Gambling and problem gambling among young adolescents in Great Britain. *Journal of Gambling Studies*, 28(4), 607–622.
- Goldstein, A. L., Walton, M. A., Cunningham, R. M., Resko, S. M., & Duan, L. (2009). Correlates of gambling among youth in an inner-city emergency department. *Psychology of Addictive Behaviors*, 23(1), 113–121.
- Hosmer, D. W., & Lemeshow, S. (1989). *Applied logistic regression*. New York: John Wiley & Sons.
- Igra, V., & Irwin, C. E. (1996). Theories of adolescent risk-taking behaviour. In R. J. DiClemente, W. B. Hansen, & L. E. Ponton (Eds.), *Handbook of adolescent health risk behavior* (pp. 35–51). New York: Plenum Press.
- Jacobs, D. (2000). Juvenile gambling in North America: An analysis of long term trends and future prospects. *Journal of Gambling Studies*, 16(2-3), 119–151.
- Jensen, P. S. (2003). Comorbidity and child psychopathology: Recommendations for the next decade. *Journal of Abnormal Child Psychology*, 31(3), 293–300.
- Jessor, R. (1998). New perspectives on adolescent risk behavior. In A. Jessor (Ed.), *New perspectives on adolescent risk behavior* (pp. 1–10). Cambridge: Cambridge University Press.
- Jessor, R., Donovan, J. E., & Costa, F. M. (1991). *Beyond adolescence: Problem behavior and young adult development*. Cambridge: Cambridge University Press.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.
- Korman, L. M., Collins, J., Dutton, D., Dhayanathan, B., Littman-Sharp, N., & Skinner, W. (2008). Problem gambling and intimate partner violence. *Journal of*

- Gambling Studies*, 24(1), 13–23.
- Langhinrichsen-Rohling, J., Rohde, P., Seeley, J. R., & Rohling, M. L. (2004). Individual, family, and peer correlates of adolescent gambling. *Journal of Gambling Studies*, 20(1), 23–46.
- Long, J. S. & Freese, J. (2006). *Regression models for categorical dependent variables using Stata*. Texas: Stata Press.
- Luder, M. T., Berchtold, A., Akre, C., Michaud, P. A., & Suris, J. C. (2010). Do youths gamble? You bet! A Swiss population-based study. *Swiss Medical Weekly*, 140, 1–6.
- Lynch, W. J., Maciejewski, P. K., & Potenza, M. N. (2004). Psychiatric correlates of gambling in adolescents and young adults grouped by age at gambling onset. *Archives of General Psychiatry*, 61(11), 1116–1122.
- Ólason, D. T., Skarphedinnsson, G. A., Jonsdottir, J. E., Mikaelsson, M., & Gretarsson, S. J. (2006). Prevalence estimates of gambling and problem gambling among 13- to 15-year-old adolescents in Reykjavík: An examination of correlates of problem gambling and different accessibility to electronic gambling machines in Iceland. *Journal of Gambling Issues*, 18, 39–55.
- Pietilä, A. M., Rantakallio, P., & Läärä, E. (1995). Background factors predicting non-response in a health survey of northern Finnish young men. *Scandinavian Journal of Social Medicine*, 23(2), 129–136.
- Proimos, J., DuRant, R. H., Pierce, J. D., & Goodman, E. (1998). Gambling and other risk behaviors among 8th- to 12th-grade students. *Pediatrics*, 102(2), e23.
- Potenza, M. N., Wareham, J. D., Steinberg, M. A., Rugle, L., Cavallo, D. A., Krishnan-Sarin, S., & Desai, R. A. (2011). Correlates of at-risk/problem internet gambling in adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 50(2), 150–159.
- Pulay, A. J., Dawson, D. A., Hasin, D. S., Goldstein, R. B., Ruan, W. J., Pickering, R. P., Huang, B., Chou, S. P., & Grant, B. F. (2008). Violent behavior and DSM-IV psychiatric disorders: Results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*, 69(1), 12–22.
- Raisamo, S., Halme, J., Murto, A., & Lintonen, T. (2013). Gambling-related harms among adolescents: A population-based study. *Journal of Gambling Studies*, 29(1), 151–159.
- Rossow, I., Hansen, M. B., & Storvoll, E. E. (2013). Changes in youth gambling after the removal of slot machines in Norway. *Nordic Studies on Alcohol and Drugs*, 30(4), 317–330.
- Slavin, M., Pilver, C. E., Hoff, R. A., Krishnan-Sarin, S., Steinberg, M. A., Rugle, L., & Potenza, M. N. (2013). Serious physical fighting and gambling-related attitudes and behaviors in adolescents. *Journal of Behavioral Addiction*, 2(3), 167–178.
- Splevins, K., Mireskandari, S., Clayton, K., & Blaszczyński, A. (2010). Prevalence of adolescent problem gambling, related harms and help-seeking behaviours among an Australian population. *Journal of Gambling Studies*, 26(2), 189–204.
- Stinchfield, R. (2000). Gambling and correlates of gambling among Minnesota public school students. *Journal of Gambling Studies*, 16(2-3), 153–73.
- Strange, M., & Sorensen, A. (2008). Childhood development. In A. Guerrero & M. Piasecki (Eds.), *Problem-based behavioral science and psychiatry* (pp. 17–29). New York, NY: Springer Science Business Media.
- Valentine, G. (2008). Literature review of children and young people's gambling. Birmingham: The Gambling Commission. <http://www.gamblingcommission.gov.uk/pdf/Literature%20review%20of%20children%20and%20young%20peoples%20gambling%20-%20Sept%202008.pdf>. Accessed October 1, 2013.
- Vitaro, F., Brendgen, M., Ladouceur, R., & Tremblay, R. E. (2001). Gambling, delinquency, and drug use during adolescence: Mutual influences and common risk factors. *Journal of Gambling Studies*, 17(3), 171–190.
- Wanner, B., Vitaro, F., Carbonneau, R., & Tremblay, R. E. (2009). Cross-lagged links among gambling, substance use, and delinquency from midadolescence to young adulthood: Additive and moderating effects

- of common risk factors. *Psychology of Addictive Behavior*, 23(1), 91–104.
- Warpenius, K., Holmila, M., & Raitasalo, K., (2012). Peliin ei puututa. Alkoholin, tupakan ja rahapeliautomaattien ikärajalvontaa testanneet ostokokeet vähittäisliikkeissä [Enforcing age limits on purchases of alcohol and tobacco and the use of slot machines: test purchases in retail outlets]. *Yhteiskuntapolitiikka*, 77(4), 375–385.
- Welte, J. W., Barnes, G. M., Tidwell, M. C., & Hoffman, J. H. (2009). Association between problem gambling and conduct disorder in a national survey of adolescents and young adults in the United States. *Journal of Adolescent Health*, 45(4), 396–401.
- Welte, J. W., Barnes, G. M., Tidwell, M.-C. O., & Hoffman, J. H. (2009). Legal gambling availability and problem gambling among adolescents and young adults. *International Gambling Studies*, 9(2), 89–99.
- Yip, S. W., Desai, R. A., Steinberg, M. A., Rugle, L., & Cavallo, D. A., Krishnan-Sarin, S., & Potenza, M. N. (2011). Health/functioning characteristics, gambling behaviors, and gambling-related motivations in adolescents stratified by gambling problem severity: findings from a high school survey. *American Journal on Addictions*, 20(6), 495–508.

