

At-risk and problem gambling among Finnish youth: The examination of risky alcohol consumption, tobacco smoking, mental health and loneliness as gender-specific correlates

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ABSTRACT

AIMS – The aims were to compare past-year at-risk and problem gambling (ARPG) and other at-risk behaviours (computer gaming, risky alcohol consumption, tobacco smoking) by age and gender, and to explore how ARPG is associated with risky alcohol consumption, tobacco smoking, poor mental health and loneliness in males and females. **DESIGN** – Data from respondents aged 15–28 ($n = 822$) were derived from a cross-sectional random sample of population-based data ($n = 4484$). The data were collected in 2011–2012 by telephone interviews. The Problem Gambling Severity Index (PGSI, score ≥ 2) was used to evaluate ARPG. Prevalence rates for risk behaviours were compared for within gender-specific age groups. Regression models were gender-specific. **RESULTS** – The proportion of at-risk and problem gamblers was higher among males than females in all age groups except among 18–21-year-olds, while frequent computer gaming was higher among males in all age groups. The odds ratio (95% CI) of being a male ARPGer was 2.57 (1.40–4.74) for risky alcohol consumption; 1.95 (1.07–3.56) for tobacco smoking; 2.63 (0.96–7.26) for poor mental health; and 4.41 (1.20–16.23) for feeling lonely. Likewise, the odds ratio (95% CI) of being a female ARPGer was 1.19 (0.45–3.12) for risky alcohol consumption; 4.01 (1.43–11.24) for tobacco smoking; 0.99 (0.18–5.39) for poor mental health; and 6.46 (1.42–29.34) for feeling lonely. All 95% CIs of ARPG correlates overlapped among males and females. **CONCLUSIONS** – Overall, past-year at-risk and problem gambling and computer gaming seem to be more common among males than females; however, for risky alcohol consumption similar gender differences were evident only for the older half of the sample. No clear gender differences were seen in correlates associated with ARPG.

KEYWORDS – adolescents, at-risk/problem gambling, gaming, gender, population study, substance use

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Introduction

The examination of potentially addictive behaviour that occurs prior to adulthood is crucial, given that youths represent high-risk populations as regards these behaviours. Based on the United Nations (UN), youth(s) refer to individuals aged 15 to 24 years (UN Secretariat, 1981). However, the

UN also recognises that broader definitions are used in member states and entities. In this study, the definition is based on the Finnish Youth Law (Nuorisolaki, 72/2006), which intends to strengthen and enhance the growth of individuals aged under 29 years. This age spectrum encompasses developmentally diverse individuals from

adolescents to emerging adults (Arnett, 2000), who are unified by their susceptibility to a range of addictive behaviours (Chambers, Taylor, & Potenza, 2003; Johansson, Grant, Kim, Odlaug, & Gøttestam, 2009; Stone, Becker, Huber, & Catalano, 2012). Potentially addictive and risk-taking behaviour is likely to vary markedly among these individuals: minors have limited access to such behaviours, and the first years of legal age and the transition towards adulthood may be accompanied by experimentation (Arnett, 2000; Staff et al., 2010). Subsequently the novelty aspect of risk-taking decreases while stability and responsibilities become increasingly common, considering that the third decade of life is manifested by increasing rates of stable work (along with decreasing rates of unemployment), marriage and parenthood (Arnett, Žukauskienė, & Sugimura, 2014). This course of development of risk-taking behaviour may differ between the genders.

Youths are a high-risk group in terms of developing gambling problems (Delfabbro, King, & Griffiths, 2014; Hardoon & Derevensky, 2001; Kristiansen & Jensen, 2014; Spelvins, Mireskandri, Clayton, & Blaszczyński, 2010). Early age of gambling onset has been linked to the development of more severe gambling problems (Jiménez-Murcia et al., 2010), such as Gambling Disorder (GD; DSM-5, APA, 2013). It gives cause for concern that age restrictions have not stopped underage youth from gambling in Finland (Castrén, Grainger, Lahti, Alho, & Salonen, 2015; Järvinen-Tassopoulos & Raitasalo 2015; Raisamo, Halme, Murto, & Lintonen, 2013; Räsänen, Lintonen, Joronen, & Konu, 2015a; Räsänen, Lintonen, Raisamo, Rimpelä, & Konu, 2015b; Warpenius, Holmila, & Raitasalo, 2012)

and internationally (Blinn-Pike, Worthy, & Jonkman, 2010; Hanss et al., 2015; Volberg, Gupta, Griffiths, Olason, & Delfabbro, 2010). Subsequently, the term at-risk and problem gambling (ARPG) is used to refer to a wide spectrum of problematic gambling (e.g., Donati, Chiesi, & Primi, 2013).

Another potential behavioural addiction, the high level of computer gaming, has been noted to have an elevated occurrence among adolescents (Holtz & Appel, 2011). Computer gaming shares similar elements to gambling, such as the loss of sensation of time, experiencing a “high” and relaxing or “escaping” (Wood, Gupta, Derevensky, & Griffiths, 2004). At present, computer gaming is nonetheless defined as a topic that requires further research before defining diagnostics is plausible (Internet Gaming Disorder, IGD) (DSM-5, APA, 2013; Pontes, Kiraly, Demetrovics, & Griffiths, 2014). In a Finnish local school sample, 6% of adolescents who played computer games, played over 40 hours a week (Luhtala, Silvennoinen, & Tenkanen, 2012). As computer gaming is a growing trend in Finland (Rimpelä, 2010), it is important to examine prevalence rates. Although some reports exist (e.g., Björklund, Heiskanen, & Kokko, 2011), information is scarce on the Finnish prevalence rates of computer gaming based on nationally collected samples.

Addictive behaviours have been noted to co-occur. Alcohol abuse and use are associated with ARPG among both adolescents and adults (Castrén et al., 2015; Hardoon, Gupta, & Derevensky, 2004; Hodgins, Stea, & Grant, 2011; Lorains, Cowlshaw, & Thomas, 2011; Molde, Pallesen, Bartone, Hystad, & Johnsen, 2009). Similarly, smoking tobacco and/or nicotine addiction is

linked to ARPG (Black, Shaw, McCormick, & Allen, 2013; Kong et al., 2013; Lorains et al., 2011; Weinberger et al., 2015; Williams et al., 2015; Yip et al., 2011).

ARPG is also associated with psychological factors, linked with mental health problems, particularly depression, among adolescents and adults (Grant, Kim, Odlaug, & Potenza, 2008; Molde et al., 2009; Odlaug, Stinchfield, Golberstein, & Grant, 2013; Williams et al., 2015). While loneliness has been studied less than the above correlates of ARPG, it has been suggested to be a risk factor for developing more severe ARPG (Castrén et al., 2013). Both physical and cognitive growth, and the changes in adolescent self-concept, as well as the need for individuation and autonomy may be associated with young people's vulnerability to loneliness (Brennan, 1982). Loneliness can be perceived as a very distressing experience with severe consequences for a youth's well-being (Rokach, 2012), including increased truancy, worse academic performance, school drop-out and poorer psychological health, such as anxiety, depression and increased risk for suicidality (Lohre, 2012; Schinka, Van Dulmen, Bossarte, & Swahn, 2012). As the phenomena of loneliness and adolescent ARPG have shared negative consequences, it is relevant to explore how loneliness is associated with problematic gambling.

As to gender differences, it is well documented that males and females differ in their addictive behaviours. First, males are more likely to be at-risk and problem gamblers (Castrén et al., 2015; Donati et al., 2013; Ellenbogen, Derevensky, & Gupta 2007; Hardoon et al., 2004; Tavares et al., 2010; Williams, Volberg, & Stevens,

2012) and tend to start gambling at an earlier age (Burge, Pietrzak, Molina, & Petry, 2004; Tavares, Zilberman, Beites, & Gentil, 2001), while the progression of gambling problems has been noted to be faster among females (Grant, Odlaug, & Mooney, 2012; Ladd & Petry 2002; Nelson, LaPlante, LaBrie, & Shaffer, 2006). Males are also more likely to be computer gamers (Griffiths, 1997; Griffiths, Davies, & Chappell, 2004). In a Finnish sample of adolescents, although females spent less time playing computer games than males, there were no gender differences in experiencing the most common harms of computer gaming (Luhtala et al., 2012). Additionally, males are more likely than females to drink heavily (e.g., Hasin, Stinson, Ogburn, & Grant, 2007; Mäkelä & Härkönen, 2010; Schulte, Ramo, & Brown, 2009) and smoke (Hellán, Helakorpi, Virtanen, & Uutela, 2013; Luopa et al., 2014; WHO, 2013). Even the role of loneliness in ARPG development may differ between the genders, as loneliness has been linked particularly to female at-risk gambling (Porter, Ungar, Frisch, & Chopra, 2004).

There are in general few findings on gender differences in relation to the comorbidities of ARPG. This is especially true within the Finnish context, where gambling studies examining gender differences with an exclusive focus on youth are scarce (Järvinen-Tassopoulos & Raitasalo 2015). One intriguing finding of this nature is that nicotine dependence was found to be a stronger risk factor associated with ARPG for females than for males (Petry, Stinson, & Grant, 2005). Consonantly, it was found that tobacco use had risen in Finland especially among female 15 to 16-year-olds who gambled at least

once per week (Järvinen-Tassopoulos & Raitasalo, 2015).

Theoretical conceptualisations of ARPG have in part convincingly incorporated associated substance use, psychological and social risk factors. Particularly appealing is the Pathways Model (Blaszczynski & Nower, 2002) of GD, which has subsequently been adapted for youth (Nower & Blaszczynski, 2004), even if it does not take a stance concerning the possible gender differences for the various proposed ARPG trajectories.

The reviewed literature highlights that based on the evidence drawn mainly from men, ARPG among youth is associated with alcohol use, tobacco use and mental health including loneliness, while the theoretical conceptualisation of ARPG fits hand in hand with the research. Limited knowledge of female ARPG, however, leaves questions open as to how generalisable the conceptualisation of youth ARPG is for females. Analogously, Poulin (2002) has identified the requirement to consider how ARPG is conceptualised among youth compared to adults, and how ARPG may differ between the genders.

This study is an examination of how the conceptualisation of gambling among youth, with regard to its empirically and theoretically founded comorbidities, is comparable between males and females. Specifically, the aims are (1) to compare the prevalence rates of past-year ARPG and other at-risk behaviours (computer gaming, risky alcohol consumption, tobacco smoking) by age and gender, and (2) to explore the association of risky alcohol consumption, tobacco smoking, poor mental health and loneliness with ARPG within genders.

First, it is hypothesised that males show higher prevalence for ARPG, computer gaming, risky alcohol consumption and smoking tobacco than do females. Second, it is hypothesised that prevalence rates of ARPG, risky alcohol consumption and tobacco smoking will decrease with increasing age, with highest rates immediately following age 18. Computer gaming is also predicted to decrease with age, with the highest rates visible among minors. Last, it is hypothesised that all inspected correlates will be significantly associated with ARPG, and that risky alcohol consumption has a stronger association with ARPG among males compared to females. In terms of identifying youth at high risk of ARPG, and developing prevention programmes and interventions, it is important to take into account heterogeneous subgroups (Nower & Blaszczynski, 2004) as well as age- and gender-specific differences (Gupta & Derevensky, 2011; Svensson, Romild, Nordenmark, & Månsdotter, 2011). The present study builds upon this need of knowledge by examining gender differences among youth.

Design

Data were derived from a population-based study entitled Finnish Gambling 2011 (Turja, Halme, Mervola, Järvinen-Tassopoulos, & Ronkainen, 2012). The initial cross-sectional random sample data (n=4484) were collected in 2011–2012 using computer-assisted telephone interviews (CATI). The participants were 15–74 years old, spoke Finnish or Swedish as their mother tongue, and resided in mainland Finland.

Participants

The age range of the current sample ($n = 822$) is from 15 to 28. All ages are well represented: 16.9% are aged 15 to 17 years; 33.1% are aged 18–21; 28.8% are aged 22–25; and 21.2% are aged 26–28. Half (49.3%) of the participants are female, and this ratio remains relatively unchanged between the age groups. The majority of participants were single (66.9%), lived together with somebody (23.8%) or were married / in a registered relationship (7.4%). In terms of occupation, 54.9% of the participants were students, 34.4% were working and 5.1% were unemployed.

At-risk and problem gambling

The Problem Gambling Severity Index (PGSI) is a nine-item instrument measuring past-year gambling behaviour and gambling consequences (Ferris & Wynne, 2001). The responses on the items are summed, giving a maximum of 27 points. Here a score of 2 or more indicated ARPG. This classification ($PGSI \geq 2$) is indirectly supported by the finding that Finnish youth who had experienced gambling-related harms, experienced on average two forms of harm (Raisamo et al., 2013). A more fine-grained classification system was not conceivable due to low rates of moderate to high scores.

Other at-risk behaviours

Computer gaming was examined with questions inquiring the hours spent gaming in the past 7 days and the past 30 days. Excessive computer gaming was defined as playing more than 5 hours a day. The responses were converted for categorisation as non-gaming, low to moderate-frequency gaming (1–4 h / day) and high frequency

gaming (≥ 5 h / day). This classification differentiates between average usage (≈ 1 h / day; Cummings & Vandewater, 2007) and usage documented among IGD gamers (≈ 5 h / day; Grüsser, Thalemann, & Griffiths, 2007).

The three-item Alcohol Use Disorders Identification Test/Consumption (AUDIT-C) was used to rate alcohol consumption (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998). Each item was rated on a scale from 0 to 4 (sum score range 0–12), where higher scores indicated higher risk consumption. A dichotomous variable was created, making a distinction between no / non-risky consumption and risky consumption. Scoring at least 6 for males and at least 5 for females indicated risky consumption (Kaarne, Aalto, Kuokkanen, & Seppä 2010). In a larger subsample from the Finnish Gambling 2011 survey, the Cronbach's alpha of the AUDIT-C was 0.61 (Castrén et al., 2013).

Tobacco smoking was measured with a single question "Have you smoked during the past 12 months?" with three response choices: "yes, daily", "yes, occasionally" and "no". Both positive responses were combined for analyses.

Mental health

Mental health was measured with the five-item Mental Health Inventory (MHI-5) (Veit & Ware, 1983). The items inquired about feelings of nervousness, calmness, happiness and about feeling down and gloomy during the past 4 weeks, and were scored on a range of 1–6, where high scores indicated good mental health (Ware & Gandek, 1998). The sum score (range 5–30) was linearly transformed to vary from 0 to 100. A cut-off score of 60 was used to clas-

sify moderate to poor mental health (e.g., Theunissen, Jansen, & van Gestel, 2011). A cut-off score of 60 produces the smallest error rate, as defined by yielding the highest sensitivity and specificity rates (Kelly, Dunstan, Lloyd, & Fone, 2008). MHI-5 has displayed satisfactory validity for measuring mood disorders and anxiety disorders in a general population sample using DSM-IV criteria as a reference (Rumpf, Meyer, Hapke, & John, 2001). In a larger subsample from the Finnish Gambling 2011 survey, Cronbach's alpha for MHI-5 was 0.77 (Castrén et al., 2013).

Loneliness was inquired with a single item with a 5-point Likert scale. The responses were recoded into 2 categories: 1) never, seldom, sometimes and 2) quite often, often.

Data analysis

Analyses were performed with SPSS (IBM SPSS Statistics 22). The analyses for the first research question were performed with X^2 test between genders within four different age groups (Table 1). Binary logistic regression models were calculated for males and females separately (Table 2). The effect of age was accounted for in all regression analyses. 95% confidence intervals (CIs) were estimated for all prevalence rates. The results of the regression analyses are presented as odds ratios (OR) and their corresponding CIs. All correlates were included in the models simultaneously. Analyses were conducted with a weighted sample, in order to make the sample characteristics match the population by taking into account age, gender and residential area (Turja et al., 2012).

Results

ARPG and other at-risk behaviours by age group and gender

Overall, 13.6% of males and 4.6% of females were defined as past-year ARPGers (PGSI ≥ 2 ; Table 1). Altogether, 86.7% of males and 60.2% of females had played computer games at a low frequency at least (≥ 1 h/day) during the past week and/or month. Of all respondents, 41.8% of males and 26.9% of females had consumed risky levels of alcohol. Also, 43.4% of males and 40.9% of females had smoked daily or occasionally. Risky alcohol consumption and tobacco smoking appeared to be somewhat lower among minors compared to older participants. The prevalence of ARPG among minors was comparably similar, if not higher, than among older participants.

The proportion of past-year ARPGers was statistically significantly higher among males than females in all age groups, except among 18–21-year-olds (Table 1). Computer gaming frequency was significantly higher among males than females in all age groups. High-frequency gaming was most common among 15–17-year-old males (6.3%). Risky alcohol consumption was more common among male respondents; yet, significant differences were seen only among 22–25-year-olds and 26–28-year-olds. There were no significant differences in occasional or daily tobacco smoking between genders.

Binary logistic regression models predicting ARPG

The significance of ARPG correlates was examined using three models (Table 2). In Model 1, age, risky alcohol consumption and tobacco smoking were included in the analysis. Among males, risky consump-

Table 1. At-risk and problem gambling (ARPG) and other at-risk behaviours by age group and gender (% ± 95% CI)

	15-17 years		18-21 years		22-25 years		26-28 years		15-28 years	
	Males n=75	Females n=64	Males n=135	Females n=137	Males n=122	Females n=115	Males n=85	Females n=89	Males n=417	Females n=405
ARPG¹, past-year										
Yes	16.2±8.34	6.1±5.86	11.6±5.40	5.9±3.95	11.8±5.72	2.6±2.91	17.1±8.00	4.7±4.40	13.6±3.34	4.6±2.01
Non-problem	83.8±8.34	93.9±5.86	88.4±5.40	94.1±3.95	88.2±5.72	97.4±2.91	82.9±8.00	95.3±4.40	86.4±3.34	95.4±2.01
Sig	X ² =4.226, df=1, p=0.040		X ² =2.998, df=1, p=0.83		X ² =7.489, df=1, p=0.06		X ² =8.776, df=1, p=0.03		X ² =22.535, df=1, p<.001	
Computer gaming frequency, past-year										
High (≥5h/day)	6.3±5.5	1.3±2.78	2.2±2.47	2.2±2.46	1.4±2.08	1.0±1.82	2.8±3.51	0±	2.8±1.61	1.3±1.09
Low to moderate (1-4h/day)	88.6±7.19	77.3±10.26	82.6±6.40	63.2±8.08	84.1±6.49	50.0±9.14	80.7±8.39	47.2±10.37	83.9±3.58	58.9±4.72
None	5.1±4.98	21.4±10.05	15.2±6.06	34.6±7.97	14.5±6.25	49.0±9.14	16.7±7.93	52.8±10.37	13.6±3.34	39.8±4.70
Sig	X ² =10.895, df=2, p=0.04		X ² =13.786, df=2, p<0.01		X ² =33.786, df=2, p<0.01		X ² =30.506, df=2, p<0.01		X ² =77.891, df=2, p<.001	
Risky alcohol consumption², past-year										
Yes	23.8±9.64	13.4±8.35	41.5±8.31	34.9±7.98	41.4±8.74	28.1±8.22	54.1±10.59	24.5±8.94	41.8±4.80	26.9±4.26
No	76.2±9.64	86.6±8.35	58.5±8.31	65.1±7.98	58.6±8.74	71.9±8.22	45.9±10.59	75.5±8.94	58.2±4.80	73.1±4.26
Sig	X ² =2.867, df=1, p=0.90		X ² =1.392, df=1, p=0.238		X ² =4.936, df=1, p=0.26		X ² =20.605, df=1, p<0.01		X ² =23.217, df=1, p<.001	
Tobacco smoking, past-year										
Occasional / Daily	30.0±10.37	34.6±11.65	38.8±8.22	42.1±8.27	46.9±8.86	42.1±9.02	53.3±10.61	42.5±10.27	43.4±4.83	40.9±4.72
No	70.0±10.37	65.4±11.65	61.2±8.22	57.9±8.27	53.1±8.86	57.9±9.02	46.7±10.61	57.5±10.27	56.6±4.83	59.1±4.72
Sig	X ² =0.384, df=1, p=.535		X ² =0.344, df=1, p=.558		X ² =0.592, df=1, p=.441		X ² =2.662, df=1, p=.103		X ² =0.620, df=1, p=.431	

Significance determined between genders within each age group; ¹Problem Gambling Severity Index (PGSI, score ≥2) with reference group: Non-problem (incl. non-gamblers and PGSI=0-1); ²AUDIT-C, the Alcohol Use Disorders Identification Test, score for risk consumption ≥5 among females and ≥6 among males; Males (n = 417, non-weighted) & females (n = 405, non-weighted); Weighted based on age gender and region of residence; tCell has expected count less than 5.

Table 2. Binary logistic regression models predicting at-risk and problem gambling (ARPG¹) presented as odds ratio and 95% confidence intervals.

	Model 1: Substance use		Model 2: Mental health		Model 3: Substance use & mental health	
	Males	Females	Males	Females	Males	Females
Age	0.98 (0.91–1.05)	0.93 (0.83–1.04)	1.01 (0.94–1.08)	0.94 (0.84–1.06)	0.97 (0.90–1.04)	0.94 (0.83–1.05)
Risky alcohol consumption ² , past-year	2.77* (1.53–5.00)	1.23 (0.48–3.14)	†	†	2.57* (1.40–4.74)	1.19 (0.45–3.12)
Tobacco smoking, past-year	1.79 (1.00–3.19)	4.24* (1.53–11.77)	†	†	1.95 (1.07–3.56)	4.01* (1.43–11.24)
Moderate to poor mental health ³ , past 4 weeks	†	†	2.23 (0.82–6.06)	0.88 (0.16–4.99)	2.63 (0.96–7.26)	0.99 (0.18–5.39)
Feeling lonely	†	†	5.26* (1.46–18.98)	8.30* (1.78–38.60)	4.41 (1.20–16.23)	6.46 (1.42–29.34)
Nagelkerke R ²	.087	.081	.059	.057	.139	.120

Binary logistic regression models presented as odds ratio and 95% confidence intervals; ¹Problem Gambling Severity Index (PGSI, score ≥ 2) with reference group: Non-gamblers or PGSI=0-1; ²AUDIT-C, the Alcohol Use Disorders Identification Test, score for risk consumption ≥ 5 among females and ≥ 6 among males; ³MHI-5, the Mental Health Inventory, scale 1–100, moderate to poor mental health ≤ 60 ; Males (n = 417, non-weighted) & females (n = 405, non-weighted); Weighted based on age gender and region of residence; $p \leq .01$; †, not included.

tion of alcohol was the sole statistically significant predictor of being an ARPGer (OR 2.77). Among females the same was true for tobacco smoking, which increased the odds of being an ARPGer by 4.24. Model 1 explained about 8.7% of variance for males and 8.1% for females. For all the regression models, the confidence interval of the odds ratio for age extended to both sides of the value 1, signifying that increasing age cannot with certainty be considered as either a risk or protective factor of being an ARPGer.

Model 2 included age and correlates related to mental health. Here, feeling lonely was a statistically significant predictor of being an ARPGer among males (OR 5.26), and an even stronger predictor among females (OR 8.30). Compared to Model 1, Model 2 had slightly lower predictive power, as it explained approximately 5.9% of variance for males and 5.7% for females.

Model 3 contained age and all correlates related to both substance use and mental health. Among males, risky alcohol consumption remained as a significant predictor of ARPG (OR 2.57), while feeling lonely was still associated with ARPG (OR 4.41) but was no longer statistically significant. Among females, a similar situation was evident, as tobacco smoking significantly predicted being an ARPGer (OR 4.01), as did feeling lonely (OR 6.46) although no longer at a statistically significant level. Substance use and mental health predictors had partially additive value in predicting ARPG, as the variance explained in model 3 was about 13.9% for males and 12% for females.

Discussion

Prevalence rates

Our results are in line with the hypothesis that males show higher prevalence for ARPG compared to females, as has

also been previously shown in Finland (Raisamo & Salonen, 2013). It may well be that males are more prone to gambling behaviour than are females (Chalmers & Willoughby, 2006) or in turn that social norms may partly protect females, as females' attitudes towards gambling are more negative and they are less vulnerable than men to developing gambling problems (Hing, Russell, Tolchard, & Nower, 2014; Potenza et al., 2001; Salonen et al., 2014; Salonen & Raisamo, 2015). It is important to note that cultural factors influence gender-specific prevalence rates, as for example addictive behaviours may be more acceptable among males (Swendsen & Le Moal, 2011).

Our results did not completely support the hypothesis that prevalence rates of ARPG will decrease with increasing age, with highest rates immediately following age 18. Among males the highest rates of ARPG were visible among 26–28-year-olds and 15–17-year-olds (about 16 to 17%), while the same was true for females aged 18–21 and 15–17 (about 6%), thus indicating that the prevalence of ARPG was relatively high among minors. During the time of data collection, the age limit of slot machine gambling in Finland shifted from 15 years to 18 years (Räsänen et al., 2015b), which may partially explain the high prevalence of underage gambling. At present, the regulation of gambling age limits is in effect weaker than the regulation of age restrictions for the sale of alcohol and tobacco products (Warpenius et al., 2012). Nonetheless, a recent national report concluded that gambling among Finnish 15–17-year-olds had decreased since 2011, with the estimated prevalence of ARPG being 12% (Salonen & Raisamo, 2015).

Gambling accessibility is extraordinary in Finland compared to other Nordic countries, as slot machines are available at supermarkets, for example, petrol stations and kiosks along with the opportunity to place sport bets and buy lottery coupons at these locations also. By way of comparison, in Norway, where the age limit of 18 is more effectively regulated than in Finland, 8.7% of 17-year-old males and 3.3% of females were classified as ARPGers using the PGSI (Hanss et al., 2015). In Sweden, where slot machines are only located on premises licensed to sell alcohol, 18.2% of 16 to 17-year-olds were classified as ARPGers, as measured by the PGSI in a national survey (Statens folkhälsoinstitut, 2010). A school-based survey on 11 to 17-year-olds in Denmark revealed that 4.7% of males and 2.3% of females were ARPGers, as measured by the SOGS-RA (Kristiansen & Jensen, 2014). In Denmark the age limit on slot machine gambling is 18 years, but the slot machine market is not run by a government-based monopoly (Kristiansen & Jensen, 2014), as is the case in all other Nordic countries.

As to computer gaming, males displayed higher rates throughout the sample, as was hypothesised. Rates of gaming decreased with age, with the highest rates among 15–17-year-olds. This underlines the consensus that computer gaming peaks during adolescence (Holtz & Appel, 2011). Among Norwegian adolescents, frequent computer gaming and developing problems with gaming were much more common among males than among females (Brunborg, Hansen, & Froyland, 2013).

Males were more often than females risky consumers of alcohol, but this difference was significant only in the age groups

of 22–25 and 26–28, thus providing limited support for the hypothesis that males show a higher prevalence rate for risky alcohol consumption. Males displayed the highest rates of risky consumption among 26–28-year-olds, while among females the highest rate was among 18–21-year-olds. In contrast to the hypothesis of males smoking tobacco at a higher rate than females (e.g., WHO, 2013), there were no significant gender differences in any age group in this sample. The highest rates of male tobacco smoking appeared at the same age as for risky alcohol consumption. Among females, tobacco smoking rates were the lowest among 15–17-year-olds, while older age groups displayed near identical rates.

Males aged 26–28 displayed the highest rates of ARPG and risky alcohol consumption, while for females these two risk behaviours peaked among 18–21-year-olds, lending only partial support to the hypothesis that these behaviours peak immediately after becoming of legal age. The declining trend of risky alcohol consumption among females beyond the age group of 18–21, and the concurrent rise in risky consumption with age among males, suggest that perhaps females change their behaviour according to social roles in a distinct manner. The finding that marriage, parenthood, employment and transitions to adulthood are associated with a decrease in alcohol consumption among females but not males (Christie-Mizell & Peralta, 2009; Stone et al., 2012) supports this conjecture. Alcohol consumption among Finns aged 15 to 30 years has also been found to rise with age among males, but decrease with age among females (Mäkelä & Härkönen, 2010). As such, male

risk-taking tendencies may accelerate systematically with age during youth, which does not occur in the same manner among females. Transitions during youth, such as completion of school and the beginning of a work career, may be related to a decrease in risk-taking behaviour such as substance use (Schulenberg & Maggs, 2002). However, it remains unclear which factors determine the apparent gender differences in the trajectories for these risk-taking tendencies.

Correlates of ARPG

Our second aim was to explore the association between risky alcohol consumption, tobacco smoking, poor mental health and loneliness with ARPG within genders. Here, all indications of gender differences are only tentative, as all corresponding confidence intervals overlapped between males and females (e.g., Gelman & Stern, 2006).

Risky alcohol consumption was a significant predictor of ARPG among males, but not among females (Table 2, model 1). Tobacco smoking was a significant predictor of ARPG among females, but not males (model 1). These findings were evident even when controlling for the effects of mental health and loneliness (model 3). Results offer partial support to the hypothesis that risky alcohol consumption and tobacco use are associated with ARPG, and that risky alcohol consumption is more strongly associated with ARPG among males. Comparably, in a longitudinal study conducted in Norway, at-risk gambling was associated with an increase in depressive symptoms, binge drinking and beginning to smoke (Brunborg et al., 2013). Furthermore, in 2007 regular

slot machine gambling among Finnish 9th graders (approximately 16-year-olds) was associated with alcohol use (Järvinen-Tassopoulos & Metso, 2009).

It is possible that in this study, the higher prevalence rates among males than females for both risky alcohol consumption and ARPG are the cause of risky consumption to be associated with ARPG significantly only among males. The same cannot be said for tobacco smoking, for prevalence rates are comparable between the genders. As such, there is reason to believe that tobacco smoking may be associated with gambling problems particularly among females. This supports the findings by Petry and colleagues (2005) and Järvinen-Tassopoulos and Raitasalo (2015). Again, these gender differences may be associated with gender-related social influences. As discussed by Donati and colleagues (2013), gambling is socially acceptable to a higher degree among males compared to females. In their study, peer gambling behaviour predicted ARPG among males but not among females (Donati et al., 2013).

As seen in model 2, poor mental health was not significantly related to ARPG, providing limited support for this hypothesis and previous findings related to this well-established comorbidity (Lorains et al., 2011). This somewhat contradicts the finding that Finnish female adolescent gamblers had an elevated risk for depressive symptoms (Räsänen et al., 2015a). The lack of significance may arise from the fact that MHI-5 and loneliness ratings had relatively high correlations for both genders. In line with the hypothesis, loneliness was significantly associated with ARPG among both genders, but was stronger among fe-

males. This association has several plausible explanations. The Loneliness Model (Cacioppo & Hawkley, 2009; Hawkley & Cacioppo, 2010) posits that loneliness may impair executive control, such that effortful attentional processes are compromised. Within the context of addictive behaviours, this consequence affecting self-regulatory processes may manifest as a declined ability to abstain from desires or impulsive behaviours. It is plausible that the association identified between ARPG and tobacco smoking among females may be related to loneliness. In fact, lonely individuals have been identified as more likely to be smokers than non-lonely individuals (Lauder, Mummery, Jones, & Caperchione, 2006).

Gender differences in gambling may also be related to motivations to gamble, and preferences for the types of games gambled. First, researchers have found that female problem gamblers are more likely to gamble in response to boredom or loneliness (Raylu & Oei, 2002), or use gambling as a part of coping with daily stressors, while male problem gamblers are more likely to play in order to win and chase losses (Corney & Davis 2010; Walker, Hinch, & Weighill, 2005). In line with this, a Danish study of a sample of adolescents found that socialisation and boredom were among the only motivations to gamble that were more common among females (Kristiansen & Jensen, 2014). It is relevant to note, though, that an association between gambling and loneliness has also been identified among males (Junttila, Kainulainen, & Saari, 2015). Second, females prefer games of chance and games that offer continuous forms of play, whereas males are viewed as multigame play-

ers and prefer games with some element of skill and excitement (Wardle et al., 2007). Consonantly, in Sweden females were found to have a stronger preference for games of chance (e.g., lottery and slot machines), while males preferred games of strategy (e.g., card games and betting on sports) (Svensson et al., 2011).

The role of the social environment in the development of ARPG may be significant for both genders, but for disparate reasons, as peer gambling seems to particularly influence males (Donati et al., 2013) and loneliness may be more strongly associated with gambling among females (Walker et al., 2005). Furthermore, whether loneliness initiates and/or maintains risk-taking behaviour through its effects on self-regulation, or is a motivational reason to engage in risk-taking behaviour, remains unclear. The Pathways Model includes explanations that gambling among youth may serve the purpose of fulfilling interpersonal needs, dealing with adverse emotional states, depression or anxiety, or it may be associated with impulsivity and antisocial behaviour (Nower & Blaszczynski, 2004). Here, the Pathways Model would suggest that among emotionally vulnerable gamblers, gambling is a way to deal with loneliness, which may be accompanied by substance use (Blaszczynski & Nower, 2002; Gupta & Derevensky, 2011). As such, the potential role of loneliness in relation to at-risk behaviours requires further research.

Limitations

The present data is correlational, and measurements of interest were utilised as nominal variables. As such, causal links cannot be drawn and comparability

across studies is limited. The PGSI instrument is not designed specifically for use among adolescents (Abbott & Volberg, 2006; Ferris & Wynne, 2001). Future studies may benefit from using an instrument originally developed for youth or at least modified for youth population (Blinn-Pike et al., 2010; Stinchfield, 2010; Tremblay, Stinchfield, Wiebe, & Wynne, 2010). Also, measuring merely the frequency of computer gaming does not provide information about the prevalence of IGD, which would be important to investigate and measure thoroughly, for example with the IGD-20 Test (Pontes & Griffiths, 2015). AUDIT-C is an adequate screening tool in the general population (Dawson, Grant, Stinson & Zhou, 2005), but in terms of a younger population, other instruments may be more valuable (e.g., Adolescent Alcohol Involvement Scale; Mayer & Filstead, 1979). Using a single question of tobacco smoking may not reveal true nicotine addiction, as positive responses may represent single instances of smoking. Future studies ought to inquire about smoking cannabis as well, which is becoming increasingly common nationally among youth (Hakkarainen, Metso, & Salasuo, 2010). Likewise inquiring about loneliness with more than a single question may provide a more detailed account of this experience. Despite its shortcomings, the study had several strengths. Conducting separate analyses for males and females contributes to much needed gender-specific research results. Also, analyses were conducted with a weighted random sample, ensuring high representativeness of the population.

Conclusions

Overall, past-year ARPG and computer gaming seem to be more common among males than females. There were indications of gender-specific trends, as gender differences in risky alcohol consumption became significant after the age of 21 years. Additionally, males displayed the highest rate of ARPG at a later age than did females. No significant differences were evident between genders for tobacco smoking. Nor were clear gender differences seen in the correlates associated with ARPG, although results suggest ARPG may be associated with risky alcohol consumption particularly among males, and tobacco smoking particularly among females. Longitudinal study designs can help resolve uncertainty related to factors influencing gender differences in risk-taking behaviour, among which loneliness appears as a meaningful determinant in light of our findings. Because gender-specific motives (excitement seeking vs. escape) and preferences for gambling types tend to be different, further studies from the Nordic countries should explore this in more depth.

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