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Associations between gambling severity and criminal convictions: implications for the welfare state

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ABSTRACT

This study addresses criminal convictions, social disadvantage and problem gambling as an interwoven set of problems. It makes use of data from a population-based gambling survey (n = 7,186) conducted in three Finnish regions. The survey data are combined with national registers to examine associations between sociodemographic factors and gambling severity, comparing persons with and without a criminal record. Gambling behavior included past-year (2016) gambling severity and perceived life-time problem gambling. Social disadvantage was assessed using sociodemographic factors such as education, employment status, level of income and receipt of basic social assistance. Logistic regression analysis showed that both past-year problem or pathological gambling (OR: 2.725) and perceived life-time gambling problems (OR: 2.363) were associated with having a conviction, compared to recreational gambling. Low education, unemployment, low income and receipt of basic social assistance were associated with receiving a conviction. When gender, age and sociodemographic factors were controlled for, odds ratios for both past-year gambling problems (OR: 1.223) and perceived life-time gambling problems (OR: 1.586) did not remain statistically significant. The current study suggests that preventive efforts against problem gambling and interventions in criminal justice systems should be expanded to incorporate the aim of reducing social disadvantage.

Introduction

Both the connection between gambling and crime and that between gambling and social disadvantage are well established. Numerous studies have found higher rates of problem gambling among criminal offenders than in the general population (Turner and McAvoy 2011; May-Chahal et al. 2017; Turner et al. 2017; Moore 2018; Riley et al. 2018; Lind et al. 2019; Widinghoff et al. 2019; Banks et al. 2020). Although only a relatively small proportion of all crime is gambling-related (Arthur et al. 2014), a study on British prisoners estimated that problem gambling is linked with up to 13% of all offending (May-Chahal et al. 2012). Problem gambling likely plays a significant role in gambling-related crime (Riley and Oakes 2015).

In this study, we explore to what extent factors that often contribute to offending in general also can explain the association between gambling and having been convicted of a crime. This echoes an increasing academic interest in so-called wicked and complex problems, which are thought to be tackled best by leveling out wider social inequalities (Head 2008; McConnell 2018). In the context of the Nordic welfare state, it is thought that the inherent ability of universal public institutions to iron out differences in social standing applies in the criminal sanction system in its ability to identify and support at-risk populations (Pratt 2007; Lappi-Seppälä and Tony 2011; Kolind et al. 2013; Kristoffersen 2013, 2013; Lahti 2017). Targeted and cross-sectoral interventions that strive toward this aim are crucial for the reliability and accountability of the welfare state (Hellman 2019a). We propose to approach criminal convictions, social disadvantage and gambling behavior as an interwoven set of wicked problems by combining data from a Finnish population survey on gambling with register-based variables measuring social disadvantage and criminal convictions.

Problem gambling and crime, criminal convictions and social disadvantage

The connection between crime and gambling is a complex one. The relationship has been addressed in surveys aimed at the general population (e.g. Bellringer et al. 2009), help-seeking gamblers (e.g. Meyer and Stadler 1999; Folino and Abait 2009) and offenders in the criminal justice system.
Self-report studies have been crucial for grasping the entire spectrum of delinquent and criminal acts and capture the so-called hidden crime (Kivivuori 2011) or the dark figure of crime (Mosher et al. 2011). In addition, problem gambling has been approached from a criminogenic perspective using court documents (Crofts 2003), police data (Sakurai and Smith 2003; Lind et al. 2015) and official registers (Laursen et al. 2016).

Previous studies suggest that criminal behavior and problem gambling share two kinds of common predictors: (1) psychological factors such as low self-control and depression (Bergen et al. 2014; Welte et al. 2017) and (2) structural factors, such as early employment, low attachment to school and parents, substance use (Dowling et al. 2017). A recent longitudinal study (Dennison et al. 2020) found an association between problem gambling and crime, but this association disappeared when adjusting for socio-demographic differences between those experiencing problem gambling and non-problem gambling.

A Danish register-based study from 2016 identified a strong general association between problem gambling and being charged with a crime (Laursen et al. 2016) showing that violence charges and drug charges were associated with problem gambling to the same extent as economic charges. However, being charged paints a different view of criminality than actual convictions, as it is possible that charges are dropped (Niemi 2018). Due to the complexity and the context-bound nature of the many associations of problem gambling and different types of crime, there is a great need for more knowledge, particularly outside North America, New Zealand and Australia (see Adolphe et al. 2019).

In this study, we use registered data on criminal convictions, representing delinquent and offending behavior for which the individual has been apprehended and convicted by the judicial system. However, it is important to note, that what behaviors are registered as criminal offenses by the judicial system is also a question of criminal code, legal praxis, and how and where police resources are used for surveillance, and arrests. It is a measure only of the kind of criminal behavior that is captured and condemned by the judicial system (Kivivuori 2011; Saarikkomäki and Kivivuori 2013).

What is clear, however, is that throughout the world, including Finland and the Nordic countries, persons, who receive criminal convictions, and especially those who are sanctioned to prison or probation, generally belong to the socially disadvantaged part of the population, having lower education, experiencing relatively more unemployment, and also showing more ill-health, and psychiatric problems (Ogloff et al. 2007; Kivivuori and Linderborg 2009; Lintonen et al. 2011; Obstbaum-Federley 2017). In Finland, similar disadvantages are associated with gambling (for instance Lind et al. 2015). Reasoning drawing on Gottfredson and Hirschi (1990) general theory of crime attribute both drug use and criminal behavior to low self-control: both types of behavior show elements of a desire for immediate gratification. The same logical connection is also often made in studies that theorize the connection between gambling and crime (Blaszczynski and Nower 2002). While these studies capture important (social)psychological mechanisms in problem behavior, they often pay less attention to societal structures and the kind of factors that may be influenced through supportive actions by the welfare state.

In this paper, we look at the relationship between problem gambling and criminal behavior and the role of sociodemographic factors (e.g. gender, and socioeconomic disparities such as education, employment status, level of income and receipt of basic social assistance). Little is known about the social disadvantages underlying both these paths and that could consequently shed light on how they are intertwined. As far as we are aware there is no earlier work that addresses socioeconomic disadvantages, gambling and crime from a societal viewpoint and that considers the implications of such a societal framing for the welfare state on a more principal level. Two recent works that come closest to this endeavor approach gambling systems as part of the welfare state regime (Egerer et al. 2018) and understand gambling-related harm in a public interest framing (Sulkunen et al. 2018).

Pathways to problems

Excessive gamblers have to constantly search for new sources of money. A typical first step is to cut back on other non-essential consumption, but after a while, this may be extended to important outlays such as food or rent. In severe cases, the individual may go on to accumulate substantial debt and commit legal offenses (e.g. Sakurai and Smith 2003; Oksanen et al. 2018). In addition to the correlation with crime (Laursen et al. 2016; Adolphe et al. 2019), gambling also entails some fundamental mechanisms that stratify people by socioeconomic status. Lower-income groups suffer proportionately more harm from their gambling habit than higher-income groups (Rintoul et al. 2013). Although problem gamblers often resort to crime to cover up their gambling-related financial difficulties (Turner et al. 2009), financial pressure alone does not in itself explain the complex relationship between gambling and crime (e.g. Lind et al. 2015; Banks and Waugh 2019).

Gambling is connected to self-reported crime; to other delinquent acts, some of which remain undetected by the criminal justice system (Crofts 2003; Sakurai and Smith 2003); and to crime leading to convictions and even prison sentences. Most problem gambling-related property crimes take place at home or in the workplace (Lind et al. 2015; Binde 2016). It is likely that problem gambling-related crimes committed against close family members are underreported to the police, being settled between the victim and the perpetrator. Victims might even be unaware that a crime has been committed, which will obviously affect reporting statistics.

The aim of this study is to investigate possible associations between gambling severity and involvement in criminal behavior in terms of criminal justice convictions. We will also examine whether any associations detected are explained by confounding sociodemographic factors
associated with gambling and criminal behavior that has led to a conviction. Through our findings, we will discuss how the emerging picture of the problems can be understood from the point of view of welfare state accountability (WSA) (Hellman and Alanko 2021).

**Materials and methods**

The data used in this study stems from the population-based Finnish Gambling Harms Survey (Salonen et al. 2017, 2018) by the Finnish Institute for Health and Welfare. The survey gathered information about gambling, gambling-related harm and opinions on gambling marketing in connection with the 2017 reform of the Finnish gambling monopoly. The first wave of data was collected by Statistics Finland and represents the situation before the reform. Most of the demographic background variables were drawn from Statistics Finland’s national registers and combined with the survey data.

Statistics Finland collected the data between January and March 2017 (Salonen et al. 2017) from adults in three Finnish regions. Participants were randomly drawn from the population information system. Oversampling was done in the age group 18–24. Statistics Finland collected the data between January and March 2017 (Salonen et al. 2017) from adults in three Finnish regions. 20,000 persons were randomly drawn from the population information system and invited to participate. The criteria for inclusion in the sample were age 18 or over (the age limit for gambling is 18 years) and the ability to understand Finnish or Swedish (Finland’s second official language). Institutionalized persons such as inmates in prisons, mental health patients and the infirm were excluded (Salonen et al. 2017).

The data were collected using web and postal surveys (Salonen et al. 2017). Invitation letters to potential participants were sent to home addresses retrieved from the population information system.

Non-eligible individuals (n = 67) were excluded from the study, leaving a final study sample of 19,933 persons (Salonen et al. 2017). The response rate was 36.1%; 7,186 adults participated in the study. Men and younger respondents were more reluctant to participate than women and older respondents. Most respondents, 71% (n = 5,084) used the online survey, 29% (n = 2,102) participated through the postal survey (Salonen et al. 2017).

**Context**

Finland has a state-owned gambling monopoly that provides a wide range of gambling products such as lotteries, EGMs and betting. The main justification for the monopoly system is the prevention and minimization of harm caused by gambling. Gambling is a popular pastime activity: according to the latest population surveys around 80% of Finnish people have gambled on at least one game type during the past year (Salonen and Raisamo 2015; Salonen et al. 2020). In 2018, the gambling monopoly revenue was estimated at over 3 billion euros (H2 Gambling Capital). Just 2.5% of all gamblers account for 50% of total gambling expenditure (Salonen et al. 2017, 2020). Using the South Oaks Gambling Screen (SOGS 3+), it has been estimated that around 3% of the Finnish population meet the criteria for past-year problem gambling (Salonen and Raisamo 2015; Salonen et al. 2020).

**Measures**

**Criminal convictions**

Data on criminal convictions were drawn from national registers kept by Statistics Finland. A total of 123 respondents (2.1%, weighted percentage) had been convicted for at least one crime during the past five years (in 2012–2016) for which the sentence was a prison sentence, community service, or a probation order. The data did not include petty fines. The crime data included the year of order and the title of the conviction. The distribution of crime types in this data set is presented in table 1 and it was similar to overall reported crime in Finland (see Danielsson 2019). The most common types of crime committed in the past five years among the studied survey population were property or financial crimes. Due to the small number of convicted respondents we were not able to analyze the data by different crime types.

**Gambling severity**

Past-year (i.e., 2016) gambling severity was measured using the 14-item Problem and Pathological Gambling Measure (PPGM; Williams and Volberg 2010). PPGM has been shown to be the most sensitive and accurate instrument available (Williams and Volberg 2014). It has three categories: recreational gambling, at-risk gambling and problem or pathological gambling. Those who gambled less than monthly were categorized as recreational gamblers. One additional category was created to represent people who did not gamble at all in 2016. Perceived life-time gambling problems were inquired using the question: ‘Have you ever felt that gambling is a problem for you?’ (‘Yes’, ‘No’, ‘I don’t know’).

The last two categories were combined with those who had never gambled or who had missing data.

**Sociodemographic variables**

Statistics Finland’s register data contains various information about the respondents, including gender and age, but also factors reflecting social disadvantage, such as education, employment status, level of income and receipt of basic social assistance in 2016.

Age was classified into six categories. As the World Health Organization’s definition for youth extends to age 24, the first age group was from 18 to 24 years and the last 10-year age group from 54 to the most common retirement age of 64. Education was measured using register-based information on whether or not the respondent had completed the matriculation examination, which is required for entry into university and other institutions of higher education.
Typically, those with college aspirations complete the matriculation examination and students with no such aspirations opt for vocational education. The level of income in 2016 (€/month) was divided into quartiles. Based on these quartiles, income level was then divided into three categories: low (Q1: under €1316.67), average (Q2 and Q3: €1316.68 to €2725) and high (Q4: €2726 or over). The data also included receipt of basic social assistance in 2016. This is available to individuals and families whose income and assets do not cover their essential daily expenses.

### Data analysis

The data were analyzed using SPSS 27 software (SPSS, Inc., Chicago, IL, USA). The data were weighted based on gender, age, education and region of residence. Statistical significance (p) was determined using chi-squared test (>2 groups). Models were built using binary logistic regression. Throughout this paper whenever we report odds ratios, we do so holding all other variables at baseline.

### Results

#### Description of the respondents

Except for Table 1, all percentages in this section refer to the percentages in the weighted sample and all summary statistics are calculated on the weighted sample. Our sample comprised 7186 respondents aged 18 or over. 52.3% of the respondents were women and 47.7% men. The mean age for women was 50.51 years (SD: 19.04) and the mean age for men 50.53 years (SD: 18.47). The women’s monthly net income (mean = 1986.92 €, SD: 1113.23) was lower than men’s (mean = 2416.22 €, SD:1574.17).

The proportion of respondents with one or more criminal convictions in the past five years was 2.1% (non-weighted n = 123). The respondents’ had committed a total of 396 crimes. As one criminal charge can include several crimes, it was possible for a single respondent to be convicted of several crimes at the same time. In these cases the statistics use the so-called principal offense rule, according to which each defendant or convicted person is described by the most serious offense. However, 58.6% of the convicted respondents were only convicted for a single crime. The most common (Table 1) crime types in convictions were property or financial crimes (44.4%) and traffic charges (24.2%). Having two or more convictions was most common with property or financial crimes. Those respondents who had traffic charges had most often only one conviction. Traffic-related crime included, for example, aggravated endangering of traffic safety, which had led to a conviction. Petty fines were not included in the data, thus minor traffic offenses are not included here.

#### Sociodemographics and conviction

Having at least one conviction during the past five years was more common among men (3.7%) than women (0.7%) (Table 2). Persons with convictions also had a lower level of income. Having a conviction was most common among the unemployed (9.7%). 3.0% of persons who had not completed the matriculation examination had convictions, compared to 1.0% of those who had completed the matriculation examination. Having convictions was significantly more common among those who had received basic social assistance in 2016 (13.5%) than those who had not received assistance (1.5%).

#### Gambling severity and conviction

The severity of past-year gambling was associated with having a conviction: 8.8% of probable problem or pathological gamblers had received convictions during the five-year period preceding the survey, compared to 3.5% of past-year at-risk gamblers, 2.0% of recreational gamblers and 1.2% of non-gamblers (Table 3). Perceived life-time gambling problems were also associated with having at least one conviction during the past five years.

#### Logistic regression models

In our logistic regression models recreational gambling were chosen as the reference group, due to the large size of this specific group. Given the popularity of gambling in Finland, recreational gambling form the normative category. Our first logistic regression model (Model 1, Nagelkerke $R^2=.029$) only included gambling-related variables: past-year gambling severity (PPGM) and perceived life-time gambling problems (Table 4). According to this model both past-year problem and pathological gambling (OR 2.725; 95% CI 1.339, 5.558) and perceived life-time gambling problems increase the odds (OR 2.363; 95% CI 1.345, 4.150) of having at least one conviction.

### Table 1. Crime types of convictions.

<table>
<thead>
<tr>
<th>Crime Type</th>
<th>One conviction</th>
<th>Two or more convictions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property or financial crime</td>
<td>13.3 (10)</td>
<td>51.7 (166)</td>
<td>44.4 (176)</td>
</tr>
<tr>
<td>Violent crime</td>
<td>16.0 (12)</td>
<td>8.4 (27)</td>
<td>9.8 (39)</td>
</tr>
<tr>
<td>Drug-related crime</td>
<td>9.3 (7)</td>
<td>8.7 (28)</td>
<td>8.8 (35)</td>
</tr>
<tr>
<td>Traffic-related crime</td>
<td>46.7 (35)</td>
<td>19.0 (61)</td>
<td>24.2 (96)</td>
</tr>
<tr>
<td>Other crime(s)*</td>
<td>14.7 (11)</td>
<td>12.1 (39)</td>
<td>12.6 (50)</td>
</tr>
<tr>
<td>At least one crime</td>
<td>18.9 (75)</td>
<td>81.1 (321)</td>
<td>100 (396)</td>
</tr>
</tbody>
</table>

The data includes 123 different respondents. Percentages and frequencies are unweighted. The table includes crime convictions during the past five years (in 2012–2016) for which the sentence was a prison sentence, community service, or a probation order. It is possible one respondent has several convictions. The data did not include petty fines. *Other crimes included e.g.: civil wrong, crimes against official duty and public order.
The second logistic regression model (Model 2, Nagelkerke R² = .209) included gender, age, education, level of income, BSA and employment status. This model suggests that, compared to female respondents, males had significantly higher odds (OR 5.004; 95% CI 3.233, 7.745) of receiving a conviction during the past five-year period. The odds of a conviction was also higher among younger age groups than in the oldest age group (65 years or older). Those who had not completed the matriculation examination were significantly more likely to have a conviction (OR 2.458; 95% CI 1.635, 3.697). Respondents who had received basic social assistance were more likely (OR 3.874; 95% CI 2.531, 5.929) to have convictions than those who were employed; the same was true of the unemployed (OR 2.814; 95% CI 1.728, 4.584). Being outside the labor force (students, pensioners and those retired for health reasons) did not increase the odds of having a conviction compared to those who were employed. Compared to the highest earning quartile, respondents with low (OR 2.734; 95% CI 1.414, 5.286) and average (OR 2.333; 95% CI 1.303, 4.176) income levels were more likely to have convictions.

Gambling-related variables were added to the third model (Model 3, Nagelkerke R² = .216) together with gender, age and socioeconomic background variables. In this model, odds ratios remained relatively high for both past-year gambling problems (OR 1.223; 95% CI 0.576, 2.597) and perceived life-time gambling problems (OR 1.586; 95% CI 0.884, 2.844), but these associations did not statistically significantly increase the odds of having a conviction.

Finally, a series of additional models were run to explore which exact sociodemographic variables attenuated the past-year gambling severity (PPGM) into non-significant. First, each background variable was analyzed separately with only past-year gambling severity. None of the background variables alone contributed to the past-year gambling becoming statistically non-significant. After this, both past-year gambling severity and perceived life-time gambling problems were analyzed separately with each background variable. These models revealed that only BSA dropped the past-year gambling severity to non-significance. Both, gender and education, however, turned it very close to non-significant.

### Table 2. Association between sociodemographic characteristics and having a conviction during the past five years.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>At least one conviction</th>
<th>No convictions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>(%)</td>
</tr>
<tr>
<td>All</td>
<td>7186</td>
<td>123</td>
<td>2.1</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>3911</td>
<td>21</td>
<td>0.7</td>
</tr>
<tr>
<td>Male</td>
<td>3275</td>
<td>102</td>
<td>3.7</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–24</td>
<td>874</td>
<td>23</td>
<td>3.1</td>
</tr>
<tr>
<td>25–34</td>
<td>925</td>
<td>22</td>
<td>3.1</td>
</tr>
<tr>
<td>35–44</td>
<td>1016</td>
<td>14</td>
<td>1.6</td>
</tr>
<tr>
<td>45–54</td>
<td>1059</td>
<td>25</td>
<td>2.9</td>
</tr>
<tr>
<td>55–64</td>
<td>1248</td>
<td>25</td>
<td>2.3</td>
</tr>
<tr>
<td>65 or over</td>
<td>2064</td>
<td>14</td>
<td>0.6</td>
</tr>
<tr>
<td>Level of income in 2016 (€/month)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (Q1)</td>
<td>1800</td>
<td>53</td>
<td>3.8</td>
</tr>
<tr>
<td>Average (Q2 and Q3)</td>
<td>3184</td>
<td>54</td>
<td>2.1</td>
</tr>
<tr>
<td>High (Q4)</td>
<td>2144</td>
<td>16</td>
<td>0.8</td>
</tr>
<tr>
<td>Employment status in 2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>3771</td>
<td>46</td>
<td>1.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>445</td>
<td>35</td>
<td>9.7</td>
</tr>
<tr>
<td>Outside labor force and other</td>
<td>2968</td>
<td>42</td>
<td>1.6</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No matriculation examination</td>
<td>3586</td>
<td>90</td>
<td>3.0</td>
</tr>
<tr>
<td>Matriculation examination</td>
<td>3600</td>
<td>33</td>
<td>1.0</td>
</tr>
<tr>
<td>Received basic social assistance in 2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>6890</td>
<td>87</td>
<td>1.5</td>
</tr>
<tr>
<td>Yes</td>
<td>316</td>
<td>36</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Percentages are weighted, frequencies unweighted; *includes pensioners, students, persons suffering from long-term illness, caregivers, others and those who don’t want to answer. **Basic social assistance is available to individuals and families whose income and assets do not cover their essential daily expenses.

### Table 3. Association between gambling behavior and having a conviction during the past five years.

<table>
<thead>
<tr>
<th>Total</th>
<th>At least one conviction</th>
<th>No convictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
<td>(%)</td>
</tr>
<tr>
<td>All</td>
<td>7186</td>
<td>123</td>
</tr>
<tr>
<td>Gambling severity in 2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not gamble</td>
<td>1310</td>
<td>12</td>
</tr>
<tr>
<td>Recreational gambling</td>
<td>5001</td>
<td>81</td>
</tr>
<tr>
<td>At-risk gambling</td>
<td>626</td>
<td>18</td>
</tr>
<tr>
<td>Problem or pathological gambling</td>
<td>139</td>
<td>11</td>
</tr>
<tr>
<td>Perceived life-time gambling problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>295</td>
<td>20</td>
</tr>
<tr>
<td>No</td>
<td>6891</td>
<td>103</td>
</tr>
</tbody>
</table>

*PPGM: Problem and Pathological Gambling Measure; percentages are weighted, frequencies unweighted; may not add up to 100% due to rounding.
Past-year gambling severity and perceived life-time gambling problems remained statistically significant when only age, level of income and employment status were added to the final model including the past-year gambling severity and perceived life-time gambling problems (Model 4, Nagelkerke $R^2 = .126$). In models with gender, BSA and education included, the gambling variable did not remain statistically significant.

**Discussion**

This study made use of a rare opportunity to explore the relationship between self-assessed gambling behavior and register-based background variables describing socio-economic status and criminal justice sentences. We approached these concurrent problems as the kind of entangled problems that the Nordic welfare state has set out to address with its general focus on equity, soft correctional treatment and inclusion (Hellman and Alanko 2021).

**No clear link between gambling severity and having a conviction**

When gender, age and sociodemographic factors were controlled for in our models, odds ratios for both past-year gambling problems and perceived life-time gambling problems did not remain statistically significant. Receiving basic social assistance had the biggest influence to the gambling severity becoming non-significant. This implies that particularly receiving basic social assistance is associated with both gambling severity and having a conviction. Those who had received basic social assistance had higher odds of having both convictions and gambling problems. Past-year gambling severity and perceived life-time gambling problems remained statistically significant only when age, level of income and employment status were left to the final model including the past-year gambling severity and perceived life-time gambling problems. In models with gender, BSA and education included, the gambling variable did not remain statistically significant.

However, our binary analyses confirmed that gamblers, and problem gamblers in particular, are overrepresented among persons convicted for a crime during the past five years. Among past-year probable problem or pathological gambling, 8.8% had a conviction, compared to 2.0% of recreational gambling and 1.2% of non-gambling. These results are in line with previous Finnish (Lind et al. 2019) and international findings (Turner and McAvoy 2011; May-Chahal et al. 2017; Turner et al. 2017; Moore 2018; Riley et al. 2018; Widinghoff et al. 2019; Banks et al. 2020).

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**Table 4. Logistic regression models on factors associated with having a conviction.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
<th>Model 3</th>
<th></th>
<th>Model 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5.004**</td>
<td>3.233–7.745</td>
<td>4.742**</td>
<td>3.047–7.381</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Female</td>
<td></td>
<td>Ref.</td>
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<td>Ref.</td>
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<tr>
<td>45–54 years</td>
<td>5.047**</td>
<td>2.245–11.347</td>
<td>5.357**</td>
<td>2.312–12.410</td>
<td>6.415**</td>
<td>2.833–14.529</td>
<td></td>
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<tr>
<td>65 or over</td>
<td></td>
<td>Ref.</td>
<td></td>
<td>Ref.</td>
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<tr>
<td>Education</td>
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</tr>
<tr>
<td>No matriculation examination (ME)</td>
<td>2.458**</td>
<td>1.635–3.697</td>
<td>2.446**</td>
<td>1.619–3.694</td>
<td></td>
<td></td>
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<tr>
<td>Has ME</td>
<td></td>
<td>Ref.</td>
<td></td>
<td>Ref.</td>
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<tr>
<td>Level of income</td>
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<td></td>
</tr>
<tr>
<td>Low (Q1)</td>
<td>2.734*</td>
<td>1.414–5.286</td>
<td>2.800*</td>
<td>1.446–5.423</td>
<td>3.024**</td>
<td>1.593–5.744</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average (Q2 and Q3)</td>
<td>2.333*</td>
<td>1.303–4.176</td>
<td>2.233*</td>
<td>1.244–4.008</td>
<td>2.210*</td>
<td>1.250–3.906</td>
<td></td>
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<tr>
<td>Highest (Q4)</td>
<td></td>
<td>Ref.</td>
<td></td>
<td>Ref.</td>
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<tr>
<td>Basic social assistance, BSA</td>
<td></td>
<td></td>
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<tr>
<td>Has received BSA</td>
<td>3.874**</td>
<td>2.531–5.929</td>
<td>3.700**</td>
<td>2.402–5.698</td>
<td></td>
<td></td>
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<tr>
<td>Has not received BSA</td>
<td></td>
<td>Ref.</td>
<td></td>
<td>Ref.</td>
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<tr>
<td>Employment status</td>
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</tr>
<tr>
<td>Unemployed</td>
<td>2.814**</td>
<td>1.728–4.584</td>
<td>2.788**</td>
<td>1.709–4.548</td>
<td>5.093**</td>
<td>3.266–7.943</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside labor force</td>
<td>1.231</td>
<td>.735–2.062</td>
<td>1.211</td>
<td>.721–2.033</td>
<td>1.705*</td>
<td>1.044–2.783</td>
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<tr>
<td>Employed</td>
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<td>Ref.</td>
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<td>Ref.</td>
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<tr>
<td>Past-year gambling severity*</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Does not gamble</td>
<td>0.648</td>
<td>.376–1.116</td>
<td>.845</td>
<td>.479–1.491</td>
<td>.663</td>
<td>.381–1.153</td>
<td></td>
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</tr>
<tr>
<td>At-risk gambling</td>
<td>1.555</td>
<td>.964–2.507</td>
<td>.983</td>
<td>.570–1.545</td>
<td>1.355</td>
<td>.834–2.201</td>
<td></td>
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</tr>
<tr>
<td>Problem or pathological gambling</td>
<td>2.725*</td>
<td>1.339–5.558</td>
<td>1.223</td>
<td>.576–2.597</td>
<td>2.194*</td>
<td>1.040–4.632</td>
<td></td>
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<tr>
<td>Recreational gambling</td>
<td></td>
<td>Ref.</td>
<td></td>
<td>Ref.</td>
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<tr>
<td>Perceived life-time gambling problems</td>
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<tr>
<td>Yes</td>
<td>2.363*</td>
<td>1.345–4.150</td>
<td>1.586</td>
<td>.884–2.844</td>
<td>1.933*</td>
<td>1.077–3.470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>Ref.</td>
<td></td>
<td>Ref.</td>
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<tr>
<td>Log likelihood</td>
<td>1424.2</td>
<td>1190.5</td>
<td>1170.3</td>
<td>1201.9</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LR Chi2</td>
<td>38.9</td>
<td>283.2</td>
<td>290.2</td>
<td>168.6</td>
<td></td>
<td></td>
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<tr>
<td>P</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
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</tr>
<tr>
<td>Nagelkerke R</td>
<td>0.29</td>
<td>0.20</td>
<td>0.216</td>
<td>0.126</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*p ≤ .05; **p ≤ .001; PGM: Problem and Pathological Gambling Measure; Weighted data was used.
**Underlying disadvantages might lead to both behaviors**

Our results show that male gender, young age, low income, receiving basic social assistance, not having completed the matriculation examination and being unemployed were indicators of having criminal convictions. The over-representation of criminal convicts among persons with pathological gambling may therefore be associated with these background factors, the majority of which represent particularly the socially disadvantaged population, so that they predict both pathology gambling and criminal convictions.

Psychological and constitutional factors have been thoroughly mapped for both problem gambling (e.g. Blaszczynski and Nower 2002) and people in the criminal corrections system (Sampson and Laub 1995). Our results may, to some extent, reflect the Pathways Model (Blaszczynski and Nower 2002), which associates criminal behavior especially to a pathway labeled as ‘antisocial impulsivist persons experiencing problem gambling’. The Pathways model identifies three types of people with problem gambling: behaviorally conditioned, emotionally vulnerable and antisocial impulsivist persons (Blaszczynski and Nower 2002). The latter may also become involved in other problematic and risky behaviors, including criminal activity. In future studies, it could be fruitful to further explore these themes using health-related register data.

Originally developed in 1968, the problem behavior theory is a social psychological framework for exploring deviance using behavioral background factors in sociocultural systems and involving a system for socialization and a system of personality traits (Jessor et al. 1968, p. 132). Over time, the theory has expanded beyond explaining problem behavior and evolved into a detailed conceptual structure (Jessor and Jessor 1977). In the 1980s and 1990s, health-related behavior came to play a more important role in problem behavior theory and was increasingly conceptualized in the explanatory variables of psychosocial and behavioral issues that capture lifestyle (Jessor 2014). Attempts to develop models for gambling in this framework have mostly been within the field of psychology (e.g. Sharpe and Tarrier 1993; Blaszczynski 1999).

This study has allowed us to identify a group of people that is hard to reach for societal efforts of integration. This is consistent with previous studies (Rintoul et al. 2013; Abdollahnejad et al. 2014; Cowlishaw et al. 2014) which have identified many comorbidities between gambling and social disadvantage as well as between disadvantage and gambling disorders. There are also many other factors such as smoking, drug use and risky alcohol consumption that are associated with both problem gambling and criminal activity (e.g. Welte et al. 2001; Mishra and Lalumière 2008; McGrath and Barrett 2009). As for associations with being convicted for illegal acts, various empirical studies have reported that gambling, risk-taking and antisocial behavior tend to co-occur (e.g. Mishra et al. 2010, 2011, 2017; Mestre-Bach et al. 2018b). Furthermore, problem gamblers who commit criminal acts seem to show poorer cognitive control and higher psychopathology (Mestre-Bach et al. 2018; Fatima et al. 2019). Excessive gambling is also linked with violent behavior (Laursen et al. 2016).

**Addressing disadvantage from the perspective of welfare state accountability**

Our findings suggest that multiple measures of problem behavior and social disadvantage are concentrated in specific demographic groups, thus making these groups vulnerable to a wide range of issues such as financial strain from gambling and a higher rate of criminal convictions. While these findings are in line with basic problem behavior theory (e.g. Jessor and Jessor 1977), we did not find a direct associations between criminal convictions and problem gambling when sociodemographic group status was properly adjusted for.

Persons with social disadvantage are disproportionately represented in the criminal justice system (see e.g. Lofstrom and Raphael 2016), partly because the typical crimes that they commit are the types of crimes that do not usually go unreported (Skogan 1977). Gambling, financial problems and crime (both economic and violent crimes) often co-occur and therefore it may be useful to deal with them together in what is often referred to as multilayered ‘wicked’ or complex problem pictures (Rittel and Webber 1974; Devaney and Spratt 2009). The interconnections between gambling and many types of delinquent behavior have many times been explained with individual-level factors such as impulsive behavior or low self-control (e.g. Blaszczynski and Nower 2002). This paper confirms that, there are societal level factors, such as low income level, that both connect to delinquent and criminal behavior and exacerbate the negative effects of gambling or be otherwise associated with it.

The concept of welfare state accountability (WSA; Hellman 2019a; Hellman 2019b; Hellman and Alanko 2021) entails a socio-legal normative point of departure for discussing how well policies and services function in view of the principles of the overall system. The resilience of the welfare state can be understood in terms of the extent to which the welfare state is able to uphold and carry out the social contract. The legitimacy of the state’s authority over citizens is embedded in the execution of this contract. When the welfare state’s ability to keep up its part of the contract is to be scrutinized in any given question, attention must be directed to the principles of its institutional setup.

Seen in the light of the WSA, the higher prevalence of gambling among socioeconomically vulnerable groups represents a great challenge for Nordic welfare states. As in the case of the other Nordic countries, Finland has recently had the agenda to vertically merge service provision throughout its social and health services (Stenius and Storbjork 2020) and has been forced to revisit some of its key welfare institutional principles including universality and equality (see Kangas and Kvist 2018; Hellman and Alanko 2021). Population studies have shown that gambling expenditure is concentrated in groups with low socioeconomic status and that low-income groups contribute proportionately more of their income to gambling than higher-income groups (Castrén et al. 2018). Male gender, low education, young
age, being single or divorced, unemployment, sick leave, retirement for health reasons, and low income are reported to predict gambling problems (e.g. Tolchard et al. 2014; Salonen and Raisamo 2015; Dowling et al. 2017). This is a group that the Nordic welfare states’ universal system is trying to reach with new synergized multi-professional foci (Klavus et al. 2020).

The finding that both gambling and legal offenses are associated with socioeconomically vulnerable backgrounds is in itself an important contribution to the literature on the concentration of multiple problems in vulnerable populations (see e.g. Bjerge et al. 2019). However, since it concerns gambling-related problems, the problem picture emerging from this study has special relevance from a welfare state perspective. Gambling levels and harms are associated with socioeconomic inequality (Rintoul et al. 2013; Tu et al. 2014; Canale et al. 2017). Earlier research has shown that gambling control policies play an important role in adjusting gambling prevalence and harm (Rossow and Hansen 2016). Our study suggests that a social policy that recognizes gambling as an integral part of the risk picture of social disadvantage in general, can effectively counteract the complex relationship between criminal offenses, social status and gambling. This is a task for which the welfare state can and should be held accountable.

It is important to have a clearer understanding of how the gambling habit ties in with other social problems so that the services designed to help gamblers can be more appropriately targeted. Our analysis identified a group of citizens whose life is marred by multiple social disadvantages that are putting them in a vulnerable position. These disadvantages are of special interest from the point of view of the welfare state’s aims of promoting equality, inclusion and social integration through its institutional structure.

We found that persons who were more socially disadvantaged on several measures had more often been convicted for a crime. As well as having a lower income level and higher gambling severity scores (PPGM), they had more often received income transfers from the state to cover their daily expenses and had less often taken the matriculation examination than those who had no convictions. On the basis of our data we are unable to assess the causal connections between gambling severity and criminal convictions. Previous studies have shown that both gambling-related criminal activity (see e.g. Kuoppamäki et al. 2014) and problem gambling-related criminal activity exist in Finland (e.g. Lind et al. 2015). However, the question of whether there is a causal relationship between problem gambling and criminal behavior remains controversial. Criminal activity related to problem gambling typically occurs alongside various other aspects of problem gambling, which is the main reason why criminal activity was excluded from the DSM-5 diagnostic criteria for gambling disorder (American Psychiatric Association 2013).

Some of the problems experienced by the gamblers in this study were probably exacerbated by social and economic disadvantage. Financial problems caused by gambling may have a more severe impact on persons in a more precarious social situation and therefore more readily lead to crime. This also underscores the need to develop preventive and supportive services that look at the broader picture rather than address just the most visible and obvious problems, such as gambling-related crime per se (see Conklin 2006; Head and Alford 2015; Bjerge et al. 2019). Our study was limited to exploring social disadvantage in terms of level of income, receipt of basic social assistance and education. To gain a broader view of the social complexity of the relationship between problem gambling and criminal behavior, future studies on gambling and criminal behavior should also consider substance abuse and mental health problems as measures of social disadvantage.

**Limitations**

The response rate in our study was not very high (36%), but nonetheless higher than the international average for web and postal gambling-related population surveys (Williams et al. 2012). Overall, women and older respondents were more willing to participate than men and younger respondents (Salonen et al. 2017). Gambling participation, particularly online gambling, and both at-risk gambling and problem gambling were more common among those who participated using the online survey than those who used the postal version.

Measurements of socioeconomic status were not affected by memory problems as the data came directly from national registers. Furthermore, compared to self-report evidence on criminal behavior, the registers we used were a reliable source of information on reported and convicted criminal acts. However, since we had only a small number of respondents with convictions, we had to measure convictions as a dichotomous variable and therefore lost valuable information on the quantity and quality of convictions. Moreover, we were unable to determine whether or not the convictions were gambling-related. We were not able to measure the full spectrum of crime, as it is likely that some less-severe criminal incidents do not lead to charges, remain undetected or unreported and thus unregistered. Unfortunately, we were not able to examine crime types due to the small number of responders with both problem gambling and convictions. Furthermore, our register-based information on criminal behavior was limited to the past five years prior the survey.

It is possible that our findings are explained by the relatively small number of respondents (n = 123) with a conviction. Indeed future population-based studies on convictions should aim to work with larger sample sizes. Moreover, a more in-depth understanding of the associations between problem gambling and crime requires that we conduct studies in different settings and include prisoners, the clinical population and the general population.

The associations between problem gambling and criminal convictions would probably be stronger if the prison population had been included in the study. It is possible that survey studies such as this are unable to reach the vast majority of people who engage in criminal activity. A more in-depth investigation of criminally active persons would also need to
have access to register data (see e.g. Aaltonen 2013). Lastly, the survey data used in this study were retrospective in nature, and the time frames used for gambling problems and the fact that data on convictions covered a time-period of five years in retrospect, also limit any inferences that can be drawn about causal connections. Therefore, we were unable to make any firm causal claims about the links between problem gambling and crime. The small number of participants in some sub-groups, such as those at-risk and problem gamblers with convictions, may be the reason for non-significant findings although the corresponding OR implies an association between the response and a covariate.

Conclusion

This study implies that problem gamblers are overrepresented among people with crime convictions. However, based on this general population sample of Finnish people, it seems that social disadvantage variables are stronger indicators of criminal convictions than gambling behavior. Therefore, preventive efforts focused on possible problem gambling and interventions in criminal justice systems should also take account of the factor of social disadvantage. This study discerns a multi-problem ridden group that puts the Finnish welfare state’s systemic accountability to the test, particularly with regard to its role in regulating gambling, minimizing and preventing gambling-related harm, but also in developing support and treatment services for problem gamblers in the prison population. Our results make it clear that efficient gambling services and a sustainable gambling policy should be an integral part of the welfare state’s toolbox in the fight against social exclusion and disadvantage.

Implications

Our results suggest that inclusive, universal and equality-based social policy is closely intertwined with both crime prevention and ethically sustainable gambling policy. Given the complexity of gambling problems, socioeconomic disadvantage and criminal behavior, it is imperative that different service providers in the welfare state work closely with one another. In the Finnish welfare state today, the screening and treatment of gambling problems are not sufficiently integrated: consequently our understanding of how gambling problems are intertwined with social disadvantage and crime remains limited. In a pilot study by Castrén et al. (2019), prison workers were found to be well aware of the extent of problem gambling and they recognized the importance of addressing the issue, but they felt they were ill-equipped to refer their clients to treatment. Similarly, although judges recognize the condition of problem gambling, it is very rarely considered a mitigating factor in explaining criminal activity (Brooks and Blaszczynski 2011). The welfare state and its justice system could well benefit from the introduction of gambling courts, for example (see e.g. Hinshaw 2005; Guenaga 2011; Turner et al. 2017; Laux 2019).

Future studies should address the relationship between gambling severity and criminal behavior using larger samples and life-time data on convictions and fines. From the viewpoint of crime prevention development, it would be particularly important to examine how the interconnections between social disadvantage and gambling lead to crimes harsh enough and visible enough to result in criminal convictions.

Disclaimer

The Ministry of Social Affairs and Health, Helsinki, Finland, had no role in the study design, analysis, or interpretation of the results nor in any phase of the publication process.

Ethics approval and consent to participate

The study was conducted in accordance with the ethical standards of the Declaration of Helsinki. The Ethics Committee of the Finnish Institute for Health and Welfare, Finland, approved the research protocol (THL/1390/6.02.01/2016). Additional approval was obtained from the Ethics Committee of the Statistics Finland (5/2016, 17.11.2016).

Potential participants were informed about the principle of voluntary participation. They were informed that participating the study involved the register-linkage, in accordance of the national data protection regulations of that time. Furthermore, the letter included information about the registers, their statutory right to disclose data for scientific purposes and a list of the register-based variables used.

The research protocol was approved by the ethics committee of the Finnish Institute for Health and Welfare. The Finnish Gambling Harms Survey dataset is openly available for research purposes from the Finnish Social Science Data Archive (https://www.fsd.uta.fi/en/). Additional approval for the use of the register data was obtained from the ethics committee of Statistics Finland. Analyses were conducted in a protected environment by Statistics Finland using a remote access system, and the results were transferred to the authors through a screening process.

Author contributions

KL, MH, YO and AHS were responsible for conceiving, designing, and planning the study. The data were analyzed by KL. KL and AHS interpreted the results. KL wrote the first draft of the article. KL, MH, YO and AHS critically revised the article for important intellectual content.

Disclosure statement

The authors declare that they have no conflict of interest.

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Data availability statement

Gambling Harms survey data is openly available for research purposes from the Finnish Social Science Data Archive (https://www.fsd.uta.fi/en/). The register-based data was available based on a separate contract with Statistics Finland. The statistical analyses were conducted in a protected environment by Statistics Finland using a remote access system.
The results were transferred to the authors through a screening process.

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