Risk of problem gambling among occupational groups: A population and registry study

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Abstract

Aims: To identify which occupational groups have elevated levels of regular gambling participation and at-risk and problem gambling, and to explore job-specific factors associated with elevated levels. **Methods**: Statistical analyses were performed on data from the 2015 Swedish population study on gambling and health. The principal registry variable was occupation, classified according to the Swedish version of the International Standard Classification of Occupations (ISCO-08). Two gambling variables were studied: regular gambling participation and at-risk and problem gambling, as measured by the Problem Gambling Severity Index (PGSI). For statistical regression analyses, socio-demographic data were used such as gender, income, and country of origin. **Results**: We found significant differences between occupational groups with regard to the two gambling variables. In general, manual jobs with predominantly male workers scored high, especially when there was no fixed workplace. Several significant differences remained when we controlled for gender. We also found support for three types of workers having elevated levels on the gambling variables: (1) building, construction and service, mobile, (2) vehicle drivers, and (3) monotonous manual indoor work. These results were confirmed by comparisons with propensity score matched controls. **Conclusion**: A policy implication of this study is that some occupational groups should be prioritised in the prevention of problem gambling. Theoretically, the study shows that occupational categories represent real-life cultures and contexts of gambling and non-gambling as

distinct from the abstract socio-demographic factors that are usually considered in relation to gambling participation and problem gambling.

At-risk and problem gambling (ARPG) is unevenly distributed in the population. Numerous studies have shown that socio-demographic factors explain a substantial part of the variation (for a summary, see Williams, Volberg, & Stevens, 2012, Appendix E) where at-risk and problem gambling are more prevalent among men, younger people, those with low income and/or low education and also in some immigrant groups. Because occupational groups have their characteristic socio-demographic profiles, it can be expected that ARPG is unevenly distributed across these groups. Furthermore, some occupational groups are likely to have elevated levels of ARPG because of job-specific reasons, such as exposure to gambling while at work.

Knowledge about which occupational groups have elevated levels of ARPG is valuable for developing preventive initiatives in the workplace and for directing them to the types of workers and work environments where they are most needed (Binde, 2016; Nower, 2003). Knowledge about the reasons why ARPG levels are elevated is useful for understanding the social, cultural, and situational correlates of problem gambling.

The impetus for carrying out this study was that we had access to population study data that included reliable and detailed registry information on the occupations of the participants. To our knowledge, no previous study has explored gambling participation and ARPG in relation to such fine-grained information on occupation.

The purposes of this study were (1) to identify which occupational groups have elevated levels of regular gambling participation and ARPG and (2) to explore which job-specific factors are associated with elevated levels.

Literature review

The literature review is based on a previous review made by the first author when conducting a study on the prevention of gambling-related harm and crime in the workplace (Binde, 2016), which included publications about the prevalence of gambling and problem gambling in various occupational sectors. That review was updated with searches in Google Scholar using various combinations of relevant keywords (i.e., "gambling AND (work OR workplace OR occupation OR job OR isco)"). Because these scoping reviews revealed very few studies (we found four) that compare gambling participation or ARPG across specific occupational groups, we concluded that a systematic review of the literature would be of no use.

Empirical studies

As mentioned, there are many studies showing a relationship between socio-economic status and factors on the one hand and gambling participation and ARPG, or problem gambling (PG), on the other. Some of these studies include observations on crude occupational classifications or social divisions, such as the six classes in the British gambling prevalence studies, which comprise, for example, "professional occupations" and "skilled occupations, manual" (Orford, Wardle, Griffiths, Sproston, & Erens, 2009; Sproston, Erens, & Orford, 2000). Such studies show that gambling behaviour varies significantly between occupation-based social divisions. For example, in one of the British studies, the prevalence of PG was more than twice as high among those with "semi-routine/routine" jobs compared to "managerial and professionals"

(Orford et al., 2009), and participation in bingo games was much more common among people with "unskilled occupations" (Sproston et al., 2000, p. 24). The book *Gambling, work and leisure: A study cross three areas* (Downes, Davies, David, & Stone, 1976) explores gambling participation in relation to a huge number of social and cultural factors in the UK, of which some are work-related, but the relevance of the results, with respect to specific kinds of jobs, is unclear.

We found only four works presenting empirical studies that compared gambling participation and/or ARPG/PG across more specific occupational groups. Two studies in Canada and the USA compared gambling participation across different occupational sectors and found that employees in some sectors gambled significantly more often than others (Alberta Health Services, 2003; Nyman, Welte, & Dowd, 2008). In the Canadian study, in a nine-class system of industries, those above average were: finance/insurance/real estate, forestry/mining, utilities, public administration and hospitals/healthcare; in the eight-class system of professions, only one was significantly above average: transportation/equipment operating. In the study from the USA, service workers gambled significantly more than other occupations (in a ten-class system) and there was a similar tendency for people working in construction and extraction. These results seem to reflect primarily cultural and socio-demographic factors, such as people gambling more in sectors where there are many more men than there are women.

Two Norwegian studies have explored ARPG in occupational groups that, for theoretical reasons, or because practical experience has suggested so, could be assumed to have elevated ARPG levels (Buvik, 2009, p. 61; Dahlgren, 2012). The results of these studies were for the most part inconclusive, mainly because of the small numbers of people with ARPG in the groups. However, one of the studies found associations between problem gambling and shift work and frequent business travel, which was assumed to be caused by such work conditions making it more likely for people to relax or kill time by gambling (Dahlgren, 2012). The other study (Buvik, 2009) found that employees in the transport sector had elevated levels of ARPG, a result that was confirmed with respect to PG by a Norwegian study (Revheim & Buvik, 2009) that focused on the transport industry. This was explained mainly in terms of "opportunity structures", more specifically taxi drivers taking breaks between driving tasks in cafés with slot machines.

A number of studies have shown that employees in casinos and other gambling venues have gambling problems more often than people in other workplaces (e.g., Guttentag, Harrigan, & Smith, 2012; Hing & Gainsbury, 2013). The reason for this is probably a combination of gambling being omnipresent in these workplaces and self-selection to such work because people with a strong interest in gambling are more likely to take jobs in the gambling industry.

On the basis of these few and disparate studies, it is not possible to draw any but the most general conclusions about relative differences in gambling participation and ARPG between occupational groups. That is, differences are created by the socio-demographic profiles of occupational groups, their associated attitudes towards specific forms of gambling, their exposure to gambling while at work, and the time structure of work and leisure.

Theories

While empirical studies are few in number, a substantial list of factors can be compiled that theoretically could cause elevated levels of gambling participation and ARPG in specific occupational sectors or categories. We present here a number of such theories that guided the second phase of our analyses, when we created merged occupational groups sharing essential work-related characteristics, and that were useful for interpreting results. Because this study focused on exploring differences across occupational groups and types of works, we did not

explicitly test any of the theories. Classical utility theory (for an overview, see Binde, 2009, pp. 26–30) and risk-taking theories (e.g., Downes et al., 1976) are not covered here, because we consider the evidence for the relevance of these theories in the context of gambling and work to be weak.

Socio-demographic factors. As already mentioned, occupational categories have their specific socio-demographic profiles. For example, in Sweden men gamble more than women, and the middle-aged tend to gamble more than the young and old (Public Health Agency of Sweden, 2016). Therefore, people at a workplace dominated by middle-aged men will in general gamble more than people at a workplace dominated by young women. There is solid evidence for the influence of socio-demographic factors on gambling participation and PG.

Something-for-nothing theory. This theory, formulated by economist John A. Nyman (Nyman, Dowd, Hakes, Winters, & King, 2013; Nyman et al., 2008), assumes that people who have low-paid work, which they perceive as boring and/or dangerous, are less inclined than others to increase their wage by working extra hours. Instead, they are predisposed to participate in gambling, thereby hoping to get "something for nothing". The few studies in which this theory has been tested have found support for it.

Self-perceived low social mobility. Studies have shown that people with low socio-economic status and self-perceived low social mobility are more motivated to gamble than others because they view winning big on the lottery as one of the few possibilities to become affluent and live a better life (Beckert & Lutter, 2013; Tabri, Dupuis, Kim, & Wohl, 2015; Tec, 1964). Anomie theory has a similar assumption – people with a low social position are likely to experience a mismatch between their actual position and culturally and socially prescribed ideals, which for them are unattainable, and winning a lot of money by gambling appears

to be a possibility for being able to live up to these ideals (Downes et al., 1976, p. 69). The link between self-perceived low social mobility and gambling is well established by past research.

Alienation. Alienation theory proposes that people who have little influence over their work – who perceive themselves as merely cogs in a machine – more often than others, and more intensely, participate in skill-based forms of gambling. By making important and consequential decisions when betting, and thereby having the opportunity to display skill, they are assumed to compensate for having little influence over their work (Banwell, Dance, Quinn, Davis, & Hall, 2006; Downes et al., 1976, p. 72). The few studies which have tested the alienation hypothesis have found support for it, but it seems difficult to isolate the alienation factor from other factors relevant to low-paid monotonous work.

Exposure to gambling at or in connection with work. Such exposure can be assumed to stimulate participation in gambling. The individual is exposed to gambling offers, for example in cafés, diners, and convenience stores while taking lunch breaks (Revheim & Buvik, 2009). Gambling is facilitated by the management having limited supervision over the activities of employees. The exposure theory has strong support when it comes to gambling participation more generally, although prolonged exposure on the population level seems to cause adaptation (Abbott, 2017).

Structure of time for work and leisure. Gambling can be a way to entertain oneself when there is nothing else to do. Thus, shift workers who are free during the daytime when family and friends are at school or working might spend more time gambling than people who work regular hours. Employees who travel a lot in their work might kill time in the evenings by gambling when they are away from home. As far as

we know, only one study (Dahlgren, 2012) has tested this theory, and it found support for it.

Gambling is part of workplace culture. For example, there is much talk about sports and sports betting. In Sweden, there is a tradition among factory workers to play football or horse pools together in a workplace syndicate (Eldh, 1996). This theory seems very plausible and there is evidence that syndicate play stimulates participation in gambling (Beckert & Lutter, 2013; Guillén, Garvía, & Santana, 2012).

As far as the above theories and assumptions are valid, it can be assumed that the decisive factors are additive or multiplicative. That is, if several factors are present in an occupation, their combined effect in creating elevated levels of gambling participation and ARPG might be substantial.

Methods

Data

We analysed data from the Swelogs 2015 population study on gambling and health (Folkhälsomyndigheten, 2016). In a random stratified sample of 21,000 people aged 16–84 years from the register of the total population, 9,420 individuals participated, which amounts to a weighted response rate of 52%. Data were collected by Statistics Sweden using telephone interviews as well as postal and online questionnaires. The Swelogs 2015 study was approved by the Regional Ethical Review Board in Stockholm, Sweden.

For our analyses, we used data only from those who were of the age at which people usually work, i.e., 18–67 years (7,284 participants). Furthermore, we only analysed those who were classified as belonging to a specific occupational group according to the SSYK 2012 (Standard för svensk yrkesklassificering, 2012 version, see below). The analysed sample comprised 2,937 individuals, which in this article is referred to as the "sample".

The sample compared to the rest of the respondents aged 18–67 years had to a greater extent gambled regularly (29% vs. 18%) but were to a lower extent at-risk or problem gamblers (6% vs. 8%). The sample had a higher proportion of women (54% vs. 49%), had a higher mean age (43 years vs. 35 years), and had a generally higher level of education. All of these differences were significant ($p < .001$). The differences were what might be expected when adults who work are compared to those who do not, for example, people on disability pensions, those subsisting on social welfare allowances, and the long-term unemployed.

Measurements

Occupational group was assessed using Statistics Sweden registry data on SSYK 2012 categories (Statistiska centralbyrån, 2012a). SSYK 2012 (hereafter SSYK) includes 10 major groups (the "1-digit level"), 46 sub-major groups (the "2-digit level"), 147 minor groups (the "3-digit level"), and 429 unit groups (the "4-digit level"). The groups are formed on the basis of a classification of about 8,500 specific jobs (Statistiska centralbyrån, 2012b), and the data are updated annually. SSYK corresponds in all essential respects to the International Standard Classification of Occupations 2008 (ISCO-08, ILO, 2012). A conversion table for translating between these two classifications is available from Statistics Sweden (Statistiska centralbyrån, 2016).

Gambling participation was assessed using answers to questions regarding the frequency of participation in various forms of gambling. The variable used in our analyses was "regular gambling", which means participating at least monthly in any form of gambling. To gamble regularly is not risky in itself, but nearly all problem gamblers are regular gamblers. In the Swelogs 2015 full sample, problem gambling and at-risk gambling were much more common among regular gamblers than among occasional gamblers (Folkhälsomyndigheten, 2016).

ARPG was measured using the Problem Gambling Severity Index (PGSI, Ferris & Wynne, 2001). The study sample contained

124 (4.2%) low-risk gamblers with PGSI scores of 1–2, 41 (1.4%) moderate-risk gamblers with PGSI scores of 3–7, and 9 (0.3%) problem gamblers with a PGSI score of 8+. Because of the low frequencies of moderate-risk and problem gamblers, when the participants in the study were split into specific occupational groups, we had no other choice than to use a low cut-off value of PGSI 1. This means that "low-risk" gambling was included along with "moderate-risk" and "problem" gambling. Hence, in this article, we refer to PGSI 1+ as "at-risk and problem gambling" (ARPG), which is a classification that has been used in several previous studies of various kinds (e.g., a review of problem gambling and delinquency among adolescents lists six such studies, see Wright, Ziegler, & Matheson, 2018). Although low-risk gambling usually means that the individual currently has no perceptible gambling problems, PGSI 1+ is a relevant category in terms of possible preventive measures where it is of interest to identify categories and arenas where at-risk gamblers can be found. Ferris and Wynne (2001) state, in their report on the PGSI, that "low" and "moderate" risk gambling means the individual is at risk if they are heavily involved in gambling and correlates of problem gambling are present (such as having "faulty cognitions" about gambling). Results from longitudinal studies in Sweden (Public Health Agency of Sweden, 2016), Australia (Victorian Responsible Gambling Foundation, 2014) and Canada (Williams et al., 2015) show significantly higher incidence rates of moderate-risk and problem gambling among low-risk gamblers compared to no-problem gamblers

Registry data on gender and other sociodemographic variables were obtained from Statistics Sweden. Data on health, happiness, and risky alcohol consumption were obtained from the Swelogs 2015 study.

All Swedish inhabitants are identified through a civic registration number based on date of birth and four extra digits. This means that all official registry data on individuals can be identified for each person. The individuals in Swelogs were all given an individual survey unit code which was linked to the civic registration number. The key combining the survey unit codes to the personal number is kept at Statistics Sweden. The registry data, including the SSYK information, were linked to the data set through these codes after informed consent from the participants.

Analyses

In the first and exploratory phase of our analyses, we calculated the frequency of the two gambling variables – regular gambling and ARPG – across occupational categories on SSYK levels 1–3. We calculated 95% confidence intervals, and percentages were rounded off to the nearest whole number.

We analysed only categories with more than 30 individuals, which commonly is regarded as the smallest sample size for which it is meaningful to calculate proportions. At the 1-digit level, 9 out of 10 groups could be included in the analysis; at the 2-digit level, 29 out of 46 groups could be included; and at the 3-digit level, only 31 out of 147 groups could be included. Nevertheless, because there were so few people in many of the omitted groups, about 70% of the sample at this level was included in the explorative analyses. The 4-digit level was not meaningful to analyse using this explorative strategy because of the small sizes of the groups.

The expected numbers of 95% confidence intervals not overlapping the estimated population proportion by chance, where the expected number is 5% of the number of groups tested, were 0.45 at the 1-digit level and 1.50 at both the 2-digit and the 3-digit levels. The observed numbers of significant differences exceeded these expected numbers at all digit levels. This means that although we analysed many groups, and although one group out of 20 ought to appear as significantly different from the sample simply by chance, the differences reported here reflected non-random differences.

We decided not to control for income, education, or other socio-economic factors that characterise professions, because doing so would have removed many of their essential characteristics and therefore would have been detrimental to the exploratory purpose of this phase of the analysis. However, we did control for gender because many of the professions that were above average with respect to gambling participation and ARPG were dominated by males. Thus, we wished to see whether our results could be simply explained by the gender factor. Logistic regression models were estimated for regular gambling and ARPG, respectively, first estimating odds ratios (*OR*s) for SSYK categories with prevalence estimates previously shown to be significantly above the estimated prevalence rate in the total sample using the rest of the sample as the reference category. The models were then re-estimated with gender also included as an explanatory variable.

In the second phase of the analysis, we merged selected occupational categories at the SSYK 4-digit level into three larger *merged groups*. As we describe in the results section, the 4-digit groups were selected on the basis of the results of the exploratory phase of the analysis as well as theoretical assumptions that tallied with these results. The merged groups gave us increased statistical power in the analysis because they included a larger number of individuals than the unit groups at the 4-digit level. The merged groups were tested against the rest of the sample, but were also tested against comparable groups of controls matched by propensity scores to confirm that the results were not due to socio-demographic factors other than type of occupation (Table 1).

Each group was first tested with either Pearson's chi-square test or t-test for categorical or continuous variables, respectively, against the rest of the sample with regard to age, gender, education, income, country of birth for the individual as well as the father and the mother, living in one of the three largest cities or not, general health, mental health, happiness, risky alcohol consumption, civil status, and family situation. These variables were chosen to reflect socio-demographic and lifestyle factors that are known to be related to gambling and gambling problems without being unique for the type of occupation. By matching on such variables, we could control for factors that were not characteristic of these specific types of jobs. The control groups can thus be said to consist of people in objectively similar life circumstances but having different kinds of jobs.

Variables showing significant differences between a merged group and the rest of the sample were used in logistic regression models where belonging to the group was the dependent variable. Different combinations were tested, and the model with the highest pseudo R^2 was chosen as the propensity score model from which propensity scores were calculated. Each set of propensity scores resulted in a set of overlapping propensity scores for cases (persons belonging to the group in question) and controls (the rest of the sample). Only individuals from this set were used whereby three cases from groups 1 and 3 and one case from group 2 were discarded because their propensity scores were outside the range of propensity scores among the eligible controls. One control per case for groups with more than 100 cases and two controls per case for group 2, which only had 69 remaining cases, were chosen through nearest-neighbour matching. Differences in regular gambling and ARPG were then tested using Pearson's chi-square test.

Post hoc power analyses were carried out for all significance tests where the *p*-value was below 0.05. The null hypothesis values were set to the total sample prevalence estimates of 29.1% for regular gambling and 5.9% for ARPG. For the exploratory analysis the power was above 0.50 for all estimates below average, and for all estimates above 1.0 for categories with a *p*-value less than 0.015 for ORs presented in Table 3. The power for significant results in the merged groups was above 0.80 except for the estimated proportion of ARPG in Group 3 where it was 0.34.

Table 1. Variables used for propensity score (PS) matching.

	Group 1. Mobile work		Group 2. Vehicle drivers		Group 3. Monotonous work	
	p-value; compared to the sample	Used in PS model	p-value; compared to the sample	Used in PS model	p-value; compared to the sample	Used in PS model
Male	**< .001; more**	X	**< .001; more**	X	**< .001; more**	X
Education (compulsory/high school/university)	**< .001; lower than average**	X	**< .001; lower than average**	X	**< .001; lower than average**	X
Income	.083		**.042; lower than average**	X	**< .001; lower than average**	X
Born in a Nordic country	.822		**.004; less**		**.017; less**	X
Country of birth (Sweden/other European country/outside Europe)	.958		**.001; less born in Sweden**	X	.161	
Father's country of birth (Sweden/other European country/outside Europe)	.580		**.010; less born in Sweden**	X	**.028; less born in Sweden**	X
Mother's country of birth (Sweden/other European country/outside Europe)	.794		**.026; less born in Sweden**	X	.085	
Residence in one of the three largest cities	**.003; less**	X	.412		**.001; less**	X
General health	.501		.708		.115	
Mental health	.578		.507		.800	
Happiness	**.008; more**	X	.434		**.050; more**	
Risky alcohol consumption	**.046; more**		.640		.398	
Type of family (single or not and with children or not)	.958		.977		**.004; more single and without children**	X
Age (continuous)	**.010; younger**	X	.114	X	**< .001; younger**	X

Note. Significant differences are marked with bold text.

Results

Explorative analyses

In the sample, regular gambling was 29% and ARPG 6%. A number of occupational groups were significantly below the sample averages for these variables (Table 2). As for regular gambling, there were one major group below average, four sub-major groups, and four minor groups. As for ARPG, there were two major groups below average, four sub-major groups, and three minor groups.

The general pattern was that occupations requiring higher education had relatively low values on the two gambling variables, as well as a few other occupational groups in which there were many women, for example minor group 941, food preparation assistants. However, in the following we will mainly be concerned with groups with values significantly *above* average because these are the most important from a preventive perspective and for understanding the work-related correlates of ARPG. Figure 1 shows the occupational groups that were significantly above average with respect to gambling participation, and Figure 2 shows the corresponding results with respect to ARPG (for *OR*s and p-values, see Table 3). The figures show a clear pattern – blue-collar and transportation workers often had elevated values on the gambling variables. In the full Swelogs sample, gambling participation was 26%

Table 2. Prevalence rates with 95% CI for SSYK groups significantly below average in regular gambling and/or ARPG.

Group No.	Job	N	Regular gambling	ARPG
	Whole sample	2937	29% (28–31%)	6% (5–7%)
1	Managers	198	33% (26–39%)	**1% (0–2%)**
2	Professionals	808	**23% (20–26%)**	**3% (2–4%)**
12	Administrative and commercial managers	66	30% (19–41%)	**0%**
21	Science and engineering professionals	103	23% (15–32%)	**1% (0–3%)**
22	Health professionals	154	**17% (11–23%)**	**3% (0–5%)**
23	Teaching professionals	278	**24% (19–29%)**	**1% (0–3%)**
52	Sales workers	172	**20% (14–26%)**	9% (5–14%)
94	Food preparation assistants[a]	69	**12% (4–19%)**	4% (0–9%)
214	Engineering professionals	59	25% (14–36%)	**0%**
231	University and higher education teachers	33	**3% (0–9%)**	0%[b]
234	Primary school and early childhood teachers	173	25% (19–32%)	**2% (0–5%)**
241	Finance professionals	33	**15% (3–27%)**	6% (0–14%)
311	Physical and engineering science technicians	68	38% (27–50%)	**1% (0–4%)**
522	Shop salespersons	158	**20% (14–26%)**	10% (5–15%)
941	Food preparation assistants[a]	69	**12% (4–19%)**	4% (0–9%)

Note. Values significantly below average are marked with bold text. SSYK = Standard för svensk yrkesklassificering; ARPG = At-risk and problem gambling.
[a]Groups 94 and 941 are identical because group 94 includes only one three-digit group: 941.
[b]No individuals in the group with ARPG but *p*-value > .05 for binomial test of proportion equal to the total proportion (5.9%) for x = 0.

and ARPG was 6% for this age group (working age: 18–67 years). Thus, some of the groups had very elevated values compared to the common level. For example, in minor group 722 blacksmiths, toolmakers and related trades workers, there were twice as many regular gamblers as in the population in the same age range and about five times as many ARPGs.

Because many of these occupations are dominated by men, one might ask whether these results could simply be explained by the gender factor. To answer that question, we controlled for gender using logistic regression (Table 3). This made the differences in regular gambling, compared with the average in the whole sample, non-significant for groups 8, 71, 96 and 711, and non-significant with respect to ARPG for groups 8 and 711. All other differences remained significant.

All *OR*s but one changed towards 1.00 when we controlled for gender. The exception being the *OR* for ARPG estimated for the shop salespersons category at the SSYK 3-digit level,

which increased from 1.9 to 2.5. This was the only category with significantly higher prevalence of either regular gambling or ARPG with a majority of women, around 70%. Among the shop salespersons, 7 out of the 16 ARPGs were women; nevertheless, the proportion of ARPGs was higher among male than among female shop salespersons: 20% (9 out of 44 men) compared to 6% (7 out of 113 women), respectively; *p* = .016.

Analysis of merged groups

We took note of which specific jobs at the 4-digit level were included in the groups on the 2- and 3-digit levels with elevated levels of the gambling variables. This gave us more detailed knowledge about the types of work included in the groups than what is indicated by their SSYK titles. For example, it became clear to us that most of the occupational categories in minor group 711 – building frame and related trades workers – had no fixed workplace. With the
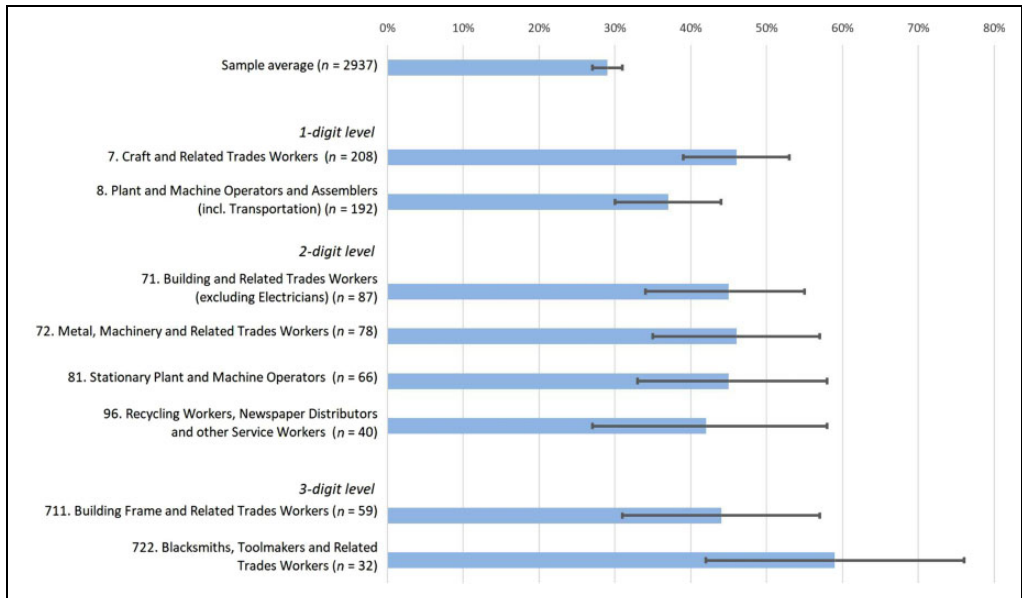
Figure 1. Occupational groups significantly above average for regular gambling participation, *n*-values and percentages.
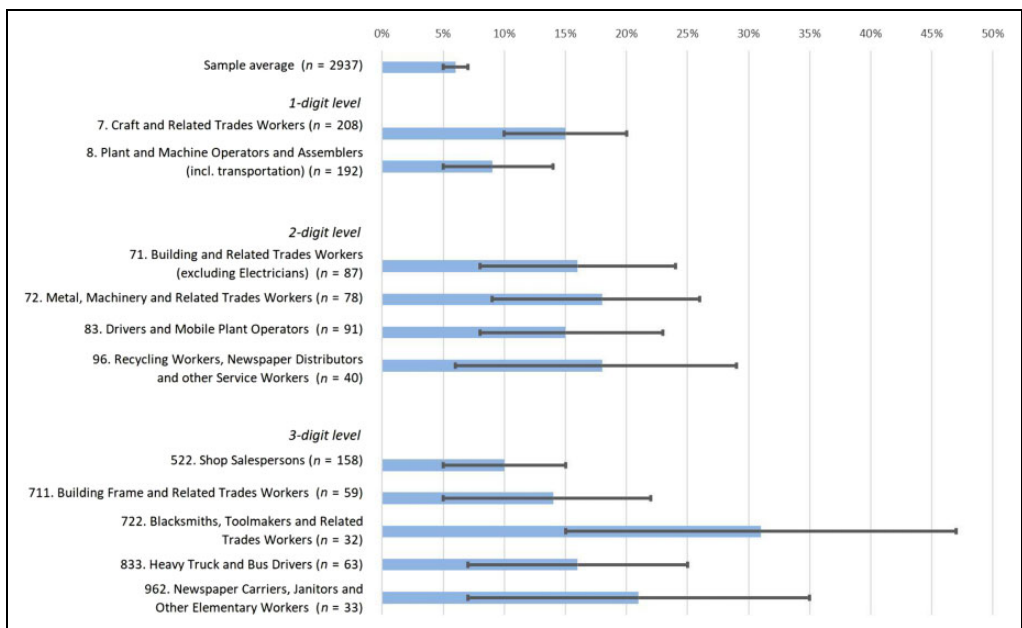*Note.* 95% confidence intervals are shown.

Figure 2. Occupational groups significantly above average for ARPG, *n*-values and percentages.
Note. 95% confidence intervals are shown.

Table 3. Crude odds ratios (ORs) and ORs adjusted for gender in SSYK occupational groups significantly above average for regular gambling and ARPG.

Regular gambling/ ARPG	Occupational group	Unadjusted		Adjusted for gender	
		OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
1-digit level					
Regular gambling	7. Craft and related trades workers	2.2 (1.7–3.0)	**< .001**	1.7 (1.3–2.3)	**< .001**
	8. Plant and machine operators, and assemblers (incl. transportation)	1.5 (1.1–2.0)	**.014**	1.2 (.89–1.7)	.221
ARPG	7. Craft and related trades workers	3.2 (2.1–4.8)	**< .001**	1.9 (1.2–3.0)	**.003**
	8. Plant and machine operators, and assemblers (incl. transportation)	1.7 (1.0–2.9)	**.038**	1.2 (.71–2.0)	.499
2-digit level					
Regular gambling	71. Building and related trades workers (excluding electricians)	2.0 (1.3–3.1)	**.001**	1.5 (0.98–2.3)	.064
	72. Metal, machinery and related trades workers	2.1 (1.4–3.4)	**.001**	1.6 (1.0–2.6)	**.037**
	81. Stationary plant and machine operators	2.1 (1.3–3.4)	**.004**	1.8 (1.1–3.0)	**.017**
	96. Recycling workers, newspaper distributors and other service workers	1.8 (1.0–3.4)	.064	1.7 (0.88–3.1)	.118
ARPG	71. Building and related trades workers (excluding electricians)	3.2 (1.8–5.8)	**< .001**	1.9 (1.1–3.5)	**.034**
	72. Metal, machinery and related trades workers	3.7 (2.0–6.7)	**< .001**	2.3 (1.2–4.2)	**.008**
	83. Drivers and mobile plant operators	3.1 (1.7–5.5)	**< .001**	2.0 (1.1–3.6)	**.024**
	96. Recycling workers, newspaper distributors and other service workers	3.5 (1.5–8.0)	**.003**	3.0 (1.3–6.9)	**.012**
3-digit level					
Regular gambling	711. Building frame and related trades workers	1.9 (1.2–3.3)	**.012**	1.4 (0.85–2.4)	.174
	722. Blacksmiths, toolmakers and related trades workers	3.6 (1.8–7.4)	**< .001**	2.9 (1.4–5.9)	**.004**
ARPG	522. Shop salespersons	1.9 (1.1–3.2)	**.022**	2.5 (1.5–4.4)	**.001**
	711. Building frame and related trades workers	2.6 (1.2–5.5)	**.015**	1.5 (0.70–3.2)	.297
	722. Blacksmiths, toolmakers and related trades workers	7.6 (3.5–16.3)	**< .001**	5.1 (2.4–11.1)	**< .001**
	833. Heavy truck and bus drivers	3.1 (1.6–6.2)	**.001**	2.0 (1.0–4.1)	**.049**
	962. Newspaper carriers, janitors and other elementary workers	4.4 (1.9–10.3)	**.001**	3.9 (1.6–9.3)	**.002**

Note. P-values below .05 are marked with bold text. SSYK = Standard för svensk yrkesklassificering; ARPG = At-risk and problem gambling.

theories in mind of why some occupational groups have elevated levels of gambling variables (see the Literature review section), we constructed merged occupational groups that were characterised by particular features of how and where work was carried out. Our intention was to see if our assumptions when creating the groups were sound, which would be indicated by these groups having elevated values for the gambling variables. It should be noted that we chose the 4-digit level groups from the full SSYK manual – in which there are quite detailed descriptions on what jobs entail – without knowing how these groups scored on the gambling variables in our sample.

Group 1 was termed "building, construction and service, mobile" (abbreviated to "mobile work"). This group included 169 individuals from 23 different kinds of jobs at the SSYK 4-digit level. These professions all had in common manual labour or craftwork performed at temporary worksites or along a route in the city or the countryside. Examples of these professions are bricklayers, floor layers, concrete placers, plumbers, scaffolders, refuse workers, and newspaper carriers. A specific theoretical underpinning for forming this group was exposure to gambling when taking breaks from work and little supervision during that time. The individuals in group 1 were, compared to the rest of the sample, to a greater extent men (92%). They had a lower level of education, were less likely to live in one of the three largest cities, had risky alcohol consumption to a greater extent, and were slightly younger on average with a lower average income.

Group 2 was termed "vehicle drivers". The group included 70 individuals from the following four 4-digit groups: taxi drivers; other car, motorcycle and bicycle drivers; bus and tram drivers; and heavy truck and lorry drivers. Thus, the individuals in this group had in common that they drove vehicles on city streets or along roads. Again, a specific theoretical underpinning for creating this group was exposure to gambling and low degree of supervision. Group 2, compared to the rest of the sample, had a higher proportion of men (89%), lower education, and lower income on average, and a higher percentage were born outside the Nordic countries and a higher percentage had parents born in other countries.

Group 3 was called "monotonous manual indoor work" (abbreviated to "monotonous work"). It included 184 individuals from 28 different kinds of jobs that have in common that monotonous manual work is performed in a fixed place, typically indoors in a factory, warehouse, or similar. Examples of professions are butchers, welders, machine operators (of various kinds), mechanical machinery assemblers, and hand packers. The specific theoretical basis for constructing this group was self-perceived low social mobility and gambling being part of the workplace culture. Group 3 had a majority of men (73%), which was significantly more than the sample on average. This group also had significantly lower education and income on average, they were younger, they were to a greater extent single without children, and they were less likely to live in one of the three largest cities in Sweden. More of them were born outside the Nordic countries, and a higher proportion had fathers born in other countries in Europe or in other parts of the world compared to the rest of the sample.

Theoretically relevant, with regard to the gambling variables, to all these relatively low-paid works, were socio-demographic factors, perceived low social mobility, and something-for-nothing theory. Structure of time for work and leisure was potentially relevant for groups 2 and 3 in which shift work is common.

The results from the analysis of the merged groups are shown in Table 4. All three groups were significantly above average compared to the rest of the sample with respect to the two gambling variables, except Group 2 (Vehicle Drivers), which was not above the average when it came to regular gambling.

The matched propensity score analyses confirmed all significant differences in regard to regular gambling and ARPG, and regular gambling was significantly above average in group

Table 4. Regular gambling and ARPG in merged occupational groups.

	Regular gambling		ARPG	
	Proportion	95% CI	Proportion	95% CI
The whole sample (*n* = 2937)	29%	(27–31)	6%	(5–7)
Group 1 Mobile work (*n* = 169)	41%[a,b]	(34–49)	16%[a,b]	(10–22)
Group 2 Vehicle drivers (*n* = 70)	33%	(22–44)	19%[a,b]	(9–28)
Group 3 Monotonous work (*n* = 184)	40%[a, b]	(33–47)	9%[a,b]	(5–13)

Note. ARPG = At-risk and problem gambling. CI = confidence interval.
[a]Significantly different from the rest of the sample; [b]significantly different from the PS-matched sample.

1 and group 3, while ARPG was significantly above average in all groups.

Discussion

An occupational group is characterised by a specific configuration of socio-demographic, cultural, and environmental factors. To a large extent, people self-select to belong to an occupational group, and group belonging is reinforced by social interactions in the workplace as well as by the customs, rituals, and collective knowledge and values associated with the profession.

In our explorative analyses, we found significant differences between occupational groups in gambling participation and ARPG. Compared with the sample, some groups were higher than average in these respects, while other groups were much lower than average. By and large, the occupational groups scoring high were blue-collar jobs or entailed driving a vehicle on city streets or highways. These results are consistent with previous findings (Orford et al., 2009; Revheim & Buvik, 2009). In addition, shop salespersons and menial ("elementary") workers, such as newspaper carriers and janitors, had elevated levels.

While some significant differences between occupational groups could be explained simply by the gender factor, other differences could not. This is likely because in real life – in occupational groups – socio-demographic and cultural factors tend to cluster. For example, university teachers tend to have high education,

high wages, little exposure to gambling in connection with work, and intellectual and cultural interests (rather than sports and gambling), and thus regular gambling and ARPG are relatively low. On the other hand, taxi drivers typically have low education, low wages, high exposure to gambling while at work, and seldom have preferences for leisure activities that are similar to those of the gambling-averse cultural elite, and thus regular gambling participation and ARPG are relatively high.

Theoretically, it could be argued that the association between specific socio-demographic factors on the one hand and regular gambling and ARPG on the other hand is an abstraction, while the association with occupational groups, which we have observed, is a real-life association. Participation in gambling and attitudes towards gambling in occupational groups – and in other spontaneous and self-selected aggregations of people in real life, such as religious congregations, political organisations, neighbourhoods, and collective leisure activities – emerge as the source of the statistical associations between specific socio-demographic factors on the one hand and regular gambling and ARPG on the other hand, as are typically found in population studies. The SSYK categories represent real-life cultures and contexts of gambling and non-gambling.

From the perspective of prevention, it is of interest to know which occupational groups score highly on the gambling variables without statistically adjusting the values for factors such as gender, income, and education. Such

knowledge also helps us to better understand the uneven distribution of ARPG in the population. From a theoretical point of view, it would have been interesting to isolate, by means of regression analyses, specific risk factors directly related to professions. However, our data did not allow such analyses of the more specific SSYK groups because the groups were too small.

We created three merged groups consisting of specific jobs on the SSYK 4-digit level, which we called mobile work, vehicle drivers, and monotonous work. Our intention was to create relatively large groups of people having work of a similar kind even though they belonged to different SSYK categories, which in the light of relevant theories and previous empirical studies could be assumed to have elevated levels of the gambling variables.

By and large, the merging produced the intended results. Mobile work and monotonous work were above average in terms of regular gambling, but not vehicle drivers, and all three groups were above average with respect to ARPG. As for ARPG, our merged group vehicle drivers, with 70 individuals, had a higher prevalence (19%) than any of the SSYK groups of similar size. However, one SSYK group at the 1-digit level was both larger and had higher regular gambling participation than any of our merged groups: major group 7, craft and related trades workers; in which there were 208 individuals and regular gambling was 46%, to be compared with 41% and 40% for the merged groups mobile work and monotonous work, respectively.

Thus, our merged groups had about the same prevalence of regular gambling participation and ARPG as in some large and high-scoring SSYK groups. This indicates that at least some of our assumptions behind creating the groups were sound. However, none of the merged groups had dramatically higher values on the gambling variables than the SSYK groups that scored highly. This is probably because there is an upper limit to the influence that factors associated with working life can have on the gambling variables.

The particular theoretical assumptions (listed in the Theories section) regarding the reasons for which particular occupational categories have elevated levels of gambling participation or ARPG/PG could not be explored because our data did not permit it. We experimented with a number of statistical models including possibly relevant factors from the Swelogs study, such as gambling during work hours, the preference for gambling alone or with others, and participation in lotteries, but could not satisfactorily control for the large number of confounding factors.

However, our findings in the exploratory analyses that blue-collar and transportation jobs have elevated levels of regular gambling and ARPG are compatible with assumptions regarding the impact of socio-demographic factors, something-for-nothing and alienation theory, self-perceived low social mobility, and exposure to gambling in combination with low supervision. Similarly, the fact that our merged groups scored relatively highly on the gambling variables indicates that one or several of the theoretical underpinnings when creating the groups were relevant, that is – in addition to the theories just mentioned – gambling being a part of workplace culture and the structure of work and leisure time. The propensity score (PS)-matched analysis showed that there is something in particular about each of the three merged groups that cannot be reduced to more general factors that are usually associated with frequent gambling participation and ARPG. Workers belonging to any of these groups scored higher on the gambling variables than similar workers not belonging to the groups in question, and the reason for this is likely to be job-specific factors. However, we cannot say precisely which factor or combination of factors. There is also the possibility that the elevated values are caused by some other more general factor not included in our PS analysis. We hope that our study can inspire others to conduct more studies in this area.

The strength of this study was a relatively large sample representative of the general population with very detailed and reliable data on the participants' occupations, as well as data on gambling behaviour and problem gambling status. However, our analyses were limited by the fact that at the more detailed, and therefore more interesting, levels of occupational groups, the groups were small in size. There were numerous occupations that we could not say anything about, and the results of our analyses must therefore be regarded as tentative. Furthermore, because of the small numbers in the groups, we could not study how regular participation in specific forms of gambling influenced ARPG, which would have been interesting because some forms are more closely associated with ARPG than other forms (Binde, Romild, & Volberg, 2017). Another limitation of the study is the low cut-off for ARPG at PGSI 1, which includes many different levels of problem gambling severity, from slightly increased risk to serious gambling problems. We could not separately analyse people with more severe gambling problems because there were too few of them in the sample. Although our results are in line with those of previous studies on socio-economic status, occupational groups, and gambling, their generalisability to other societies and cultures is unknown. The social and cultural contexts of a particular kind of job might vary considerably between countries, especially between Western and non-Western societies, and therefore the propensity to gamble might vary among the workers having the same job.

Conclusion

We found large differences in regular gambling participation and ARPG across occupations. Professional jobs requiring higher education typically had low levels of regular gambling and ARPG, while blue-collar and transportation jobs had elevated levels, especially when there was no fixed workplace. Our study further showed that people with manual and monotonous indoor work scored higher on regular gambling and ARPG than others. Some of these differences are evidently caused by the socio-demographic factors and associated socio-cultural values that characterise particular occupational groups, while others are specific to the work environment such as the opportunity to gamble at or in connection with work.

This study clearly shows that job-specific factors have an impact on gambling participation and ARPG, but we cannot say exactly which these factors are and what theories offer the best explanations of our observations. Our results are compatible with, but do not prove the veracity of, something-for-nothing theory, self-perceived low social mobility and anomie theory, exposure to gambling, structure of time for work and leisure, and gambling being part of workplace culture.

In future research, occupational groups with elevated levels of regular gambling participation and ARPG might be examined in more detail through specific surveys directed at them. Qualitative studies would give further insights into the work-related correlates of ARPG.

Our results have implications for the prevention of problem gambling. Some occupational groups in Sweden have much higher than average rates of regular gambling participation and ARPG, and thus selective preventive measures in working life should target these groups specifically.

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The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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