

Harmful types of gambling: changes and emerging trends in longitudinal helpline data

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Background: Gambling products differ in terms of their harm potential. Products are also constantly developing and changing. However, little research has addressed changes and trends in the types of gambling that are associated with harms. The current study explores trends in the gambling product categories identified as harmful in longitudinal helpline data from three Nordic countries. **Methods:** We use data collected by national helplines in Denmark (StopSpillet), Finland (Peluuri) and Sweden (Stödlinjen) in their daily operations ($N = 46\,646$). The data consist of information collected on gamblers and concerned significant others who have contacted these helplines between January 2019 and December 2022. We analyse which gambling products are mentioned as harmful by clients. The analysis uses linear regression with the interaction term (country) times time regressed over the outcome variable (proportion per month). **Results:** The results show that an increased share of contacts concern online gambling. Online casino products have become the most harmful category across contexts. The share of reported harms from online betting and new emerging online forms is also increasing. The share of land-based products as a reported source of harms has decreased across 2019–22. **Conclusions:** The results suggest that online gambling environments, and particularly online casino products, are associated with increasing harms to help-seekers. The harmfulness of different gambling products may not be stable, but change over time. Further harm prevention efforts are needed to address the online gambling field, including emerging formats.

Introduction

Gambling can cause severe harms to individuals and societies. Gambling harms refer to the wide range of negative consequences related to gambling, ranging from financial detriment to relationship breakdown and even suicidality.¹ The risk of harms is increased by provision-related factors, including exposure, environment and the types of gambling products that are available.² For example, gambling provision via online channels but also wide availability of land-based gambling products has been connected to elevated harms.^{3,4} Different types of gambling products are also connected to varying levels of harm.

The harmfulness of different gambling products has been previously studied using mainly cross-sectional methods. These include population studies that have been used to identify levels of problematic gambling among players of different gambling products. Overall, studies have indicated that online electronic gambling machines (EGMs), other online casino products, land-based EGMs (non-casino and in-casino), and various forms of sports betting have the highest rates of participation among those who are identified as having a gambling problem or a moderate risk of gambling problems.^{5–7} These same products are also connected to other harms beyond problematic gambling.⁸ Other population studies have focused on opinions on the harmfulness of different products. The same harmful product categories emerge in these studies: particularly online EGMs, land-based EGMs and fast online betting products are considered harmful.⁶

Harmful gambling products share many problematic characteristics. These include, for example, speed and high event frequency,

interactivity, high bet sizes and immersive characteristics adopted from video game design, such as possibilities to level up.^{3,9} Some evaluation and assessment tools have been developed to estimate the harmfulness of gambling products based on their characteristics.⁹ Similar evaluations can also be used by gambling companies for product development.

Less research has addressed longitudinal changes in terms of gambling products that are associated with harms. Some longitudinal studies have considered trends in product sales over time, and particularly changes during the Coronavirus disease 2019 (COVID-19) pandemic.^{10,11} Some longitudinal population studies have also looked at changing gambling behaviours and their association with problematic gambling scores.¹² To our knowledge, there have been no previous studies charting longitudinal trends in the harms caused by different gambling products.

Yet, the gambling industry is constantly developing and expanding its offer to attract new market segments and to retain the interest of existing players. New developments are also taking place outside of the traditional gambling industry. New gambling-like (or ‘gambling-adjacent’¹²) products have gained popularity in recent years. These include esports betting where monetary bets are made on the outcome of video game competitions.¹³ Esports have been found to be correlated with high levels of gambling problems and harms.^{14,15} Skin betting is another example of a new gambling-like product. Skin betting consists of using decorative items in electronic gaming as currency.¹³ Skins can also be wagered in chance-based games or used as bets on esports events often via unregulated online operators.^{16,17} Recent evidence shows that skin betting predicts

gambling-related problems among young players.^{12,16} Crypto trading is another emerging gambling-like product. Cryptocurrencies are digital coins based on blockchain technology. Like skins, cryptos can be traded or used as currency for gambling. A recent scoping review found a likely association between problematic gambling symptoms and intensity of cryptocurrency trading.¹⁸ Finally, loot boxes, a type of in-game randomized reward mechanism, have caused concern due to their gambling-like features. While evidence of a causal link between loot box involvement and gambling problems is mixed, empirical research has found an association between loot box use and problem gambling.^{19–21} Participation in these emerging forms of gambling remains low at a population level, but rising particularly among young males.¹²

The current study explores trends in the gambling product categories that are causing harms using longitudinal helpline data ($N=46\,646$) from three Nordic countries (Denmark, Finland and Sweden). The Nordic countries are a good source of information on new gambling trends. The Nordics were among the first countries to introduce legal online gambling and they share many societal similarities. Denmark, Finland and Sweden each have a national gambling helpline that routinely collects data on contacts, including the gambling products that callers participate in or identify as a source of harms. Helpline data provide interesting data on gambling-related harms and trends because helplines typically constitute the first line of help and support.²² Helplines provide a low threshold to access help for a variety of gambling-related harms spanning beyond diagnostic gambling disorder. Helpline data can therefore have a wider reach to individuals experiencing gambling harm and provide information on a wider range of harms than population surveys. Although self-reported gambling in general yield adequate reliability, helpline data may also include a lesser response bias than data from population surveys as callers with gambling problems are likely to have overcome feelings of embarrassment, stigma and shame that may increase the likelihood of desirable responding.^{23,24} Helplines have a wide reach particularly in Europe and their client base reflects the population groups that have been identified at risk for gambling harms in population studies (particularly males, young individuals, and seniors).²² Helpline data have been previously used to study trends in overall gambling harms within societies^{25,26} or the main product categories causing harms at specific time points.²⁷ However, to our knowledge there have been no previous studies using helpline data to identify changes and emerging trends in harmful gambling product categories.

Setting

Denmark, Finland and Sweden are Nordic societies with a similar societal organization and similar helpline structures to assist individuals experiencing gambling harms. The three countries are also similar in terms of their gambling offers which consist of a wide selection of both land-based and online products. Each of these countries has a wide legal availability of different gambling formats online and in land-based environments.

Denmark has a licensing system for other products than the National Lottery. The monopoly of Danske Spil was opened to licensed providers in 2012, but Danske Spil remains an important operator across product categories. According to the estimate of H2 Gambling Capital, the channelling rate of the licensed Danish market was estimated at 89% in 2021.²⁸ The Danish helpline StopSpillet is run by the Danish Gambling Authority. The helpline was established in 2019 and its services are aimed at gamblers, digital gamers and concerned significant others (CSOs). StopSpillet operates via telephone and chat.

Finland upholds a monopoly system for all land-based and online gambling, although the monopoly is set to be opened to a licensed market for online gambling in 2026. The monopoly operator, Veikkaus, faces important competition from offshore (unlicensed) gambling providers. In 2021, the channelling rate to the monopoly

was estimated at 65%.²⁸ The Finnish helpline Peluuri is financed by the Finnish monopoly. Peluuri has operated since 2004. Its services are directed at gamblers, digital gamers and CSOs. Help is provided via telephone, chat and online resources, including online peer support.

In Sweden, land-based gambling is mainly provided under the monopoly of Svenska Spel. Online gambling was regulated under a licensing system in 2019. Licensed operators can offer online casino, sports betting, and horse race betting products online. The channelling rate to licensed gambling offer was 88% in Sweden in 2021.²⁸ The Swedish helpline, Stödlinjen, is run by the Centre for Psychiatry Research at Stockholm County Council and funded by the Swedish Ministry of Health and Social Affairs. Stödlinjen has operated since 1999. It assists gamblers as well as CSOs by telephone, chat, e-mail and online resources.

The period of observation (2019–22) also coincided with the COVID-19 pandemic globally, and in the Nordic countries. The Nordic countries differed somewhat in terms of their response to COVID-19 which may have impacted particularly the supply of land-based gambling.²⁶ Availability restrictions were more important in Finland than in Sweden and Denmark, and these differences in availability may be reflected in reported harms and help-seeking,²⁶ as suggested by the so-called ‘availability theory’³ This background is considered in the interpretation of the results.

Methods

Data

We used longitudinal data collected on telephone and chat contacts to StopSpillet (DK) and Peluuri (FI) (January 2019 to December 2022), and data collected from Stödlinjen’s (SE) online problem gambling screener (January 2019 to June 2022). The data collection in Sweden only extends to June 2022 due to changes in the screener that impacted data quality. Each helpline collects data on the contents and time stamps on contacts (or screener completion), allowing us to analyse trends over time. The full data consists of 46 646 contacts to the helplines (Sweden $N=42\,563$; Finland $N=2239$; Denmark $N=1844$). In Finland and Denmark, we only included contacts by gamblers and CSOs. We excluded for example prank calls, wrong numbers or contacts not directly related to help-seeking. For the analysis, we aggregated the data at a monthly level.

Ethics approval for the study was obtained from Aalborg University Faculty of Social Sciences and Humanities (Denmark), University of Helsinki Ethical Review Board in Humanities and Social and Behavioural Sciences (decision number 56/2022) (Finland), and the Swedish Ethical Review Authority (Dnr 2022-03651-01) (Sweden).

Variables

Each helpline collects data on the gambling products that clients identify as a source of harms. The pre-set product categorizations vary somewhat across the helplines. For this study, we standardized them into top-level categories for comparability. Table 1 describes the product categories used in this analysis.

The variable collection differs somewhat across the helplines. In Sweden, individuals filling an online problem gambling screener are prompted to enter which game types they have engaged in in the previous month. In Denmark and Finland, counsellors manually enter observations on the content of the conversation using an online interface. In Finland, the 2019–21 data collection has a separate question about the main product causing harms and another question about possible other products causing harms. These have been combined in the analysis. In Denmark, counsellors ask callers about the gambling types they currently engage in. In Finland and Denmark, the helplines also address harms caused by video gaming. These contacts are not numerous, and they are

Table 1 Gambling product categories used in the analysis

Product category	Denmark	Finland	Sweden
Land-based sports betting	Physical betting	Sports betting land-based	Sports betting land-based
Online sports betting	Online betting	Sports betting online	Sports betting online
Horse games (online and land-based)	n/a	Horse games (channel unspecified)	Horse games (channel unspecified)
Land-based casino	Physical casinos (blackjack; roulette)	Casino games in land-based locations	Casino games in a casino with international rules
Online casino	Online casino (blackjack, roulette, other); EGMs online	Casino games online; EGMs online	Casino games online
Poker	Online poker, physical poker	Poker online, live poker	Poker online, poker land-based
Land-based EGMs outside casinos	Physical EGMs	EGMs in land-based venues	EGMs in land-based venues
Lotteries	Physical lotteries (lotto; banco); scratch cards; online bingo; bingo in venue	Lottery in venue; lottery online; scratch cards; scratch cards online; bingo	Slow draw games (lottery; keno); bingo (channel unspecified)
Other	Other or n/a	Other game	Other game

recorded separately. They have not been included in the current analysis.

In addition to statistical observations, the Finnish helpline collects qualitative counsellor observations on the contact. These have been included in the analysis when they indicated more information on the 'other' game category. In Denmark and Sweden, the 'other' box does not allow inputting Supplementary text.

Statistical methods

The analysis focused on changes over time. We first summed the reported game type for each country and recalculated them into proportions per month. To evaluate the trends over time, we analysed each game type category using linear regression with the interaction term country \times time regressed over the outcome variable proportion per month. Time was treated as a continuous variable, ranging from 1 (January 2019) to 48 (December 2022). Using linear regression this way, the slopes indicate the trends in terms of average change in proportion per month over the period. Estimates, confidence intervals, and *P*-values are presented for the inferential statistics. Each regression model was tested for linearity and distribution of residuals. Due to violation of the assumptions for linear regression, trends for poker, horse betting and other game types in Finland, and other game types in Denmark were excluded from the quantitative analyses. We used the R-packages Interactions, lmtest and lsmeans in the analyses.^{29–31}

Results

Table 2 describes the main results of the analysis per country, year and game type category. Table 3 describes the trends by country and game type. A visual presentation of trends over time is presented in figure 1.

Online gambling features increasingly in the helpline data collection. Online casinos were reported in each of the three countries as the main product engaged in by help-seekers for gambling harms. Online casino gambling also had a positive trend over time. In Sweden, 62.8% reported gambling on online casinos in 2019 and 70.2% in 2022 (trend = 0.0021, *P* = 0.03). The corresponding figures for Denmark were 35.7% (2019)–46.8% (2022) (trend = 0.0024, *P* < 0.001), and in Finland 55.3% (2019)–69.8% (2022) (trend = 0.0045, *P* < 0.001). In addition, online betting increased in Finland from 4.6% in 2019 to 16.9% in 2022 (trend = 0.032, *P* < 0.001). In Sweden and Denmark, the corresponding trends were non-significant.

While online, and particularly online casino gambling features in increasing proportion across the contexts, the proportional share of other product categories is decreasing. The results show a dramatic decrease for land-based betting in Denmark, from 23.0% in 2019 to 4.8% in 2022 (trend = -0.050, *P* < 0.001). In Sweden and Finland, the category did not have significant changes. In terms of land-based

Table 2 Proportions and absolute numbers of helpline contacts per game type and country, 2019–22

Country, % (N)	2019	2020	2021	2022
Online casino				
Denmark	35.7 (204)	47.4 (189)	44.8 (177)	46.8 (214)
Finland	55.3 (344)	61.4 (303)	70.5 (251)	69.8 (523)
Sweden	62.8 (6666)	66.0 (5261)	68.6 (5491)	70.2 (2870) ^a
Online sports betting				
Denmark	48.6 (284)	38.5 (163)	47.7 (189)	47.8 (228)
Finland	4.6 (28)	8.4 (41)	12.1 (40)	16.9 (126)
Sweden	22.6 (2362)	19.3 (1540)	21.5 (1730)	20.9 (855) ^a
Land-based sports betting				
Denmark	23.0 (132)	17.4 (73)	13.3 (52)	4.8 (20)
Finland	1.1 (7)	2.2 (10)	1.3 (5)	2.3 (17)
Sweden	9.4 (985)	8.5 (673)	8.8 (710)	8.8 (359) ^a
Land-based EGMs outside of a casino				
Denmark	14.1 (80)	11.6 (55)	6.4 (25)	13 (60)
Finland	44.4 (281)	24.2 (139)	11.6 (37)	10.3 (77)
Sweden	15.9 (1666)	15.2 (1201)	13.8 (1106)	16 (657) ^a
Poker				
Denmark	12.7 (74)	12.7 (53)	10.0 (39)	12.3 (57)
Finland	0.4 (3)	0.5 (2)	0.2 (1)	6.7 (50)
Sweden	16.9 (1720)	16.4 (1302)	14.4 (1153)	15.3 (629) ^a
Lotteries				
Denmark	3.4 (20)	4.1 (17)	2.7 (11)	0.9 (4)
Finland	2.1 (13)	3.8 (19)	4.7 (16)	14.2 (107)
Sweden	19.9 (2083)	17.5 (1390)	17.4 (1406)	17.0 (701) ^a
Land-based casinos				
Denmark	5.8 (31)	3.9 (19)	3.5 (14)	3.8 (18)
Finland	0.4 (3)	0.5 (3)	0.6 (2)	1.9 (14)
Sweden	7.6 (780)	7.2 (572)	7.5 (601)	7.9 (321) ^a
Other				
Denmark	1.5 (8)	5.7 (21)	5.0 (19)	2.7 (12)
Finland	0.5 (3)	0.6 (3)	1.5 (5)	0.6 (4)
Sweden	12.0 (1161)	13.1 (1041)	13.9 (1121)	14.3 (585) ^a
Horse betting				
Denmark	–	–	–	–
Finland	0 (0)	1.1 (5)	0.3 (1)	0.5 (4)
Sweden	10.8 (1111)	11.5 (916)	11.6 (926)	9.7 (399) ^a

a: Data collection for Sweden only extends to 30 June 2022.

non-casino EGMs, the Finnish data showed a sharp decline in the proportion of individuals reporting this game type, from 44.4% (2019) to 10.3% (2022) (trend = -0.0094, *P* < 0.001). In Denmark and Sweden, the patterns for land-based EGMs were stable.

In terms of poker and lotteries, the Finnish data showed increased reporting of these types by help-seekers, while the trends were slightly negative in the Swedish and Danish data. However, only Sweden had a significant negative trend (for lotteries, trend = -0.0010, *P* = 0.03).

An interesting category in the helpline reporting is formed by the 'other' products category. The 'other' category is a comparatively small category, but it appears to be growing particularly in the

Table 3 Trends by country and game type

	Trend [95% CI]	SE	T-value	P-value
Online casino				
Denmark	0.0024 [0.0009, 0.0040]	0.0008	3.13	<0.001
Finland	0.0045 [0.0030, 0.0061]	0.0008	5.75	<0.001
Sweden	0.0021 [0.0020, 0.0040]	0.0010	2.20	0.03
Online sports betting				
Denmark	0.0004 [-0.0010, 0.0018]	0.0007	0.58	0.56
Finland	0.0032 [0.0018, 0.0045]	0.0007	4.64	<0.001
Sweden	-0.0002 [-0.0020, 0.0014]	0.0008	-0.26	0.80
Land-based sports betting				
Denmark	-0.0050 [-0.0055, -0.0037]	0.0004	-10.40	<0.001
Finland	0.0002 [-0.0007, 0.0010]	0.0004	0.37	0.71
Sweden	-0.0001 [-0.0012, 0.0009]	0.0005	-0.27	0.79
Land-based EGMs outside of a casino				
Denmark	-0.0006 [-0.0020, 0.0008]	0.0007	-0.84	0.41
Finland	-0.0094 [-0.0109, -0.0080]	0.0007	-13.21	<0.001
Sweden	-0.0003 [-0.0020, 0.0014]	0.0009	-0.33	0.74
Poker				
Denmark	-0.0004 [-0.0015, 0.0006]	0.0004	-0.94	0.35
Finland ^a	-	-	-	-
Sweden	-0.0008 [-0.0021, 0.0004]	0.0005	-1.49	0.14
Lotteries				
Denmark	-0.0005 [-0.0012, 0.0002]	0.0004	-1.34	0.18
Finland	0.0029 [0.0022, 0.0037]	0.0004	8.15	<0.001
Sweden	-0.0010 [-0.0018, -0.0001]	0.0004	-2.15	0.03
Land-based casino				
Denmark	-0.0005 [-0.0009, -0.0001]	0.0002	-2.32	0.02
Finland	0.0003 [-0.0001, 0.0007]	0.0002	1.38	0.17
Sweden	0.0001 [-0.0004, 0.0006]	0.0003	0.35	0.73
Other				
Denmark ^a	-	-	-	-
Finland ^a	-	-	-	-
Sweden	0.0009 [0.0004, 0.0014]	0.0004	2.21	0.03
Horse betting				
Denmark ^b	-	-	-	-
Finland ^a	-	-	-	-
Sweden	-0.0001 [-0.0005, 0.0006]	0.0002	-0.48	0.64

Note. Trend estimates were derived from the time coefficients from each regression model.

a: Game types that did not meet the assumptions for linear regression and were therefore excluded.

b: Data on horse betting were not collected in Denmark.

Swedish context. In Sweden, the 'other' category had a positive trend (0.0009, $P=0.03$) whereas the slightly growing trends in Finland and Denmark were non-significant. In the Swedish and Danish helpline collection, the 'other' is not described separately. However, in the Finnish data collection, the 'other' category includes an open free text input option across 2019–21 (not in 2022 due to changes in data collection practices). Observations in the Finnish data show that, at least in that context, the 'other' category consisted predominantly of stock trading or day trading in 2019 and 2020. However, in 2021, contacts recorded in the 'other' category consisted of crypto trading and trading on virtual items (skin betting). This increase in popularity of crypto trading and skin betting may also account for the increases in the 'other' category in Sweden.

Discussion

Gambling is an evolving market. All gambling products can cause harms, but some products are more likely to do so. This paper has investigated trends and changes in the gambling product categories that are associated with harms, using longitudinal helpline data. The comparative data from Denmark, Finland, and Sweden has shown some common trends across the Nordic area. Online casino gambling, including online EGMs, has become the main type of gambling reported by people contacting gambling helplines in the Nordics. The share of online casino products has also increased

across 2019–22. The finding is in line with previous evidence showing that online EGMs produce harms and are considered harmful by those who gamble.⁵ The results also showed that in addition to online casino products, online betting, and new emerging online formats, such as cryptocurrency trading or skin betting, are increasingly mentioned by help-seekers. At the same time, the share of many traditionally harmful land-based products, such as land-based EGMs, is declining in helpline data.

There are many plausible explanations to these trends. First, the observation period coincided with the COVID-19 pandemic when the bulk of land-based gambling provision was closed to limit infections. Research from the Nordics and elsewhere shows that the consumption of land-based gambling was not fully substituted by online alternatives. However, consumption as well as experienced harms increased among those who were already gambling online.^{32,33} This is likely to be visible also in the longer-term trends of the current study. The share of land-based gambling harms has continued to decrease even after the COVID-19 restrictions were lifted. This suggests that the COVID-19 pandemic was not only a boost to the digitalization of gambling but also to the digitalization of gambling harms. The fact that our study coincides with the COVID-19 pandemic is also a strength. COVID-19 was characterized by unprecedented availability restrictions in land-based gambling. The results confirm other reporting²⁵ on how changes in the availability of gambling products can translate into reduced harms, or in the case of this study, into reductions in help-seeking. Availability restrictions in land-based environments have reduced participation in these types of gambling among help-seekers.

Second, in addition to COVID-19-related factors, other public health-oriented policy measures are likely to be visible in the changing trends. In Finland, the availability and accessibility of land-based EGMs was restricted during the period of observation. These reforms included a 40% reduction in the number of land-based EGMs during 2020 as well as mandatory identification and mandatory loss-limits in land-based EGM gambling during 2021. In addition to COVID-19 effects, the decline in the share of harm caused by land-based EGMs in Finland is likely resultant of these measures. In Denmark, Danske Spil launched a mandatory player card to its land-based betting products in 2020. This may account for at least a part of the decline in the share of reported harms related to land-based sports betting in Denmark.

Third, the development of new products and the cross-selling of products to customers may be visible in some of the emerging trends. New gambling products at least partly substitute existing products in the market.³⁴ However, this substitution can also be driven by active promotion and product development by gambling companies. Wide product portfolios and large consumer databases enable cross-selling new and more profitable products to existing customers.¹³ The development of new products and changes in existing products are likely to have an influence on harms. A good example is the digitalization of sports betting that has created a market for in-play betting. In-play betting has been connected to higher problem gambling severity in comparison to traditional betting.³⁵ Such developments are likely to impact the levels of experienced harms across and within product categories and may partly explain the growing importance of sports betting in help-seeking statistics in our study.

In addition, an important part of gambling and gambling-like activity is taking place outside traditional channels and licensed gambling provision. Much of the harms are created by unlicensed offshore gambling beyond regulatory control. In the Finnish Peluuri data from 2022, 65% of contacts concerned gambling on offshore provision.³⁶ In Sweden, 48% of those who have self-excluded from licensed gambling via the national self-exclusion register have reported gambling outside the licensed market.³⁷ Furthermore, new and emerging forms of gambling such as crypto trading or skin betting are conducted on online platforms outside of the

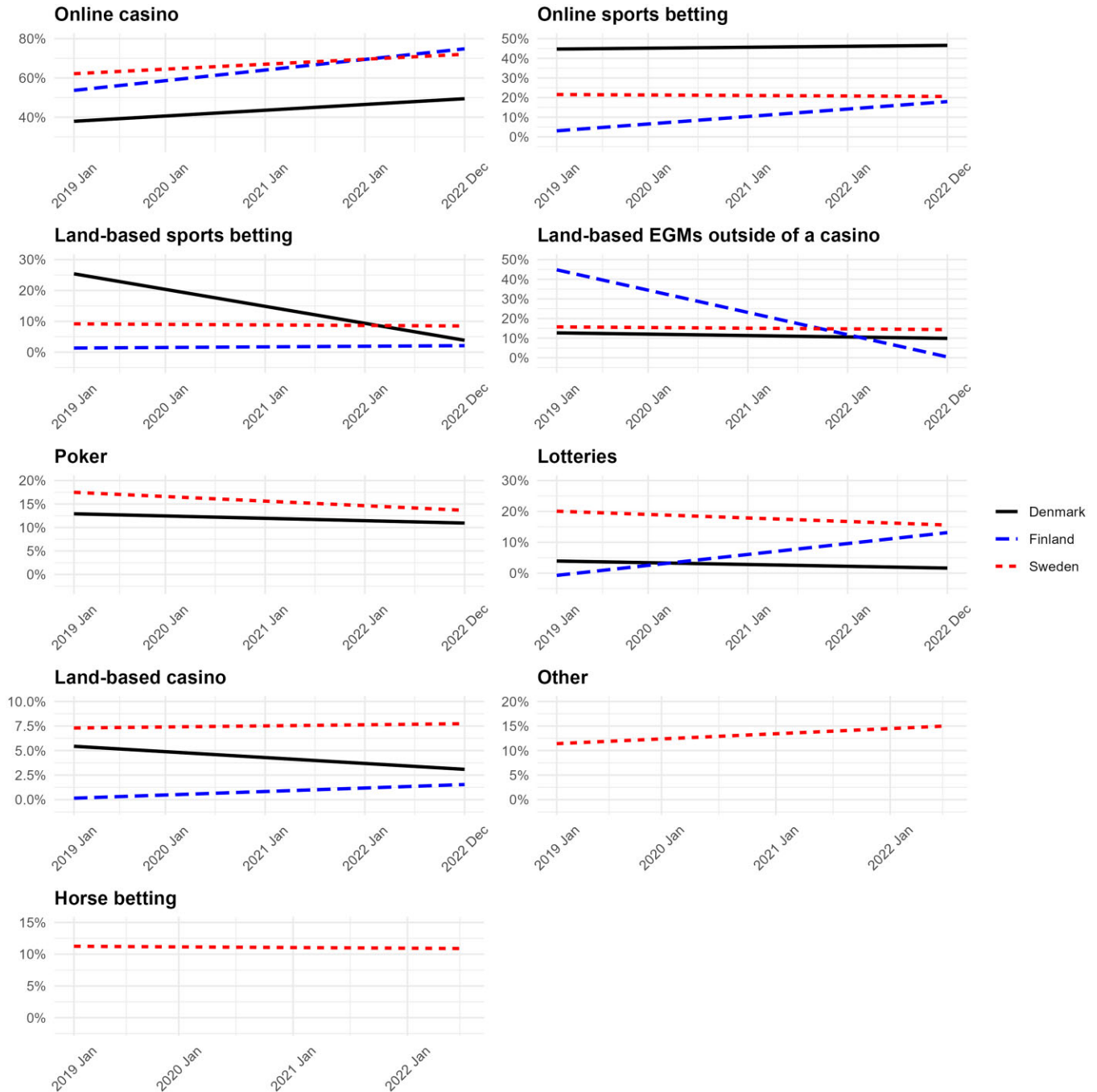


Figure 1 Time trends for each game type by country. The time trends were derived from the fitted models

traditional, regulated gambling market. These products were also visible as emerging trends in our data.

The results of this study suggest that public health interventions to reduce exposure to and availability of gambling can be an effective tool in reducing harms. However, these harms can be offset by other products from within or outside of the regulated gambling system. In addition to a substitution effect in terms of gambling sales, the data show that there may also be a substitution effect in terms of gambling harms, at least at a population level. This substitution may concern the same or new consumer segments. Going forward, it is crucial to consider the public health implications of wider product categories and gambling offers, rather than focusing interventions on single product or product groups. Furthermore, it is important to bring emerging forms of gambling, such as crypto trading and skin betting, under the umbrella of gambling regulation and harm prevention.

This study was limited to three Nordic countries with a relatively similar societal organization and level of economic development. Gambling harm trends are likely to be different in other contexts. Furthermore, the data consisted of only harms reported by individuals contacting helplines. A recent systematic review and meta-analysis on the prevalence of help-seeking behaviour gambling found that only 4% of individuals with moderate risk of problem gambling seek help and 20% of individuals with a higher risk of problem gambling seek help.³⁸ It is therefore likely that an important part of individuals experiencing harms are not represented by the helpline data. However, helplines have a wider reach than other treatment and support services for gambling. Despite these shortcomings, the study has been able to highlight some new and emerging trends in terms of harmful gambling products that should be addressed by stringent public health policies in the Nordics and beyond.

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Conflicts of interest: None declared.

Data availability

The data that support the findings of this study are available from the national gambling helplines of Denmark, Finland and Sweden. Restrictions apply to the availability of these data. The data were used under license for the current study, and so are not publicly available. Data are, however, available from the authors upon reasonable request and with permission of the helplines.

Key points

- Gambling products differ in terms of their harm potential.
- An increasing share of help-seekers for gambling report partaking in online gambling while the share of land-based gambling is declining.
- The share of new and emerging forms of gambling is increasing in helpline statistics.
- Population-level public health interventions can reduce the consumption and experienced harms of gambling products.

References

- 1 Marionneau V, Egerer M, Raisamo S. Frameworks of gambling harms: a comparative review and synthesis. *Addiction Res Theory* 2023;31:69–76.
- 2 Hilbrecht M, Baxter D, Abbott M, et al. The conceptual framework of harmful gambling: a revised framework for understanding gambling harm. *J Behav Addict* 2020;9:190–205.
- 3 Sulkunen P, Babor TF, Cisneros Örnberg J, et al. Setting limits: gambling, science and public policy—summary of results. *Addiction* 2021;116:32–40.
- 4 Gainsbury SM, Angus DJ, Blaszczynski A. Isolating the impact of specific gambling activities and modes on problem gambling and psychological distress in internet gamblers. *BMC Public Health* 2019;19:1372.
- 5 Allami Y, Hodgins DC, Young M, et al. A meta-analysis of problem gambling risk factors in the general adult population. *Addiction* 2021;116:2968–77.
- 6 Booth L, Anderson AS, White V, et al. Public perceptions of harm for nine popular gambling products. *J Gambl Stud* 2021;37:1113–26.
- 7 Abbott M, Bellringer M, Garrett N, Mundy-McPherson S. New Zealand 2012 national gambling study: gambling harm and problem gambling. Report No. 2. Gambling and Addictions Research Centre, Auckland University of Technology, 2014.
- 8 Raybould JN, Larkin M, Tunney RJ. Is there a health inequality in gambling related harms? A systematic review. *BMC Public Health* 2021;21:305.
- 9 Blanco C, Blaszczynski A, Clement R, et al. Assessment tool to measure and evaluate the risk potential of gambling products, ASTERIG: a global validation. *Gaming Law Rev Econ* 2013;17:635–42.
- 10 Andersson MJ, Balem M, Håkansson A. An interrupted time series analysis of gambling behavior based on gambling operator revenue-based taxation during the COVID-19 pandemic in Sweden. *Public Health* 2022;211:14–20.
- 11 Marionneau V, Selin J, Impinen A, Roukka T. Availability restrictions and mandatory precommitment in land-based gambling: effects on online substitutes and total consumption in longitudinal sales data. *BMC Public Health* 2024.
- 12 Wardle H, Tipping S. The relationship between problematic gambling severity and engagement with gambling products: longitudinal analysis of the Emerging Adults Gambling Survey. *Addiction* 2023;118:1127–39.
- 13 Wardle H. *Games without Frontiers?: Socio-Historical Perspectives at the Gaming/Gambling Intersection*. Cham: Springer International Publishing, 2021, 111 p.
- 14 Hing N, Russell AMT, Bryden GM, et al. Skin gambling predicts problematic gambling amongst adolescents when controlling for monetary gambling. *J Behav Addict* 2021;10:920–31.
- 15 Zendle D. Beyond loot boxes: a variety of gambling-like practices in video games are linked to both problem gambling and disordered gaming. *PeerJ* 2020;8:e9466.
- 16 Greer N, Hing N, Rockloff M, et al. Motivations for esports betting and skin gambling and their association with gambling frequency, problems, and harm. *J Gambl Stud* 2023;39:339–62.
- 17 Greer N, Rockloff MJ, Russell AMT, Lole L. Are esports bettors a new generation of harmed gamblers? A comparison with sports bettors on gambling involvement, problems, and harm. *J Behav Addict* 2021;10:435–46.
- 18 Johnson B, Co S, Sun T, et al. Cryptocurrency trading and its associations with gambling and mental health: a scoping review. *Addict Behav* 2023;136:107504.
- 19 Drummond A, Sauer JD, Ferguson CJ, Hall LC. The relationship between problem gambling, excessive gaming, psychological distress and spending on loot boxes in Aotearoa New Zealand, Australia, and the United States—A cross-national survey. *PLoS One* 2020;15:e0230378.
- 20 Garea SS, Drummond A, Sauer JD, et al. Meta-analysis of the relationship between problem gambling, excessive gaming and loot box spending. *Int Gambl Stud* 2021;21:460–79.
- 21 Jayemanne D, Chillas S, Moir J, et al. *Loot Boxes and Digital Gaming: A Rapid Evidence Assessment*. London: Department for Culture, Media and Sport, 2021.
- 22 Berman A, Arillo A, Berntsson A, Rodda S. Helplines for problem gambling worldwide: what do they do and whom do they reach. *J Gambl Issues* 2023;52:1–32.
- 23 Schell C, Godinho A, Cunningham JA. Examining change in self-reported gambling measures over time as related to socially desirable responding bias. *J Gambl Stud* 2021;37:1043–54.
- 24 Goldstein A, Vilhena-Churchill N, Munroe M, et al. Understanding the effects of social desirability on gambling self-reports. *Int J Ment Health Addiction* 2017;15:1342–59.
- 25 Rossow I, Bang Hansen M. Gambling and gambling policy in Norway—an exceptional case. *Addiction* 2016;111:593–8.
- 26 Wall H, Kristiansen S, Molander O, et al. Gambling helpline contacts during Covid-19-related availability restrictions: an interrupted time series analysis. *Public Health* 2023;224:14–19.
- 27 Abbott M. Gambling and gambling harm in New Zealand: a 28-year case study. *Int J Ment Health Addiction* 2017;15:1221–41.
- 28 H2 Gambling Capital. An overview of Finland's gambling market. 2021. Available at: <https://www.egba.eu/uploads/2021/09/H2-EGBA-Presentation-September-2021.pdf> (10 November 2023, date last accessed).
- 29 Long JA. Interactions: comprehensive, user-friendly toolkit for probing interactions. Available at: <https://cran.r-project.org/package=interactions> (10 November 2023, date last accessed).

- 30 Zeileis A, Hothorn T. Diagnostic checking in regression relationships. 2002. Available at: <https://cran.r-project.org/web/packages/lmtest/vignettes/lmtest-intro.pdf> (10 November 2023, date last accessed).
- 31 Lenth RV. Least-squares means: the R Package lsmeans. *J Stat Soft* 2016;69:1–33.
- 32 Brodeur M, Audette-Chapdelaine S, Savard A-C, Kairouz S. Gambling and the COVID-19 pandemic: a scoping review. *Prog Neuropsychopharmacol Biol Psychiatry* 2021;111:110389.
- 33 Månsson V, Wall H, Berman AH, et al. A longitudinal study of gambling behaviors during the COVID-19 pandemic in Sweden. *Front Psychol* 2021;12:708037.
- 34 Marionneau V, Nikkinen J. Market cannibalization within and between gambling industries: a systematic review. *J Gambl Issues* 2017;37:1–35.
- 35 Lopez-Gonzalez H, Griffiths MD, Estévez A. In-play betting, sport broadcasts, and gambling severity: a survey study of Spanish sports bettors on the risks of betting on sport while watching it. *Commun Sport* 2020;8:50–71.
- 36 Peluuri. Peluuri vuosiraportti 2022. 2023. Available at: <https://www.peluuri.fi/peluuri/peluurin-vuosiraportit> (10 November 2023, date last accessed).
- 37 Stödlinjen. Årsrapport 2020. 2020. Available at: https://api.stodlinjen.se/uploads/Stodlinjen_arsrapport_2020_reviderad_220912_5d7e46fd96.pdf (10 November 2023, date last accessed).
- 38 Bijker R, Booth N, Merkouris SS, et al. Global prevalence of help-seeking for problem gambling: a systematic review and meta-analysis. *Addiction* 2022; 117:2972–85.