

The Nordic battle of gambling models
Are we ready for the evolution of gambling?

Emerging forms of gambling: Rethinking gambling and gaming in the digital age

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Aims

- Main aims
 - How to rethink gambling in transforming digital world
 - Integration of social psychological perspective
 - Cross-national and longitudinal evidence (data-driven presentation)
- Change of gambling environment
 1. Growing importance of online gambling and gaming
 2. Convergence of gambling and gaming
 3. Change of online environment and culture
 - Change of consumer cultures and ways of spending
 - New forms of spending and investing (e.g. cryptocurrency trading)

Läb and projects

Emerging Technologies Lab

Principle investigator:

Atte Oksanen

Over 10 researchers

4 post-doc-researchers

3 senior researchers

1 visual artist

1 professor

Methods: survey studies with longitudinal design, cross-national research, experimental studies, large-scale data analysis, register-based data analysis

Funding

- Academy of Finland
- Tampere University
- Kone Foundation
- The Finnish Foundation for Alcohol Studies
- The Finnish Cultural Foundation
- The Helsingin Sanomat Foundation
- The Finnish Work Environment Fund
- Jenny and Antti Wihuri Foundation
- Juho Vainio Foundation
- Scandinavian Research Council for Criminology
- Ministry of Education & Culture, Finland

Problem Gambling and Social Media Project



- **Funding:** Finnish Foundation for Alcohol Studies 2017–2020
- **PI:** Atte Oksanen
- **Researchers:** Dr. Markus Kaakinen, Dr. Aki Koivula, Dr. Iina Savolainen, Dr. Anu Sirola
- **Collaboration:** Prof. Hye-Jin Paek, Prof. Izabela Zych & Prof. Bryan Lee Miller, Prof. David Garcia
- **Data**
 - Cross-sectional and experimental data
 - Large scale data on social media gambling discussions

<https://projects.tuni.fi/problem-gambling-and-social-media/>

YouGamble surveys

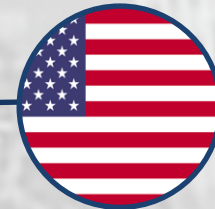
YouGamble

- Online survey given to youths aged 15 to 25
- Dynata
- Includes an experiment on gambling messages
- Response time ca. 15 minutes



Finland

- $N = 1200$, $M = 21.29$, $SD = 2.85$, 50.00% female)



the U.S.

- $N = 1212$, $M = 20.05$, $SD = 3.19$, 50.17% female)



South Korea

- $N = 1192$, $M = 20.61$, $SD = 3.24$, 50.42% female)



Spain

- $N = 1212$, $M = 20.07$, $SD = 3.16$, 48.76% female)

Gambling in the Digital Age Project

- **Funding:** The Finnish Foundation for Alcohol Studies (2021–2024)
- **PI:** Atte Oksanen
- **Researchers:** Dr. Iina Savolainen, Dr. Eerik Soares Mantere, Dr. Anu Sirola, Ilkka Vuorinen, Heli Hagfors, Hannu Jouhki, Janne Vepsäläinen
- **Main aims:** 1) online gambling, 2) convergence of gambling and gaming, and 3) new forms of gambling
- **Data:** 1) Longitudinal survey data, 2) interview data, and 3) online data

GDA longitudinal surveys

- ***Gambling in the Digital Age (GDA)*** survey was targeted to Finnish speakers in mainland Finland in April 2021
 - Participants ($N = 1530$): 18–75 years old ($M = 46.67$; $SD = 16.42$), 50.33% male
 - Data collection was administrated by Norstat
 - All respondents answered the 15-min survey online.
 - Sample vs. population: no major deviation in gender, age, geographical area; slightly more participants with higher education
- Follow-up surveys in 6-month intervals
 - T2, Oct–Nov 2021 ($n = 1198$, 78% out of T1)
 - T3, Apr–May 2022 ($n = 1097$, 72% out of T1)
 - T4, Oct–Nov 2022 ($n = 1008$, 66% out of T1)
 - T5, Apr–May 2022 ($n = 937$, 61% out of T1)

GDA measures (examples)

- **Excessive behaviors**
 - Problem Gambling Severity Index (PGSI)
 - Internet Gaming Disorder Test (IGDT)
 - Compulsive Internet Use Scale (CIUS)
 - AUDIT-C
- **Online environment:** Gaming and gambling types and activities, online environment, IBRS-9
- **Subjective wellbeing:** e.g. Perceived Stress Scale (PSS) and psychological distress (MHI-5), Basic Psychological Need Satisfaction and Frustration Scale, Social and Emotional Loneliness Scale for Adults (SELSA)
- **Others:** impulsivity, materialism, personality

General situational framework

Behavior in context

- Behavior is a function of the person and their environment:
 $B = f(P, E)$ (Lewin 1936)
- Internet and social media have changed the gambling environment
- There is a need for situational analysis of gambling behavior online



**German-American social psychologist
Kurt Lewin playing online poker
in Otto Dix style
according Dall-E2 (2023)**

Social-ecological models

- Ecological systems theory (Bronfenbrenner 1979)
 - Micro, meso, exo and macro systems
- Social-ecological models are widely adapted to analysis of public health (e.g. WHO 2017)
- Social-ecological aspects noted in gambling research (e.g. pathways model, Blaszczynski & Nower, 2002)



**Online gambling environment
in Fritz Lange style
according Dall-E2 (2023)**

Spheres of online gambling

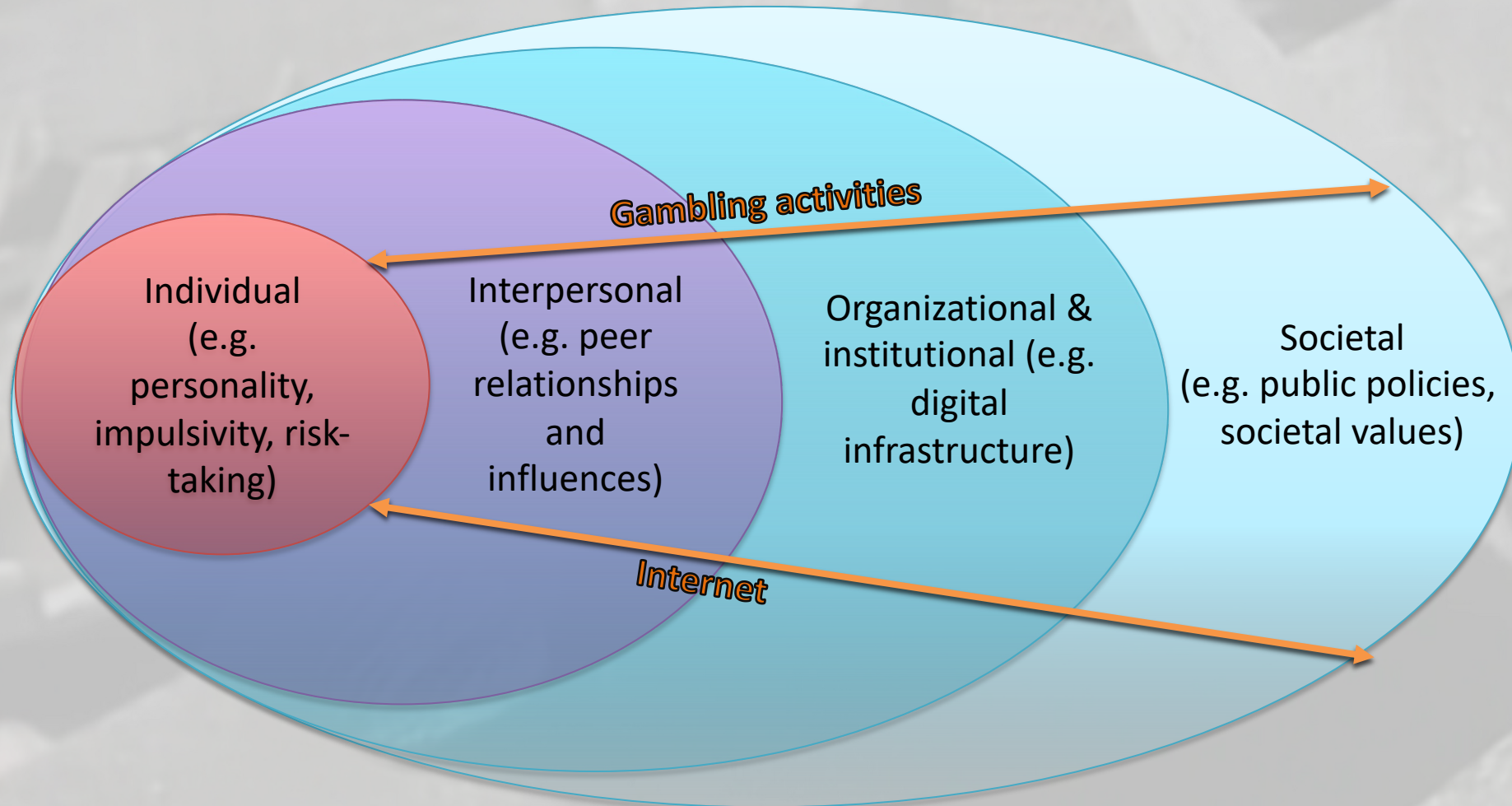


Figure. Social-ecological model of problem gambling (Oksanen et al., 2021)

Needs and motivations

Basic psychological needs

- Human needs for
 - Relatedness
 - Autonomy
 - Competence (Ryan & Deci, Self-determination theory)
- Homo ludens (Huizinga)
 - playing as central part of human development and culture
- Gambling companies aim to exploit human basic needs
- To what extent we should be worried?



**Online gambling environment
in Fritz Lange style
according Dall-E2 (2023)**

Needs and motivations in excessive gambling

Table 1. Excessive gambling, hybrid negative binomial multilevel models (GDA T1–T5)

	Within-person effects, B (SE)	<i>p</i>	Between-person effects, B (SE)	<i>p</i>	Model n	Model obs
Frustration autonomy	ns	0.611	0.53 (.08)	<0.001	1530	2,467
Frustration competence	ns	0.385	0.63 (0.08)	<0.001	1530	2,467
Frustration relatedness	0.20 (0.08)	0.009	0.66 (0.08)	<0.001	1530	2,467
Motives						
Escape	0.29 (0.03)	<0.001	1.03 (0.07)	<0.001	1530	5,773
Money	0.27 (0.04)	<0.001	1.74 (0.07)	<0.001	1530	5,773
Competition	0.19 (.03)	<0.001	1.31 (0.07)	<0.001	1530	5,773
Excitement	0.19 (0.04)	<0.001	1.58 (0.07)	<0.001	1530	5,773
Social	0.14 (0.03)	<0.001	0.69 (0.07)	<0.001	1530	5,773
Competence	0.14 (0.03)	<0.001	0.84 (0.07)	<0.001	1530	5,773
Materialism	ns	0.881	1.18 (0.14)	<0.001	1,252	2,208

Note. Standardized coefficients. Models include age, gender, income and education as controls. Frustration measured only T1 & T5, materialism measured T2 & T4

Gambling communities online

- YouGamble surveys (FIN, US, SK, SPA)
 - participation to online gambling communities as the biggest risk factor for excessive gambling among young people (Oksanen et al., 2021)
 - Communities mostly for pro-gambling activities, not self-help (Sirola et al., 2018)
 - Loneliness influences gambling community participation (Sirola et al. 2019)
 - Good social ties as protective factor (Oksanen et al., 2021).
- Systematic reviews
 - Online communities have an increasingly central role in learning about gambling, continuing, and spreading of gambling behaviors (Sirola et al., 2021 & Savolainen et al., 2022)

Online bubbles

- Identity bubbles (Identity bubble reinforcement model, IBRM, Keipi, Näsi, Oksanen & Räsänen, 2017)
 - 3 dimensions
 - Social identification
 - homophily
 - Information bias
 - Measured by Identity bubble reinforcement scale (IBRS-9; Kaakinen, Sirola, Savolainen & Oksanen, 2020)
- Bubbles are important due algorithms of social media and internet services
 - Marketing and peer-influences

Online communities and social ties in excessive gambling

Table 2. Excessive gambling, hybrid negative binomial multilevel models (GDA T1–T5)

	Within-person effects, B (SE)	p	Between-person effects, B (SE)	p	Model n	Model obs
Involvement in online identity bubble	0.11 (0.04)	0.014	0.41 (0.08)	<0.001	1530	5,773
Online gambling community participation	0.07 (0.02)	<0.001	0.98 (0.07)	<0.001	1530	5,773
Online gaming community participation	0.08 (0.03)	0.016	0.32 (0.07)	<0.001	1530	5,773
Loneliness	0.14 (0.05)	0.002	0.68 (0.07)	<0.001	1530	5,773
Meaningful relationships (SELSA)	-0.17 (0.06)	0.002	-0.47 (0.07)	<0.001	1530	5,773

Note. Standardized coefficients.

Models include age, gender, income and education as controls.

Online community participation

Table 3. Descriptive statistics on monthly online gaming and gambling related community participation (T5, %)

Monthly activities	All participants (<i>n</i> = 937)	Among at-risk gamblers (PGSI \geq 5, <i>n</i> = 74)
Online gambling community participation	3.42 %	18.92 %
Online gaming community participation	10.42 %	22.97 %
Online platforms for streaming gambling	2.67 %	16.22 %
Twitch	4.16 %	10.81 %
Discord	6.87 %	12.16 %

Types and risks

Converging activities



- Introduction of digital gaming themes and features in gambling games
 - e.g. arcade game features in electronic gambling machines
- introduction of gambling themes and features in digital games
 - e.g. gambling activities within digital games, loot boxes
- Gamblification and gamification of other financial activities
 - e.g. stock-trading and crypto-currency trading

New worries – to what extent?

- To what extent we should be worried
- Lack of comparison of gambling and gaming harms
- Lack of longitudinal studies on
 - risk of different gambling and gaming types
 - novel digital game features such as loot boxes and micro-transactions

“...they’ve been made so addictive, that, online casinos now have story games quite much, where you get to have an adventure. And usually they are also set in some modern, like you have some childhood game, that you used to play with your PC as a child, now it’s a game in an online casino. (...) or based on films or bands. They make people hooked, like me, you have some familiar song on the background and then you keep rolling the slots...”

Interviewee, qualitative part of GDA project

At risk gaming is very rare

- **At-risk gaming** based on Internet Gaming Disorder Test (IGDT) generally very low
 - Scoring system suggested by Király et al., 2017 → Range 0–9
 - Cut-off for at-risk gaming set very low ≥ 1 because of the generally low prevalence of gaming problems (e.g., only 1.11% reported “disordered gaming”, $\text{IGDT} \geq 5$).
- **At-risk gambling** more prevalent based on Problem Gambling Severity Index (PGSI)
 - Cut-off for at-risk gambling: PGSI score ≥ 5 (PGSI range 0–27)
 - 11.75% at least once during T1–T4
- *Please note:* At-risk cut-off of IGDT is very low and does not match at-risk cut-off of PGSI. It was selected only for analytical reasons.

Larger sums on gambling

- Gambling games were played by 95.12% of the participants at least once in T1–T4
- The corresponding figure for digital games was 77.83%
- Larger sums of money were spent on gambling than gaming
 - 31.93% of respondents had spent over 25 euros per month on gambling, corresponding figure for digital gaming was 5.40%
- Gambling problems more prevalent than gaming problems.
 - Overlap: Of the at-risk gamblers (PGSI ≥ 5), 46.32% reported at-risk gaming during a follow-up
 - Off all participants, ca. 4.88% reported both at-risk gambling and at-risk gaming during the follow-up

Risky types

- **Gambling:** online casino games and EGMs had the highest risks for at-risk gambling
 - Most of the gambling game types were also associated with higher at-risk gaming
 - Also within-person effects
- **Gaming:** role-playing games and strategy and simulation games had the highest risk for at-risk gaming
 - Digital gaming types were not strongly associated with at-risk gambling
- Gambling in **offshore gambling** sites is a major risk factor for at-risk gambling and at-risk gaming
- **Microtransactions** within a game are associated with at-risk-gaming and gambling (also within-person effects)

Table 4. Population-averaged multilevel logistic regression models using a generalized estimating equating approach

Note. analytical weights were used. All models include in total 3,608 observations from 902 participants. T1-T4

	% all	% of	<u>At-risk-gambling</u> OR (SE)	% of	<u>At-risk-gaming</u> OR
Gambling					
Online casino games	10 %	57 %	4.32 (1.16)***	29 %	3.14 (0.74)***
Online poker	3 %	23 %	-	15 %	-
Casino games	2 %	20 %	-	13 %	-
Betting: sports & horse racing	21 %	49 %	2.21 (0.41)***	35 %	2.32 (0.49)***
Slotmachines	9 %	47 %	3.56 (0.95)***	21 %	2.24 (0.64)**
Lotteries	53 %	75 %	2.70 (0.57)***	48 %	1.09 (0.24)
Scratch cards	13 %	32 %	2.10 (0.49)**	23 %	1.88 (0.52)*
Private betting	2 %	15 %	-	12 %	-
Games of skill for money	3 %	18 %	-	13 %	-
Digital games played					
Action & adventure games	15 %	26 %	1.01 (0.26)	51 %	3.25 (0.95)***
Fighting & shooting games	12 %	23 %	1.32 (0.32)	45 %	5.69(1.41)***
Platform games	12 %	26 %	1.27 (0.22)	42 %	3.73 (1.00)***
Puzzle games	23 %	34 %	1.16 (0.17)	53 %	2.75 (0.46)***
Racing and sports games	9 %	22 %	1.79 (0.53)	38 %	4.47 (1.21)***
Strategy & simulation games	15 %	34 %	1.62 (0.31)*	55 %	5.80 (1.37)***
Role-playing games	8 %	19 %	1.89 (0.52)*	42 %	7.84 (2.22)***
Social games	11 %	29 %	1.34 (0.32)	34 %	2.65 (0.68)***
Educational games	12 %	26 %	1.63 (0.37) *	33 %	2.49 (0.54)***
Single player games	35 %	47 %	1.22 (0.21)	78 %	3.92 (0.80)***
Multi player games	15 %	28 %	1.38 (0.37)	45 %	2.58 (0.78)**
Gambling/gaming activities					
Offshore online gambling sites	10 %	56 %	5.02 (1.85)***	32 %	3.78 (1.19)***
Onshore online gambling sites	42 %	77 %	2.74 (0.59) ***	41 %	1.23 (0.27)
Online gambling communities	4 %	22 %	2.17 (0.78)*)	13 %	2.27 (0.84)*
Online gaming communities	12 %	21 %	1.36 (0.27)	45 %	3.90 (1.11)***
Microtransaction within dig. games	13 %	43 %	2.77 (0.76) ***	54 %	5.90 (1.29)***
>25€/month for gambling	30 %	76 %	3.13 (0.56)***	38 %	1.43 (0.26)*
>25€/month for gaming	6 %	24 %	2.41 (0.65)**	32 %	4.35 (1.31)***

Table 5. multilevel hybrid regression models using generalized linear modelling (fitted using the logit link and binomial distribution)

Within-person effects	At-risk gambling				At-risk gaming			
	B	SE (B)	Z	p	B	SE (B)	Z	p
Online casino games	1.16	0.43	2.71	0.007	0.45	0.56	0.81	0.420
Slot machines	1.40	0.51	2.73	0.006	0.11	0.51	0.21	0.830
Strategy and simulation games	0.50	0.62	0.80	0.421	1.18	0.42	2.83	0.005
Role-playing games	0.33	0.80	0.41	0.681	0.96	0.54	1.77	0.077
Microtransaction (dig. games)	1.16	0.58	2.00	0.046	0.90	0.40	2.27	0.023
Onshore gambling sites	1.14	0.50	2.28	0.023	0.56	0.43	1.29	0.197
Offshore gambling sites	-0.55	0.68	-0.81	0.418	0.67	0.75	0.90	0.370
Online gambling communities	0.02	0.19	0.09	0.927	0.30	0.25	1.22	0.223
Online gaming communities	-0.02	0.22	-0.10	0.917	0.21	0.17	1.25	0.210
Between-person effects								
Online casino games	4.71	1.10	4.27	0.000	2.15	0.82	2.61	0.009
Slot machines	4.55	1.18	3.86	0.000	-0.11	0.80	-0.14	0.889
Strategy and simulation games	1.58	1.38	1.14	0.253	0.48	0.59	0.80	0.423
Role-playing games	0.55	1.57	0.35	0.727	2.72	0.68	4.03	0.000
Microtransaction (dig. games)	4.84	1.03	4.72	0.000	1.64	0.62	2.67	0.008
Onshore online gambling sites	1.31	1.16	1.13	0.258	-1.64	0.45	-3.65	0.000
Offshore online gambling sites	3.37	0.87	3.89	0.000	1.93	0.67	2.90	0.004
Online gambling communities	1.28	0.42	3.06	0.002	-0.04	0.27	-0.14	0.887
Online gaming communities	-0.84	0.54	-1.56	0.120	0.57	0.18	3.09	0.002
Controls								
Male	0.60	0.72	0.83	0.405	-0.30	0.38	-0.78	0.436
<30-years old	-0.47	0.86	-0.55	0.584	1.20	0.40	3.01	0.003
Bachelor degree	-1.02	0.69	-1.48	0.140	-0.71	0.38	-1.87	0.062

Note. All independent measures are standardized in models.
Both models include in total 3,608 observations from 902 participants.

Crypto-trading as gambling

- Old link between financial market activity and gambling
 - Especially speculation (e.g. day trading) (Arthur et al, 2016)
- Novel online platforms for stock and cryptocurrency trading
 - Concerns about gamification (e.g. Warren Buffett on Robinhood “taking advantage of gambling instincts of people”)
- How attractive the new online platforms are for gamblers?
- Do they have addictive potential?



GDA measures: financial activity

- **Investing:** *“How often have you practiced investing (e.g., investing in stocks or funds)?”*
- **Real-time stock-trading platform users:** *“How often do you use services suitable for real-time investing (e.g., eToro, Plus500)?”*
- **Cryptocurrency trading:** *“How often have you traded in cryptomarkets (e.g., Binance, BitPanda)?”*
- *Study 1: types of monthly investors/traders*
 - **Non-investors**
 - **Regular investors** (no real-time platform use nor cryptocurrency trading)
 - **Investors using real-time stock-trading platforms** (no cryptocurrency trading)
 - **Cryptocurrency traders**
- *Study 2 (T1–T3): cryptocurrency trading (during past 6 months)*³⁰

Excessive behaviors among traders

- 22.29% regular investors, 3.01% stock-trading platform users, and 3.59% were crypto-market traders at T1
- Stock-trading platform use and cryptocurrency trading were associated with younger age and male gender
- Cryptocurrency traders were more likely to have an immigrant background and have taken instant loans
- Both real-time stock-trading platform use and cryptomarket trading: excessive behaviors
- Cryptocurrency traders: excessive gambling, gaming, and internet use, psychological distress, perceived stress, and loneliness

Longitudinal findings underline risks

- Within-person changes in cryptocurrency trading → increased excessive gambling
- Excessive gambling was more common among cryptocurrency traders.
- Of the confounding factors, offshore online gambling, excessive gaming, and excessive internet use had within-person effects on excessive gambling
- Offshore and onshore online gamblers and excessive gamers showed more excessive gambling than others
- Cryptocurrency trading + offshore gambling = significantly higher rate of excessive gambling

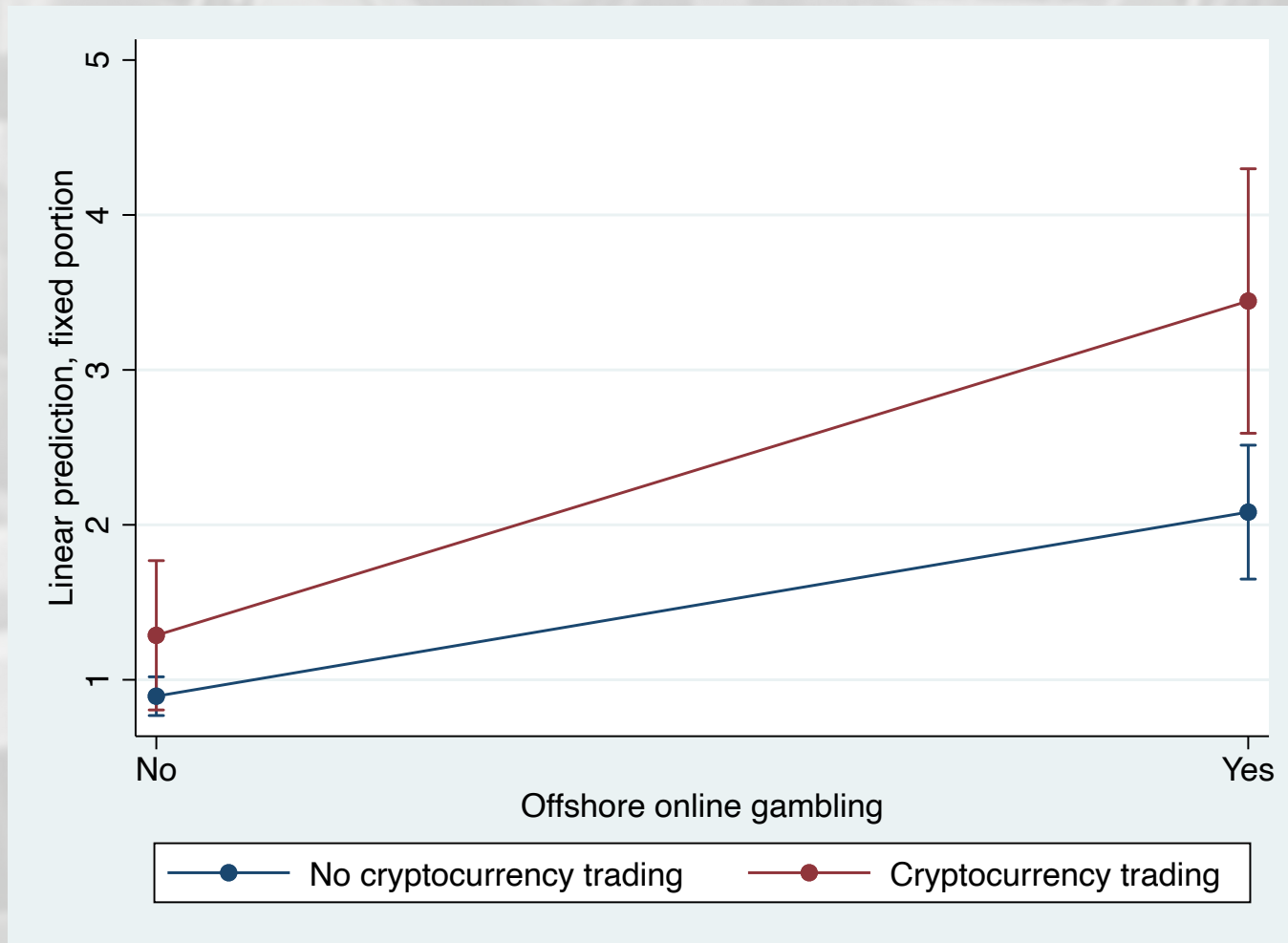


Figure. Excessive gambling among those who trade cryptocurrencies and gamble offshore

Notes on cryptotraders

- Both published studies showed that gamblers are attracted by cryptocurrency trading
 - Possibility to make money for gambling
 - Trading as such as gambling-like activity (casino-like features etc.)
 - Cryptos are heavily marketed
- Cryptocurrency trading was associated with a number of addictive behaviors
- Mental wellbeing issues among cryptotraders
- Cryptocurrency trading predicted higher gambling problems
 - Particularly interaction with offshore gambling is important
 - Online ecosystem: instant loans, cryptomarketplaces and online casinos marketed for same people

Digital infrastructure and public policies

Access and advertisements

- Access to online casinos might vary between countries (e.g. Oksanen et al. 2021 on young people, Finland highest)
 - Also variation targeted advertising

Table 6. Descriptive statistics on online advertisements targeted monthly on participants (T5, %)

Targeted monthly	All	Among at-risk gamblers (PGSI \geq 5)
Gambling advertisements	48.56 %	77.03 %
Pay-day loan advertisements	58.06 %	81.08 %
Cryptocurrency advertisements	20.28 %	41.89 %

Pay-day loans and debt enforcement

- Pay-day loans a recognized problem in Finland
- Finns in dept enforcement (dept problems) 2005–2013: 20.3% (registry-based information) (Oksanen et al., 2015)
- GDA: ever in dept enforcement 19.87%
 - 44.83 among at-risk gamblers (PGSI \geq 5)
- Regulation of loan sharks (pay-day loans and consumer credit) would be important

Young debt

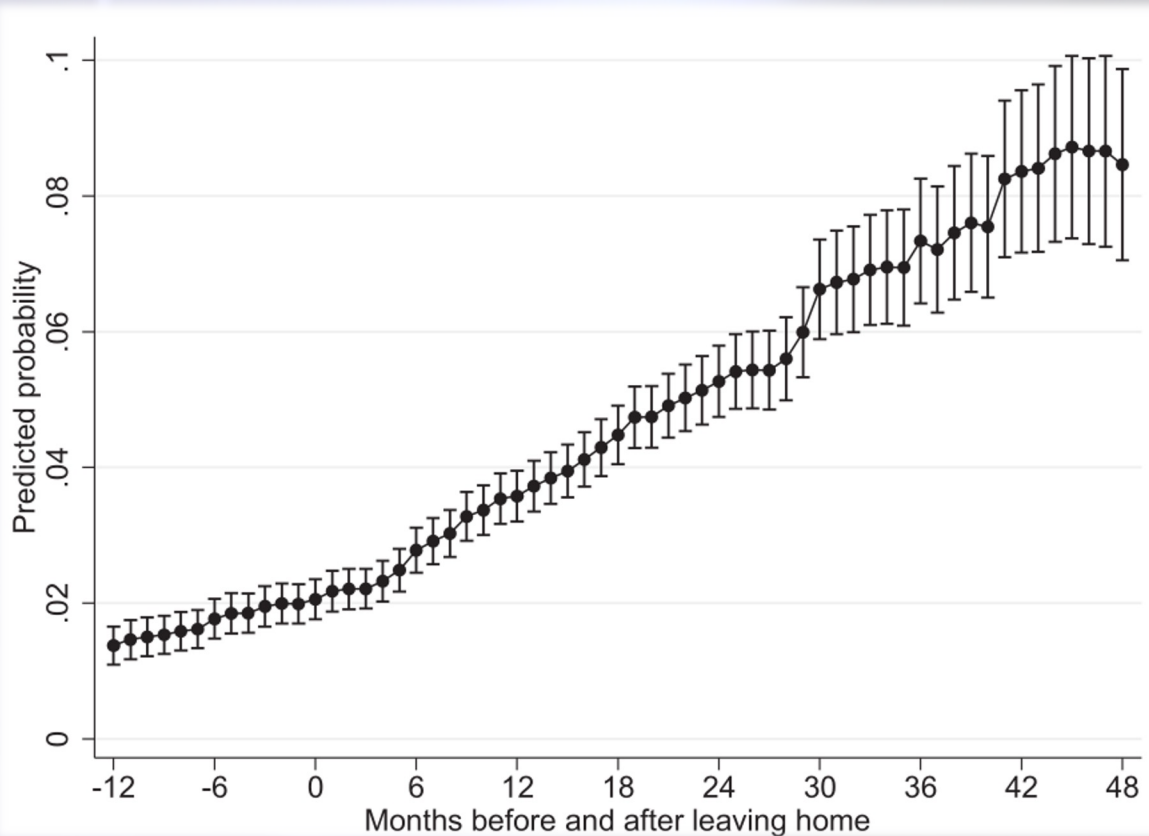


Fig. Predictive margins of debt problems before and after leaving parental home with 95% CIs. Note. Adjusted for sex, age, education, time of moving back, income, criminal convictions, parental background, year, and quartile of the year

N = 9196,
993,168 person-months/
observations

From Oksanen et al. 2017 (based on registered-data of 150,010 individuals and monthly debt enforcement information 2005–2013)

Last points

- Gambling should be re-thought
 - Gaming is not an issue, unfair involvement of financial transactions are
 - Technological development might bring new issues (AI, Metaverse)
 - Gambling-like actions should be put on focus
 - They attract excessive gamblers and cause harm
 - Other addictions important when treating (e.g. excessive internet use)
- From social psychological perspective
 - Better ways to guarantee fulfilment of basic psychological needs
 - Importance of good social relationships
 - Humans as group animals
 - pro-gambling communities as a problem
 - Pro-recovery communities would be important

Thank you

- <https://research.tuni.fi/emerging-technologies-lab/>
- atte.oksanen@tuni.fi

Selected publications

- Hagfors, H., Vuorinen, I., Savolainen, I., & Oksanen, A. (2023). A longitudinal study of gambling motives, problem gambling and need frustration. *Addictive Behaviors, 144*, 107733.
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- Sirola, A., Savela, N., Savolainen, I., Kaakinen, M., & Oksanen, A. (2021). The role of virtual communities in gambling and gaming behaviors: A systematic review. *Journal of Gambling Studies, 37*(1), 165-187.