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GAMING AT THE WORKPLACE

An Investigation of the Relationship between Videogames and Occupational Health in the Age of Gaming Disorder

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Ongelmapelaaminen työelämässä

Directly involved project researchers:

Veli-Matti Karhulahti, Miia Siutila, Jukka Vahlo, Mikaela von Bonsdorff, Matti Munukka, Minna Rantanen & Raine Koskimaa

Indirectly involved project researchers:

Marcel Martonicik, Matus Adamkovic, Valtteri Kauraoja & Jukka-Pekka Puro

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UNIVERSITY OF JYVÄSKYLÄ

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Contents

Tiivistelmä (Abstract in Finnish)

Työn aihe ja tarkoitus

Valtaosa suomalaisista pelaa säännöllisesti erilaisia videopelejä, kuten konsoli-, mobiili- ja pöytäkonepelejä. Pelaamisen, terveyden ja työelämän väliset jännitteet ovat nousseet pinnalle etenkin Maailman terveysjärjestön (WHO) hiljattain käyttöön ottaman diagnoosin myötä: ongelmallisesta videopelaamisesta on voinut saada mielenterveydenhäiriön diagnoosin vuodesta 2022 alkaen. Hankkeen tavoitteena oli ymmärtää, miten näitä pelaamiseen liittyviä terveysongelmia voidaan tunnistaa ja mikä on näiden vaikutus työelämään.

Aineisto ja metodi

Hankkeessa kerättiin yli 16-vuotiailta vastaajilta kyselyaineisto (n=8217), joka edustaa Suomea iän, sukupuolen ja asuinpaikan mukaan. Tutkittavaksi erotettiin edustava työväestö (n=3921), mikä sisältää työssäkäyvien lisäksi työttömiä ja lomautettuja. Tuhat vastaajaa täytti kyselyn sekä 2021 että 2022. Lisäksi haastattelimme kuusi videopelaamisen vuoksi ammattilaisen tukea hakenutta työikäistä pelaajaa ja 10 yli neljä tuntia päivässä pelaavaa työntekijää. Yhdeksän heistä haastateltiin sekä 2021 että 2022. Lopuksi haastateltiin kuusi terveysalan ammattilaista ja 10 HR- tai esihenkilöedustajaa. Kaikki päätutkimukset julkaistiin rekisteröityinä tutkimusraportteina (RR), joiden tutkimuskysymykset, hypoteesit ja menetelmät vertaisarvioitiin etukäteen. Tutkimukset julkaistiin avoimesti, vertaisarviot ovat avoimia ja kaikki aineistot tallennettiin avoimeen jatkokäyttöön Tietoarkistoon.

Keskeiset tulokset

Ongelmallisen videopelaamisen esiintyvyys Suomen työväestössä oli kyselymittarien mukaan 0.4–7.5%. Monet erot tunnistettujen ongelmaryhmien välillä kuitenkin viittaavat siihen, että nykyiset mittarit ja mallit eivät ole luotettavia. Etenkin kliinisiä validaatiotutkimuksia tarvitaan luotettavan epidemiologisen tiedon tuottamiseen tulevaisuudessa. Samana aikaan laadullinen analyysi todentaa, miten yksilötasolla ongelmat voivat olla suuria. Pelaamiseen liittyvät ongelmat näyttävät olevan osa laajoja ongelmien verkkoja, jotka rakentuvat nuorena ja voivat johtaa syrjäytymiseen.

Johtopäätökset

Tulosten valossa pelaamisella ei toistaiseksi ole selkeitä vaikutuksia työterveyteen populaatiotasolla. Yksilötasolla syrjäytyminen, terveysongelmat ja niihin liittyvä pelaaminen voi kuitenkin katkaista koulutus- ja urakehityksen, minkä vuoksi työnantajien tulisi tehdä yhteistyötä tukipalveluja tarjoavien tahojen kanssa näiden henkilöiden auttamiseksi työelämään. Yleisesti ottaen työntekijöiden pelaamiseen tulisi suhtautua tavanomaisena harrastuksena, joka parhaimmillaan tasapainottaa ja tukee yksilön elämänkokonaisuutta.

INTRODUCTION

Videogames have been a popular pastime in Finland for decades. Likely related to the global success of the Finnish game industry—led by companies such as Supercell, Rovio, and Remedy—the public views and sentiment regarding gaming have arguably been highly positive, at least in comparison to countries like China and South Korea where top-down regulations have been implemented in the past. Thus, when the World Health Organization (WHO) recently made a decision to take "gaming disorder" into effective psychiatric use as an independent mental disorder under "addictive behaviours" for the International Classification of Diseases (ICD-11), this also sparked change in the Finnish discourse. As the average age of people who play videogames in Finland is now 40 years (Kinnunen et al. 2022), the relationship between gaming and occupational health has become a relevant research question.

Despite the long-term global growth of the gaming industry and the increasing age of actively playing populations, there has been little research on the link between videogames and work life in general. In Finland, perhaps the only in-depth previous investigation is a report funded by the Finnish Work Environment Fund (Vahlo et al. 2015), which found 20% of their surveyed employees across various fields playing videogames during work hours. Additionally, the report examined gaming applications in occupational wellbeing and found three ways in which they operate:

a) Primary benefits are experienced when gaming is considered beneficial for autonomous reasons, e.g. when gaming serves as relaxing recovery from work.

b) Secondary benefits are experienced when gaming is instrumentally applied, e.g. as a special means to motivate learning or work outcomes.

c) Tertiary benefits are experienced when gaming indirectly leads to desired goals, e.g. when playing with colleagues improves social relationships.

However, the results implied that it was very unusual for companies to engage with these benefits or actively pursue them (Vahlo et al. 2015). Notably, at the time, the above WHO decision had not been announced yet and the scientific discourse regarding the potential negative occupational effects was not strongly present in the Finnish context.

Today, in 2023, it remains widely unknown if and how gaming is associated with the evolving changes in people's work around the world and Finland in particular. The remote work conditions largely introduced by the COVID-19 pandemic and Russia's military aggression toward Ukraine recently contributed to the Finnish environment in various critical ways, forcing both employees and employers to reassess their obligations as well as possibilities globally. In this context, it is possible that the role of gaming critically changes too. For instance, gaming could yield benefits in previously unutilized ways via improved socialising and recovering from work—yet at the same time, an open question remains regarding whether excessive hours of play or other elements of gaming might also contribute to occupational problems or health issues. In brief, the goal of this project was to investigate the latter, as follows.

RQ1: How to identify gaming-related health problems in the working adult population?

RQ2: How do gaming-related health problems affect work life, especially in Finland?

Follow-up research meta-question:

What is an optimal line of action in the current situation affected by "gaming disorder" ?

Conceptual issues. Research on gaming-related health problems (GRHPs) has been carried out since the 1980s (e.g., Ross et al. 1982), and the literature over these past decades has used dozens of diverse terms to refer to these problems, typically without definitions. Currently, it is still a standard practice for studies to use the term "gaming disorder" but not apply the official criteria of the ICD-11, from which the term derives. Sometimes "gaming disorder" is mixed with "internet gaming disorder", the latter of which refers to the American Psychiatric Association's proposed classification in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR)

and has entirely different symptomatology. On top of this, “gaming disorder” also tends to label most of the recent meta-reviews and meta-analysis (e.g., Stevens et al. 2021), which draw data from scales that were developed before both the DSM-5 and the ICD-11, thus referring to numerous vague ad hoc concepts that researchers developed for their own study purposes in various different conditions.

As a consequence of the above, in many studies, one might do well to more correctly speak of GRHPs instead of gaming disorder unless the specific ICD-11 criteria are addressed and properly tested as a diagnostic construct. On the other hand, the diagnostic practice around gaming disorder is only beginning and there are few or no clinical experts with the knowledge and will to support proper assessment. As our results later show, the currently available screening measures are generally unreliable and lack various types of validity, which makes addressing gaming disorder scientifically a difficult task. In the present report, we will speak of both GRHPs and gaming disorder by the following premise: “GRHP” is used when the nature of problems is unclear, and “gaming disorder” is used when ICD-11-based measures have been applied or for other reasons there are grounds for diagnostic language. In the next section, we outline the project strategy.

PROJECT STRATEGY: A REGISTERED REPORTS APPROACH

Although GRPHs have been studied for more than 40 years, little progress has been made in the field. As it was already discussed in the 1980s, some players have health problems related to their gaming habits, but the nature of these problems and their link to specific design or other elements remains unclear (for a review of the current hypotheses, see Flayelle et al. 2023). This is partially due to the constantly evolving game industry that introduces new types of play and technology applications each decade, thus changing the landscape of human-computer interactions somewhat radically in frequent periods (aka *design vestigiality*, see Karhulahti & Grabarczyk 2021) . For instance, the initial concerns of overspending in arcade games (1980s) were soon replaced by the immersive qualities of the home computer (1990s), which again was overcome by the concerns of the internet in the early 2000s and, once more, online gaming more specifically in the 2010s. As we are now witnessing the most recent stage of evolution in the 2020s, the worries are moving increasingly toward more general gamification features in smartphones (used in various social media applications) as well as monetisation tactics that are arguably moving some sectors of game design toward the gambling industry (e.g., Xiao & Henderson 2021). In this historical context, it is not surprising that reaching stable research findings is hard.

Another persistent problem concerns not only the research on gaming but the revolutionising meta-scientific practices more generally. In the past two decades, especially social and medical sciences have come face what is nowadays reflected on as the “replication crisis,” referring to the generally low level of research quality and, specifically, the fact that most findings published even in the best journals cannot be replicated (e.g., Chambers 2017). Various reasons have been suggested as contributors for this lack of replicability, ranging from issues in measurement and

validity to errors in statistical inference and, most critically, a number of questionable research practices (e.g., John et al. 2012). In brief, the current academic system has drifted into a situation where research and researchers are assessed primarily by attention value and quantity: top journals want researchers to report "shocking" discoveries that find their way into newspaper headlines and increase journal readership (i.e., profits); meanwhile, researchers are desperately driven to publish such discoveries because the academic incentives reward this quantity via university and individual metrics (see Schönbrodt et al. 2023). As a consequence, various fields are now filled with "discoveries" that in closer investigation (or replication) do not hold after all, while at the same time, null results or other findings that do not imply radical change rarely even get published—either because researchers are not incentivised to write such findings to begin with, or because journals are not interested in publishing "boring" findings (e.g., Smaldino & McElreath 2016). Ultimately, consequences of these vicious cycles are many "file drawer" problems and publication biases that undermine the trustworthiness of modern science in general (see Munafò et al. 2017).

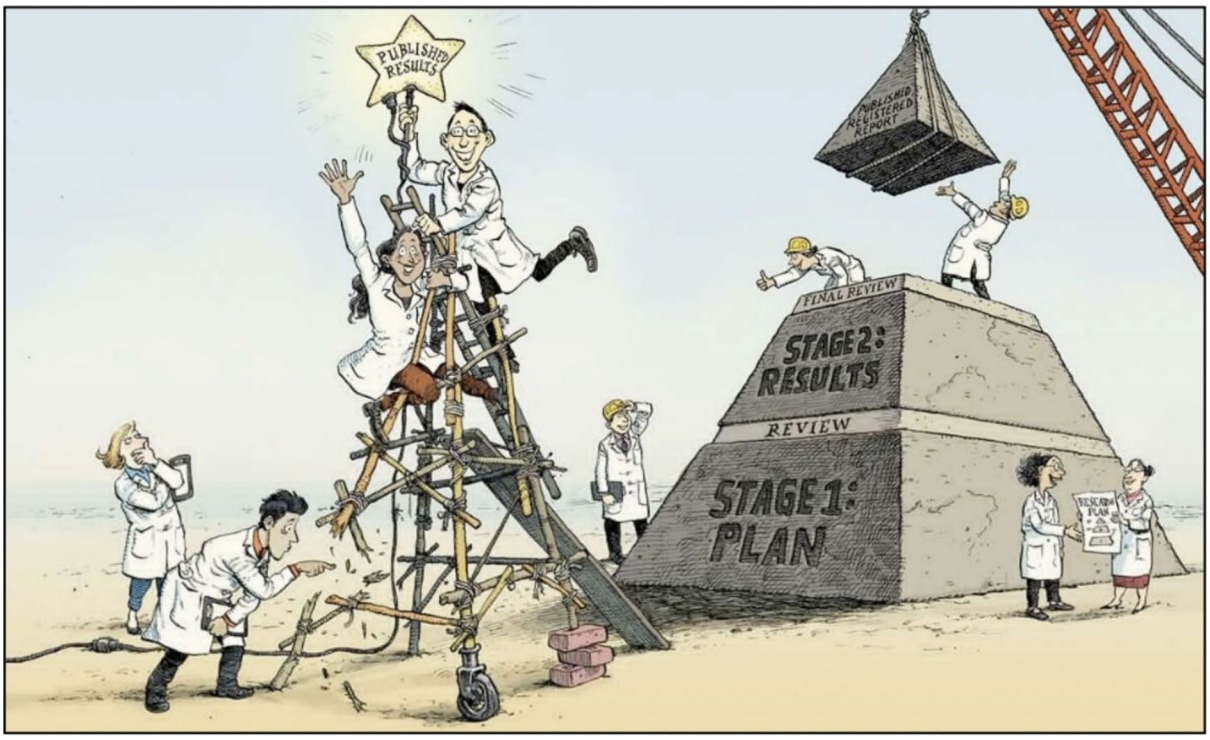

Figure 1. Illustration of Registered Reports by David Parkins in Nature Human Behaviour.

As an antidote to this state of affairs, the scientific world has recently and increasingly started adopting various "open science" practices, which collectively increase the trustworthiness of research and improve both the transparency and quality of

studies in many ways (e.g., Crüwell et al. 2019). Examples of these practices include data sharing, transparent reporting standards, study pre-registration, and methodological justifications. As the most radical addition to this list of open science practices, more than 350 scientific journals, including flagship journals like *Nature*, have recently implemented a completely new format of publication called "registered reports" (RRs; Figure 1) where all the above best-practice details are peer reviewed *before* the study is carried out, thus ensuring a high quality of research from the beginning and making sure that the "shock value" of any upcoming results will not affect the prospective publication of studies (e.g., Chambers & Tzavella 2022). In other words, studies following the RR format are evaluated solely based on the quality or research and validity of research questions, thus helping to improve the overall health of scientific literature and produce results that are reliable, whether they spawn the interest of newspaper headlines or not. Accordingly, the present project was designed to deliver all of its four key research studies as RRs—by doing so being the first Finnish research project exclusively dedicated to RRs and paving the way with the first-ever published RRs in qualitative methods and the Finnish language. The workflow of the project's four key studies is presented below (Figure 2).

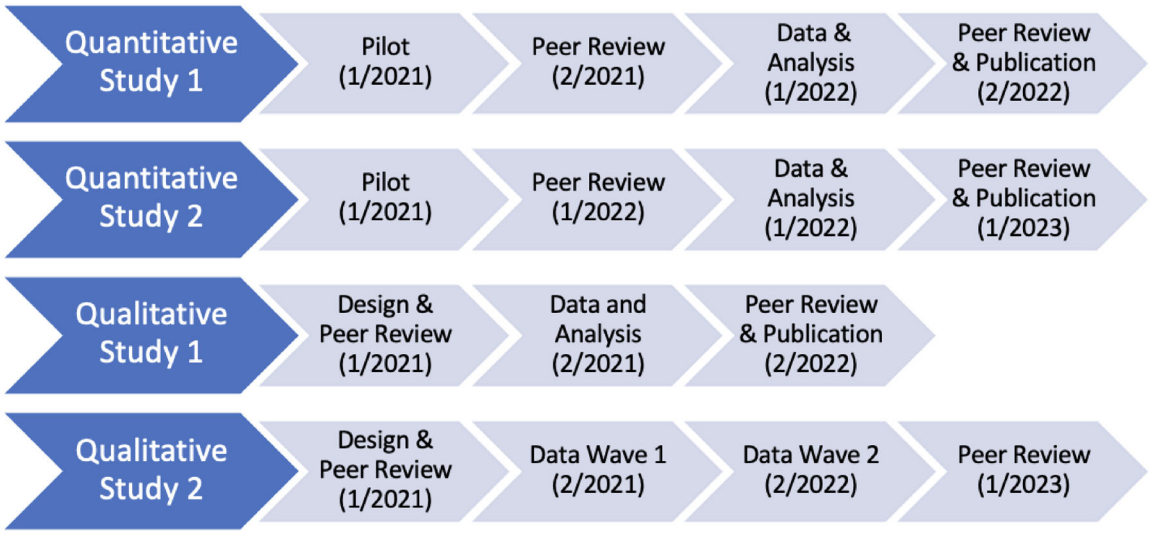

Figure 2. Project research workflow by the main contributions.

- The **first quantitative** study was designed to yield answers to RQ1. The idea was to assess the overall prevalence of GRHPs in Finland based on four unique survey measures and test their associations with health. In sum, the goal was to investigate whether it would be possible to gather reliable

evidence by using survey GRHP instruments, and if so, what would that evidence be.

- The **second quantitative** study was designed to yield answers to RQ2. The idea was to assess the overall prevalence of GRHPs in the Finnish working population based on four unique survey measures and test their associations with work ability and recovery (with time spent gaming). In sum, the goal was to investigate what GRHP survey instruments, if applied as such, tell about the link between GRHPs and work. Additionally, an exploratory component was designed to test the stability of GRHPs over a period of one year.
- The **first qualitative** study was designed to further inform RQ1 and RQ2. The idea was to investigate the phenomenological differences between treatment-seeking and actively gaming individuals in the working population by means of in-depth interviews. Experts were additionally interviewed to better contextualise the analysed experiences.
- The **second qualitative** study was likewise designed to further inform RQ1 and RQ2. The idea was to follow both gaming groups by a 1-year period and specifically investigate the potential phenomenological changes that such a time frame could introduce to actively gaming people in the working population. An in-depth interview approach was applied again with systemic health measures to better understand the temporal associations between gaming, health, and work.

In addition to the above four key studies, the project involved a number of side components that contributed to the ***research meta-question*** and deepened or supported the key studies. Some of these side components were planned from the start (e.g., qualitative investigation with HR people regarding the role gaming in the workplace), whereas others were included due to unexpected opportunities that opened exceptionally promising research avenues (e.g., qualitative investigation of Restart program data consisting of working age treatment-seeking adults). The findings of side components are reported separately in their own section below.

As an appendix to this report, we attach a previously unpublished study that was carried out to better understand both gaming and gambling in relation to work ability, work engagement, and work recovery. The study was written in Finnish and submitted for review first to *Lääkärilehti* and then *Duodecim*. Both journals rejected the study outright without the opportunity to revise or resubmit, for which the results have not passed peer review nor published in a scientific journal. Therefore, the results are not discussed in this report. As the project time schedule did not

allow us to reconstruct the study for a third Finnish journal, these events further support the core approach undertaken by this project, namely, to publish important work as registered reports, which can a) save the limited resources available from funding bodies, b) respect the volunteer labour exerted by journal peer reviewers, c) facilitate scientific knowledge distribution by allowing all meaningful results to be published, and d) improve the mental health and working conditions of all occupationally involved academic parties by eliminating bureaucratic loops generated by content-based (not data or method based) chains of journal resubmission. For more details and research on these meta-scientific topics, we guide the reader to the Peer Community in Registered Reports platform (https://rr.peercommunityin.org/) and the Center for Open Science (https://www.cos.io/initiatives/registered-reports).

QUANTITATIVE FINDINGS

Study 1: Identification and Measurement of GRHPs

- Karhulahti, V. M., Vahlo, J., Martončik, M., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2022). Ontological diversity in gaming disorder measurement: a nationally representative registered report. *Addiction Research & Theory*, 31 (3). https://doi.org/10.1080/16066359.2022.2115033

This study was designed to acquire statistical knowledge of GRHPs and the instruments that are currently being used for their measurement. We chose four popular measures that represent different ontological systems: gambling-based criteria in the DSM-IV, internet gaming disorder criteria in the DSM-5, gaming disorder criteria in the ICD-11, and self-assessed frequency of problems. The applied measurement scales are the following: Game Addiction Scale (GAS7) (Lemmens et al. 2009), Internet Gaming Disorder Test (IGDT10) (Kiraly et al. 2017), Gaming Disorder Test (GDT) (Pontes et al. 2021), and Problem Gaming Test (THL1) (Salonen & Raisamo 2015). We then registered three hypotheses with exact statistical procedures, as follows:

H1: We expect the ICD-11 and DSM-5 based GRHP prevalence rates to be meaningfully lower than the DSM-IV and Self-assessment based prevalence rates.
H2: We expect ICD-11, DSM-5, and DSM-IV based GRHPs to overlap. Those who meet the ICD-11 criteria also meet the DSM-5 criteria, and both above additionally meet the DSM-IV based criteria.
H3: We expect those with DSM-IV and Self-assessment based GRHPs to have (equally) lower health in comparison to the general population.

The hypotheses were developed by utilising pilot data (*N*=1000), which provided us with good initial estimates of the operability of measures and their relationships. Collecting the pilot data also enabled us to carry out longitudinal quantitative analyses in a later part of the project (see Quantitative Study 2).

Data and methodology

According to our plan, the data were collected with Bilendi, i.e. respondents were invited remotely from the company's 2.2 M panel of participants. We recruited 8217 respondents as representative of gender (women = 4130, men = 4070), region (East = 797, South = 3662, West = 2831, North = 927), and age (*M* = 48.60, *SD* = 18.18). We included two control questions in the survey and Bilendi removed those responses that failed both (i.e. not included in *N* = 8217). Additionally, participants who reported not having played videogames within the past six months did not fill out the GRHP instruments, and they were considered not having GRHPs. The order of the screening instruments was randomised.

To test **H1**, we planned to calculate the prevalence rates with 95% confidence intervals for each of the four instruments. We set the H0 interval (null corroboration region) to the lower bound of 95% CI in the smallest obtained prevalence rate and the H1 interval (alternative acceptance region) twice above the upper bound of 95% CI in that prevalence rate. To test **H2**, we planned to assess group overlap against conditional probability $P > 0.917$. The null was tested against conditional probability $P < 0.714$. To test **H3**, we planned to compare the means of mental and physical health between the DSM-IV based group and the rest of the sample (one-tailed Welch t-test). This was repeated with self-assessment. Because mental and physical health were measured separately, we carried out the test twice with a corresponding alpha level 0.025 (multiple comparison correction). Equivalence testing was used in case of no evidence for effect.

Findings and discussion

For **H1**, we found all the measures producing significantly different prevalence rates. This corroborated the first hypothesis (see Figure 3). For **H2**, which assessed the overlap of groups produced by the measures, the results were mixed (Figure 3). The overlap between DSM-5 and ICD-11 based measures was poor, but that between DSM-IV and DSM-5 based measures was good. The overlap between ICD-11 and DSM-IV did not produce corroboration nor falsifying evidence. For **H3**, we found corroborating evidence for the measures to identify groups with lower mental

health than the general population, but we did not find evidence for them to be different or similar in regards to health levels.

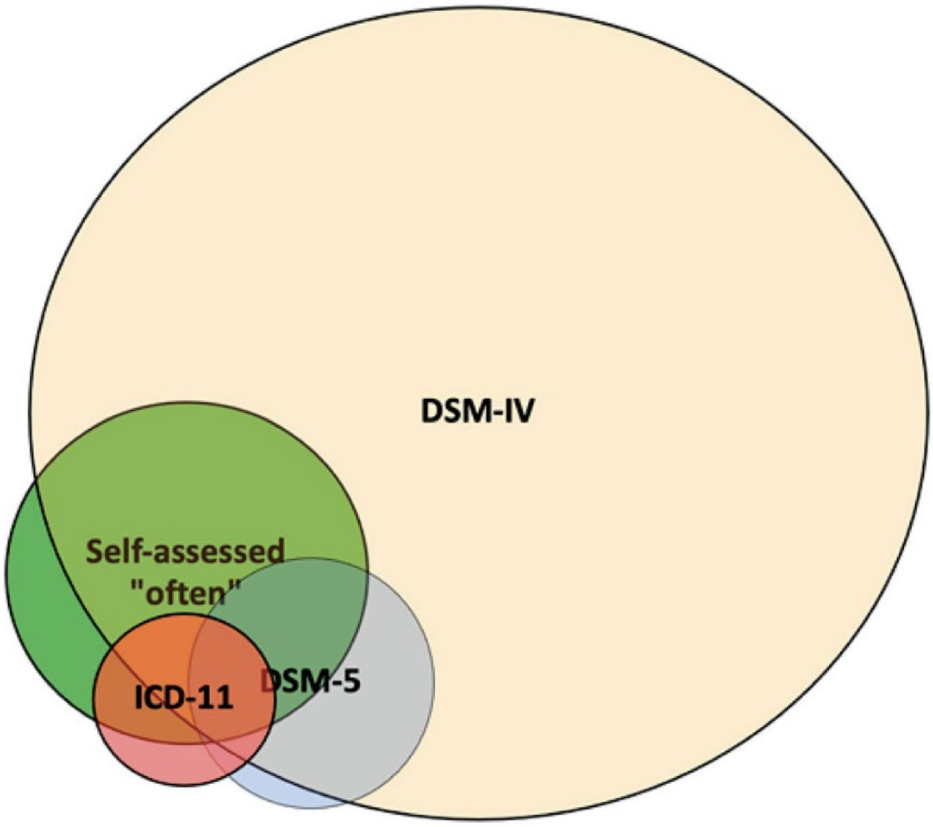

Figure 3. Prevalence and overlap of DSM-IV, DSM-5, ICD-11, and Self-assessment measures of GRHPs in nationally representative sample of Finnish people (*N*=8217).

Additionally, we carried out a vast number of exploratory analyses. A clear message from those analyses concerned physical health: we did not find any evidence of lower physical health in the GRHP groups in comparison to the general population, and in fact, those who self-assessed having GRHPs had a significantly *higher* physical health. Against previous beliefs, it appears that GRHPs are not related to low physical health, albeit confirmatory research is required to corroborate that hypothesis. Finally, we also explored the differences between measures regarding their performance with our control questions. We found strong exploratory evidence for mischievous responding taking place among participants who report GRHP symptoms: the more problems participants reported, the more they also failed with the control question (Table 1). This finding, likewise, requires follow-up research to be confirmed, yet adds another grain of salt to the current epidemiological estimates produced by the presently available GRHP measures.

Taken together, the findings confirm two things. First, we found corroborating evidence for the measures to identify groups that have lower mental (but not physical) health than the general population. Second, we found corroborating evidence for the measures to identify groups of significantly different prevalence, and in the case of DSM-5/ICD-11 overlap, also completely different individuals. As a conclusion, there is a strong need for better and more consistent measures, which are able to identify individuals who may need support in their lives.

GRHP construct groups	Failed first control
THL1 (4/4, problems 'almost always')	22.7%
DSM-5 based (IGDT10)	13.5%
THL1 (3/4, problems 'often')	12.8%
ICD-11 based (GDT)	9.6%
DSM-IV based (GAS7)	8.1%
THL1 (2/4, problems 'sometimes')	2.3%
THL1 (1/4, problems 'never')	0.1%
Total sample, including all GRHPs	1.4%

Table 1. Participants who failed one of the two control questions based on how much they reported having GRHPs.

Study 2: GRHP Prevalence and link to work ability and recovery in Finland

- Karhulahti, V. M., Vahlo, J., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2023) Videopelaamisen, työkyvyn ja työstä palautumisen suhde: kansallisesti edustava rekisteröity tutkimusraportti. *Psykologia* 58 (2), 130–145. ISSN 2670-322X.

In this article, we zoomed into the Finnish working population in particular. The study is the first Finnish registered report in which the planning, hypotheses, and methods were also peer reviewed before the study was carried out. The idea was to explore both via confirmatory and exploratory approaches the connections between GRHPs and occupational health in working adults. The explicit research question for this study was as follows:

How do gaming and GRHPs relate to work ability and work recovery?

Data and methodology

In this study, working ability was defined as the balance between personal (mental, physical, emotional) resources and the demands of work (Ilmarinen, 2009). Upholding a high level of working ability can increase well-being amongst the working age group, and employment in general. In terms of work recovery, existing studies (e.g. Reinecke 2009) have reported the popularity of using gaming as a recovery method after work.

From the previously described dataset (Quantitative Study 1), we selected participants who belong to the working population, i.e. currently working, laid off, or unemployed (N = 3921), excluding retiree and student segments. For measuring working ability, the work ability index in short form was used (von Bonsdorff et al 2008). Work recovery is defined and measured based on the model developed originally in Finnish (Mauno et al. 2018). Three hypotheses were registered:

H1: We expected the work ability of people with GRPHs to be lower when compared to the general population.
H2: We expected large amounts of play-hours (30+ hours a week) to be connected to low work ability.
H3a: We expected the work recovery of people with GRPHs to be lower than in the general population.
H3b: We expected large amounts of play-hours (30+ hours a week) not to be connected to low work recovery.

The time spent on gaming was measured with a question about the participants' estimated time spent gaming weekly, with an option to specify used platforms between a computer, game console, and smartphone.

Findings and discussion

To our knowledge, the present data collection was the most extensive Finnish survey related to gaming and work so far. According to Gaming Disorder Test, 0.4 % of the working population was found to meet gaming disorder criteria. Other measures provided higher estimates. The highest estimate was produced by Game Addiction Scale, which identified 7.5 % of the Finnish working population with game addiction (as an ad hoc construct).

Both **H1** and **H2**, regarding the expectedly low work ability of individuals with GRPHs and large amounts of gaming hours, did not receive support. The work ability of the group identified by Gaming Disorder Test was not significantly lower than the general population, however, we did find statistically significant effects with other measures. The effect sizes ranged between g = .39–61, and while they did not

exceed the preset clinical cutoff g = .67, some of the confidence intervals did. Notably, statistical significance was also dependent on whether ANOVA or Welch's t-test was used. **H3a**, in turn, expected a weaker work recovery for the GRHP groups but not for those with high gaming hours. Only the group recognized by Game Addiction Scale showed a statistically significant negative difference (g = .37), which was solitary and so small that the results supported a null hypothesis.

It should be kept in mind that statistical differences between groups cannot, however, identify the potential problems concerning individual participants. Effect heterogeneity, referring to individual variety beyond group differences (e.g. Johannes et al. 2021), should be taken into account in future study. Again, the large discrepancies between the different tools also deserve emphasis. It will be important to improve the validity of the currently available tools and ensure that they are measuring the intended phenomena.

In addition, the longitudinal data gave us an exploratory opportunity to assess the stability of GRPHs for 492 participants in a 9-month period during 2021 and 2022. As Table 2 illustrates, temporal stability does not appear to be strong. This could be because of the possible cyclical nature of GRPHs, which can both manifest and vanish in intervals of months. Alternatively the variety of results could mirror inaccuracy with survey measurement or participant response. These issues should be addressed by designing studies with these issues in mind, combining a variety of tools and qualitative methods for comparing a variety of health effects and their stability.

Table 2 Frequency of GRPHs in pilot data (T1) and follow-up nine months later (T2).

GRHPs (n = 492)	**T1**	**T2**	**T1 and T2**
GDT	1	1	0
IGDT-10	4	2	0
GAS7	29	39	17
THL1	10	9	3

Based on the findings, GRPHs do not seem to be an acute societal risk in terms of work ability and recovery. As this study was not designed to infer direct causality, future studies should aim at better understanding direct causal effects. If such effects are reliably identified, this may have notable importance for the Finnish working life in the long term. Likewise, more severe tests for null and small effects as well as better understanding of the practical meaning of effect sizes in work ability (and recovery) are worth pursuing in the future.

QUALITATIVE FINDINGS

Study 1: Comparing treatment-seeking and actively gaming adults in work life

- Karhulahti, V. M., Siutila, M., Vahlo, J., & Koskimaa, R. (2022). Phenomenological strands for gaming disorder and esports play: a qualitative registered report. *Collabra: Psychology*, 8(1), 38819. https://doi.org/10.1525/collabra.38819

A critical area considering GRPHs has been the lack of clarity concerning the differences between them and healthy intensive play, the latter of which involves several gaming hours per day without related health problems. In this study, we approached the question by interpretive phenomenological analysis with interviews in two groups of highly involved videogame players: those who seek or have sought clinical help for their problems with gaming (n=6), and those who play esports more than 4 hours per day without self-reported related health problems (n=10). These data were contextualised with interviews of health experts (n=6) who have experience of working with the former group. The health experts' views were generally in line with the other data, for which we do not discuss health expert data separately in this report.

Data and methodology

The treatment-seeker data were generated with the help of our clinical collaborators, such as the Restart program and A-Clinic. The esports players were recruited with an open call in local online gaming communities and forums, starting from Kanaliiga that is an ongoing amateur esports league for working adults in Finland. The third

group, clinical experts, were recruited from local hospitals, therapy centres, and other medical institutions, as well as through our collaborating institutions.

Findings and discussion

The analysis produced three subordinate themes for both gaming groups.

Treatment-seekers

Escaping and solving difficulties in adolescence by gaming; current play experiences and their associations with self-image shadowed by memories

All individuals seeking treatment had experienced challenges during their childhood or teenage years, including bullying, discrimination, and family problems. These difficulties were explicitly mentioned by many of them as the reason for their excessive gaming when they were young. The relationship between these life problems and GRHPs was either direct or indirect. In some cases, gaming provided an immediate escape from these issues, while in others, it acted as a response to the anxiety, depression, and other related problems caused by these challenges. The participants did not follow consistent patterns in terms of how or what they played, or whether they played alone or with others. However, videogames, in general, provided a safe haven where they could experience feelings of autonomy, belongingness, comfort, and control, which served as a coping mechanism for their otherwise difficult life situations.

Treatment-seekers

Struggling with limited means to regulate gaming in a paradoxical situation where it both satisfies basic needs and contradicts personally meaningful obligations

The individuals seeking treatment expressed that gaming fulfilled their psychological needs, and the effectiveness of gaming in meeting these needs made it challenging or even impossible for them to control their gaming habits. Throughout years or decades, they had acquired the skill of using gaming as a means to bring enjoyment and purpose into their lives. However, as they matured and their self-perception and values changed, it became difficult for them to replace gaming with alternative activities, despite their attempts to do so. To some extent, videogames had become a mediator in their interactions with the real world on a daily basis.

Treatment-seekers

Feeling of guilt or regret for having wasted time on gaming over experiences that would have had "real value"

The treatment-seekers experienced feelings of guilt or regret due to the substantial amount of time they had spent on gaming, which they perceived as inferior to real-life achievements and "true values." This forms the third underlying theme among these individuals. In various ways, the participants had come to the realization that gaming was not what they truly desired to engage in to the extent they had been doing. Gaming was no longer a priority in their hierarchy of values. However, implementing practical changes in their daily behaviors, which had been established over years or decades, proved to be challenging for them due to various reasons that were partially unknown to us.

Esports players

Gaming is a core component of identity and values

The early narratives of esports interviewees bear similarities to those of our treatment-seekers in several ways. Both groups had developed gaming as a hobby, which often became an integral part of their identity during adolescence. They dedicated a significant amount of time to playing games and considered gaming as a crucial aspect of their lives. However, the esports interviewees displayed the ability to engage in other activities and make conscious decisions not to play. They demonstrated active regulation of their gaming habits on a daily basis, establishing rules for themselves to pause gaming and attend to other mental, physical, or personal needs. Despite consciously moderating their gaming, they still regarded it as a foundational element of their identity and life that they were not willing to abandon. They believed that quitting gaming would directly result in feelings of anxiety, depression, and other negative emotions.

Esports players

Awareness of gaming having the potential to become excessive, which has produced successful balancing and regulation of play

Similar to the treatment-seekers, esports players also spent a significant amount of time on gaming. Many of them openly acknowledge that, in retrospect, there were instances when they should have played less. They recognize the potential negative impact of excessive gaming and have actively pursued other life goals throughout

their journey. They strive to strike a balance between gaming and non-gaming aspects of their lives. Despite dedicating entire days and nights to gaming, esports players reflect upon their gaming habits, actively regulate them, and integrate gaming into their non-gaming lives. This ensures that their lives continue to progress and flourish without being hindered or stagnant due to excessive gaming.

Esports players

Gaming is a high-investment meaningful routine

Several participants in this group had non-gaming competitive hobbies that they actively engaged in alongside their gaming pursuits. However, gaming tended to consume a significantly greater amount of their time. This disparity can be attributed to the accessibility of gaming, as it does not rely on the physical presence of others or necessitate the scheduling of practice sessions. Additionally, gaming is less physically demanding compared to various types of exercise. For esports players, gaming provides a sense of accomplishment and allows fulfilling basic needs; thus, they hold a strong investment in gaming, which has an integrated part of their identity.

In summary, our in-depth analysis suggested three unique themes for each group, and their differences can be summarised as follows:

> For treatment-seekers, the experience of disorder derives from gaming interfering with self—what one wants to be, do, and have throughout life. For esports players, the experience of balance derives from gaming being integrated into self—what one wants to be, do, and have throughout life.

Our findings are perhaps the strongest evidence so far to demonstrate the specificity and diversity of problems related to gaming, and as such, suggest that gaming disorder, as a diagnostic category, should be subject to ongoing investigation along with the accumulating evidence on the variety of related problems that people have—and how those problems are related to specific sociocultural factors and mental disorders.

Finally, it is worth reporting that 14 of our 16 participants also filled out GRHP survey scales, as applied and listed earlier. The most efficient scale for identifying treatment-seekers was the single-item self-assessment measure: three treatment-seekers self-reported to have problems at least “often” (zero esports players). The other validated instruments performed worse. In other words, the best current way to identify treatment-seekers seems to be their self-assessment of problems. In fact, during participant checking, one of the treatment-seekers told us that the scales did not measure their gaming problems due to poor verbal phrasings related to time.

Based on our qualitative findings, we suggest that one key reason for the validated instruments to be inefficient for identifying treatment-seekers is that they clearly measure multiple "problem" (and non-problem) dimensions at once; moreover, as our participants were already seeking treatment, official diagnostic criteria such as increasing interest in gaming simply did not apply. On the other hand, none of our esports players met any of the cutoffs either, which is comforting regarding the fears of false positive diagnoses.

Study 2: Longitudinal Modelling of GRHPs as Life Thinning

- Karhulahti, V. M., Siutila, M., Vahlo, J., & Koskimaa, R. (2023). Life Thinning and Gaming Disorder: A Longitudinal Qualitative Registered Report (pre-print). *PsyArXiv*. https://doi.org/10.31234/osf.io/rfbcu

This study is a longitudinal continuation of the previous study. Thus the present study was planned as a 1-year follow-up with the same participants and with question sets that were designed to highlight possible changes in gaming and other life. Our goal was to better understand how the experiences in both groups evolve and develop over time, and to gain exploratory knowledge of how health interacts with those changes in the working population.

Data and methodology

We recontacted the participants of the previous study and received confirmation for participation from 5 treatment seekers and 4 esports players. We used the Phenomenology of Play Follow-up (POP-UP) interview frame that is similar to the one used in the baseline study but also considers temporal phenomenological changes in the light of the interviewees' previous answers. Contextualizing survey data were collected using the same instruments as in the baseline study.

Findings and discussion

A process model (Figure 4) was created to visualise the findings, which implied adolescence and early adulthood experiences to initiate coping-gaming for both groups. We hypothesise that coping-gaming can either be successful or unsuccessful, and it plays a part in the growing relationship the player has with game-playing. The participants with no self-identified gaming problems still often remembered using gaming as a coping mechanism for their various adverse adolescent experiences. In these cases of successful coping-gaming, it helped the players in identity-building, building

supportive social networks, and developing emotionally in safe sociocultural contexts. These interviewed players held onto gaming and their largely positive memories related to it throughout their childhood, sometimes identifying gaming as resilience.

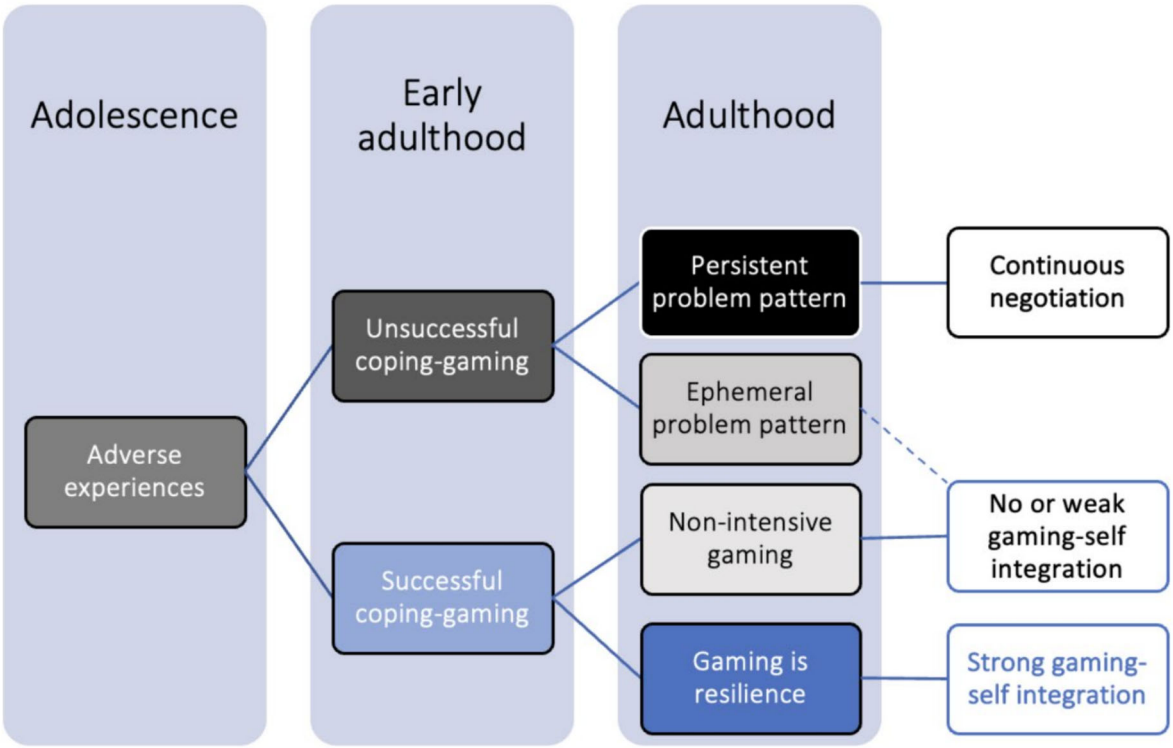

Figure 4. Process model of coping-gaming.

The interviewed treatment-seeking participants also reported using gaming as a coping mechanism during adolescence. While these gaming-memories are also largely positive in nature, they were often retrospectively associated with negative experiences in a different manner. A major difference between these two groups is how treatment-seeking participants often described “loops”, where gaming is unable to solve existing problems which subsequently keep returning in cycles.

As such, it seems that coping-gaming in adolescence shapes the meanings of play early on, and these meanings remain present in adulthood until an axiological shift where such meanings begin to lose value for the individual. Some treatment-seeking participants experienced their problematic patterns as ephemeral, able to reconstruct or replace the meanings said individual has for gaming. Others identified their problematic patterns as persistent, implying that their negotiation continues without resolution. The latter pattern in particular can be expected to hinder or completely block access to working life.

Theoretically, we propose a process of *life-thinning* (cf. social thinning, McCrory et al. 2022) to describe a situation where unsuccessful coping-gaming erodes the

significance of gaming experiences, while remaining so central as a hobby that it also narrows the range of self-efficacy and distances the experienced availability and value of other life choices. This is true until an axiological crisis (reconstruction of one's values) disrupts the cycle and subsequent self-reflection contributes to deliberate regulation of gaming time and, in a positive scenario, reverse life thinning.

The *resilience-integration* process, in turn, describes a successful version of using coping-gaming for adverse adolescence experiences, during which the hobby integrates as part of the individual's resilience. Gaming remains a stable part of their identity, without self-perceived problems. It's also able to rapidly adapt and evolve at the face of unexpected life events and continues to be an efficient coping tool for the individual, as well as one of their many meaningful domains in life. For these players, value and meaning in neither life domains nor gaming are at direct risk due to a balance between the personal goals and gaming habits of the player. As such, life-thinning is not experienced despite an active gaming hobby. For our esport players, gaming kept its meaningful and gratifying status over the years.

The study distinguishes these two processes (Figure 5) as models to describe the paths between players who seek treatment for their gaming and players to whom gaming is an integral part of their support system and identity. To simplify, based on this model, a life-thinning path can eventually prevent a person's occupational opportunities, but other types of intensive gaming can help in building a strong social network that improves the general well-being and occupational health of the individual.

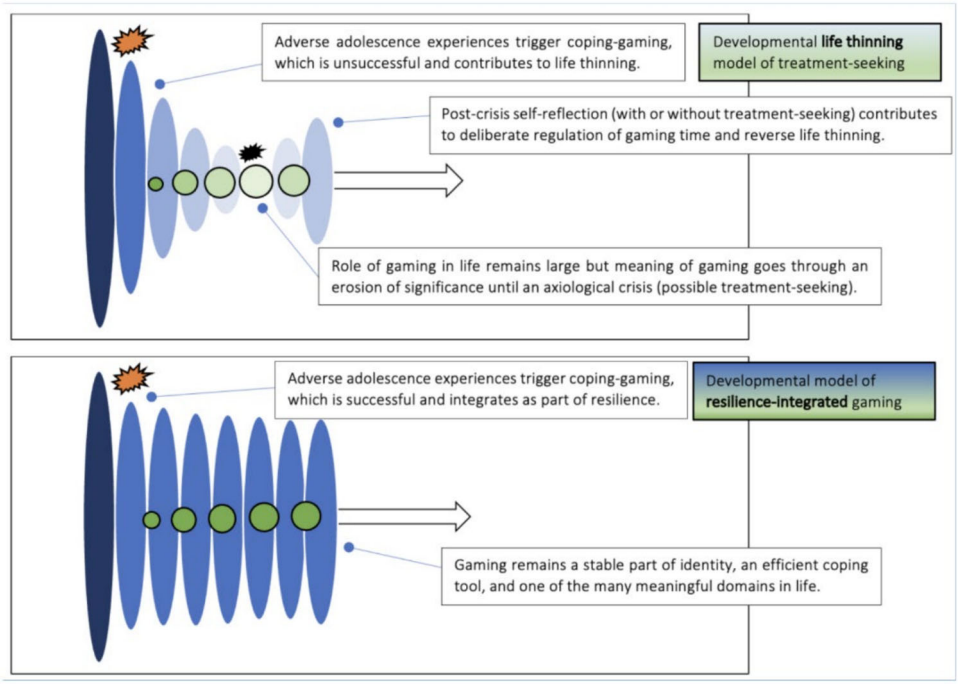

Figure 5. A model of life-thinning and resilience-integration.

FINDINGS FROM SIDE COMPONENTS

The original project plan included two additional studies, which were not designed as registered reports. As discussed in the Project Strategy section earlier, one of these studies was rejected by two Finnish authoritative journals, for which it has no journal publication but is attached here as an appendix. The second planned publication—a qualitative study with HR representatives from Finnish workplaces—is discussed below. Additionally, during the project time, we encountered various opportunities to reflect on our (meta) methodological approach as well as engage with unforeseen data and analyses. These reflections and engagements are reported here as side components.

Insights from the HR (manuscript to be submitted in June)

- Early public description: Siutila, M. (2021) Gaming at the Workplace: Human Relations Perspectives. Center of Excellence Blog. https://coe-game-cult.org/2021/08/30/miia-siutila-gaming-at-the-workplace-human-relations-perspectives/

This study focuses on the perspectives of human relations managers and supervisors, and how gaming has (or has not) been visible in their working environments. The data consist of 10 interviews from people working in the above mentioned roles in companies and institutions from various fields and varying sizes. Five of the companies are in IT, the rest are from education, retail, public service and medicine. The interviewees were asked questions that focus on their role in the company, how well they know the other employees and their hobbies, if and how gaming is present in the company or the workers' lives, and how they themselves see gaming in relation to work life and other hobbies.

There was a clear divide between the interviewees from IT companies and those from other fields in regard to how much gaming was present in the work. In the IT companies the interviewees saw gaming as part of the workplaces and

workers they represent to varying degrees. For instance, many employees play games in their free time and talk about these experiences at work. Some companies had teams participating in competitive leagues for games and in one this was used to promote company spirit and team building by inviting others to watch their teams matches. As such, gaming has become one more leisure activity supported by these companies, which they hoped will help their employees to relax and feel home.

In contrast, the interviewees from outside of IT felt that gaming was not really present in their workers professional life in any way. In fact, many were hesitant to participate in the study because they were worried if we wished to hear their experiences as they had little to nothing to give in relation to gaming. In the few instances where gaming was mentioned in workplaces, the interviewees noted that it was done in passing and rarely. For example, when employees discussed their weekend plans they might mention a plan "to relax with their gaming buddies." However, for none was gaming an important or consistent activity to such a degree that they would regularly discuss it in work.

There was also a clear divide between the IT companies and the rest in how the company get-togethers were organised during COVID-19. Traditionally these used to include things like bowling, food, drinks and sauna, but the pandemic and subsequent restrictions made most of this impossible. During the pandemic, the IT companies organised team building events where the employees would get to order food home paid by the company, get together online over a conferencing app and play games together. In contrast, in companies from other fields such events were either not organised, or they involved something else than gaming. For example in one company they had listened to a concert together. Regardless of how differently gaming was present in the daily work life of the companies, they all had similar views on gaming "as a hobby among others." All of our interviewees stated that gaming could be a dear hobby for a person that contributed positively to their general well-being by providing a means for relaxation and recovery after work. They did not feel that gaming would be somehow detrimental to work as such.

However, the companies also recognised that gaming can become a hindering pastime if it takes too much time. Most mentioned that a lack of sleep could become an issue, especially in the kind of work that requires one to be present early in the morning. Some also mentioned possible physical problems, from back and neck pain to bad posture and even wrist troubles. Yet gaming was not seen as a only possible hobby that could be problematic for companies: participating in competitive sports could require employees to take time off in order to travel to competitions and tournaments, and injuries caused by sports and exercise could also require long medical leaves. The general ethos of the interviews was that all hobbies, including gaming,

were good in moderation and could be problematic in one way or another if taken into extremes.

Finally, when discussing how work life might change in the future in regards to gaming the interviewees were somewhat in agreement. The IT companies saw it becoming even more important for their workers and as a company sponsored or organised activity. The non-IT companies tended to believe that with younger generations who have been playing throughout their youth and childhood entering the workforce it was likely that gaming could also become a more prominent part of their work life.

Methodology and Open Science

The present project took place during the COVID-19 pandemic, which significantly affected both the developing use of technological applications as well as workplace cultures around the world. Arguably, one of the benefiting parties of these events were gaming companies, many of which during the lockdown era increased their user activity and revenues. As a response to this, numerous calls for responsibility were made and the companies were demanded to share their player behaviour data for scientific use in order to advance scientific progress regarding the potential effects of gaming on human life. Nonetheless, these calls often echoed an absurd situation where the academic community aimed to establish research collaboration with companies in the name of open science—yet itself was unable to follow the same principles, namely, systematically keeping datasets and critical methodological features (e.g., statistical code) hidden and thus unreproducible. The first side component of the project is a time-critical commentary of these events (Karhulahti 2021), further highlighting the foundational importance of the open science principles followed in the project.

A year later, the commentary was followed by two related publications. The first one (Karhulahti 2022a) reflected on the project's two qualitative studies, which were published as registered reports. Retrospectively, it appears that our project was, in fact, the first one in the world to publish in-depth qualitative analysis in the RR format—something that we started suspecting while being able to find any previous examples or guidelines that would facilitate the workflow. Another thing that soon became manifest was the journals' lack of interest in qualitative results: at the stage of initial inquiry, many journals explicitly stated that they are not interested in publishing qualitative results regarding the topic, even though their journal descriptions or aims and scope did not include such methodological exclusions. Accordingly, a proposal for journals to adopt qualitative registered reports was made (Karhulahti

2022a) to combat this issue, which has stagnated research progress in many fields from medical to social sciences and beyond. Linked to this, a complete original article was written to explain how data sharing can (and should) be a default also in qualitative studies, which pursue best practices and cumulative scientific findings (Karhulahti 2022b).

Two other methodological side components were published during the project. The first one took place at the early stages of the project and was established as a research collaboration with our Slovakian colleagues (Karhulahti et al. 2023a). In this effort, we systematically investigated all currently used screening scales for gaming disorder (and internet gaming disorder) by means of qualitative content analysis in order to better understand the potential differences in measurement. Indeed, we found critical differences in measurement operationalization, which thus informed the development of the rest of the project. In part, our choice of survey scales and their use was influenced by this initial study and led us to develop the Finnish version of the Gaming Disorder Test, the content of which was largely in line with the official ICD-11 diagnostic criteria.

The final methodological side component, which also directly concerns the fruitful application of open science practices in the project, is a correspondence that we had in the journal *Addiction, Research and Theory*. As our original study was published (see Quantitative Study 1) with the data and materials open for reuse, this immediately sparked interest in the research community and generated two official responses to our study only within weeks, both of which were published in the same journal. The responses utilised our data by running new analyses with different methods, thus providing alternative interpretations of the phenomenon. In our correspondence, we further review the constructs through a network analytic approach and celebrate the opportunity to make rapid scientific progress in transparent dialogue with colleagues.

Preparation and Triangulation

At the start of the project, two side components were published to support the launch and planning of future designs. In the first one (Karhulahti et al. 2022a), ongoing data collection and analysis were utilised for the development of the Phenomenology of Play interview frame, which was eventually used in both of the project's qualitative main outcomes (Qualitative Study 1, Qualitative Study 2). In the second one (Karhulahti 2022c), an initial review of literature was carried out to map out the existing scientific knowledge regarding gaming and work environment topics. These

efforts facilitated writing all Stage 1 proposals and established a basis for maintaining a bibliography at the project website through the years.

Two more studies were carried out to further understand the results gained by the earlier quantitative and qualitative efforts. In the first one (Adamkovič et al. 2023)—in collaboration with our Slovak colleagues and supported by their parallel efforts to improve measurement practices in the psychopathological literature—we applied network analysis to a newly collected sample of actively gaming adult individuals. Having learned from our previous study that identical symptoms (usually from the DSM-5-TR or the ICD-11) tend to be measured in myriad ways by different validated measurement scales, we tested whether changing the operationalization of a single item would lead to significant differences also on the network level. Indeed, we found exploratory evidence for this hypothesis, in addition to which the results implied no network differences across different gaming groups, thus indicating that working and other populations are unlikely to differ in in this regard.

The final side component (Karhulahti et al. 2023d) was initiated as a collaboration with the Restart treatment program. Although the program had collaborated with our project from the start, only later were their treatment-seeker data made available for research use. We chose to utilise this valuable opportunity and applied qualitative template analysis to open descriptions of reasons for treatment-seeking (*N*=110). The findings implied that Finnish adults seek treatment for many kinds of games and gaming-related problems, including but not limited to those, which are described in diagnostic manuals (Figure 6). In fact, more than half (58 %) of the treatment-seekers did not even meet the more flexible internet gaming disorder criteria. These figures can be at least partially explained by the learned thematic insights; for instance, the existential and financial problems expressed by the treatment-seekers are not listed in either of the dominant diagnostic manuals (DSM-5-TR, ICD-11). In conclusion, we must end with a cliche call for more research that will help us better understand the nature of problems that people have with gaming, and to what degree those problems entail clinical or diagnostic solutions. On the other hand, for occupational purposes, non-clinical and non-diagnostic instances might well be tackled with support services in a similar vein to “work ergonomics” that can improve everyday conditions and prevent future challenges without explicit intervention.

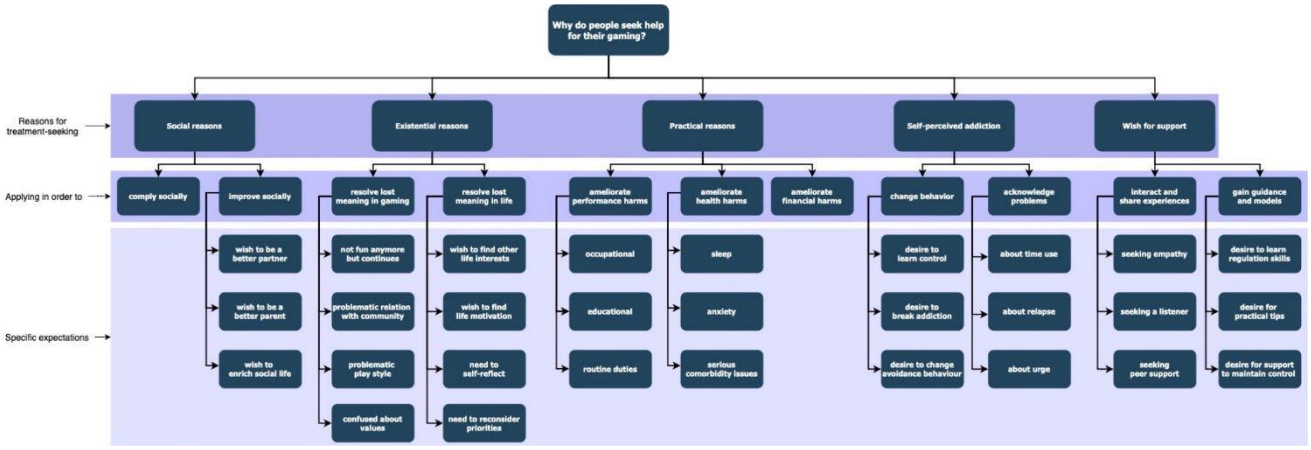

Figure 6. For a higher resolution image, see: https://osf.io/s4kdj/

RECOMMENDATIONS FOR OCCUPATIONAL STAKEHOLDERS

Most Finns regularly play various videogames, such as console, mobile and desktop games. Since gaming has become a central part of how people of all ages spend their time, understanding gaming as a culture and hobby is also important for employers. The importance of this matter is emphasised by the tensions between gaming, health and working life, which have risen to the surface especially by the World Health Organization's effective decision to start diagnosing "gaming disorder" in 2022. On the other hand, during the COVID-19 pandemic, the World Health Organization also encouraged people to play videogames e.g. for social health benefits. While the benefits obtained from gaming can reflect improved wellbeing of the working community, problems related to gaming may have an undesirable effect, for instance, on the individual's ability to work.

Based on the project outcomes, we propose a set of three recommendations, which can help both employers and employees to better construct and support gaming-work relationships in the present era.

Occupational health is a sum of all life components; gaming can serve as a component in many different ways

For most players at the working age, gaming is a hobby among others. A passion for gaming can speak of a balance between work and everyday life or an active life attitude. According to our results (Qualitative Study 1, Qualitative Study 2), employees who played for more than four hours daily had excellent work ability and they perceived gaming as an asset that supported their resilience. Gaming seems to connect to problems mainly when multiple challenges pile up on one individual over several years. Many who experience gaming in a web of problems may be at risk of being socially marginalised, and typically they do not have a long-term work contract.

However, they may have skills that are in demand on the job market, such as IT and programming skills.

Recommendation. As a default, ***employees'*** gaming should be perceived as a regular hobby, which at best balances and supports an individual's overall health and life.
Recommendation. To support excessively gaming individuals at the risk of social exclusion, ***employers'*** should further develop means to integrate them into work communities. Providing tasks that are challenging and rewarding in various ways can help in the process.

Problems related to gaming are rare and varied

No more than 0.4 % of our respondents in the nationally representative survey of the Finnish working population met the diagnostic gaming disorder criteria (Quantitative Study 2). It is essential to emphasise that the survey represented the entire working-age population of Finland in terms of age, geographical location and gender, without an overrepresentation of young people. Although the measures need much more development, it is evident that diagnostic-level problems concern a very small part of Finnish employees. Based on the follow-up research (Qualitative Study 2), it also seems that people report problems in cycles. For most of those who experience GRHPs, the problems had already disappeared after a year (Quantitative Study 2). Although more research is needed to more accurately answer several open questions, the results are somewhat clear in one regard: the current prevalence of gaming is not a reason to panic from the viewpoint of Finnish working life and wellbeing. At the same time, it is good to emphasise that in clinically significant instances the life situation seems to be difficult overall, in which case the availability of support services is important. Employers can help identify and understand such instances, and serve as supportive pillars in the process.

Recommendation. Marginalisation and social exclusion, with and without related gaming, do not usually allow for conventional education and career development. ***Employers*** could cooperate with public support services, such as the Restart program in Finland, in order to bring the skills of players who have been outcast in the society into working life.
Recommendation. Supporting ***employees*** who have gaming as an active hobby, e.g. by enabling occupational amateur esport teams or by involving remote workers in cooperative activities through gaming, can further improve the overall well-being and sense of community in the workplace.

Gaming is part of a wider network of technology at work and outside of it

Today, gaming is converging with many forms of technology and media. Social media, streaming services and interactive live broadcasts (live-stream) contain numerous game-like features, while videogames, in turn, contain diverse narrative and social features. In the future, it will be increasingly valuable for the employer to understand how both work and employees live and develop in these changing networks.

Recommendation. Gaming literacy is a critical part of today's media literacy. A basic understanding of how videogames and their mechanics work can help an ***employer*** better understand changes in working life, employee well-being and hidden skills. Meanwhile, for the ***employees***, good gaming literacy can help them reflect on their own media use as well as their role in today's technology-infused workplaces.

CONCLUSIONS

To our knowledge, this was so far the largest scientific project with a goal to investigate the relationship between gaming and work, and in particular, how health and wellbeing fit in that relationship. First, the project asked: (**RQ1**) *How to identify gaming-related health problems in the working adult population?* Based on the results, it is clear that the currently available survey measures cannot be used as reliable indicators. In the absence of better tools, for now, the best line of action appears to be the use of direct self-reflection—how often does one experience gaming problems?—as was originally done by the National Institute of Health in Finland (Salonen & Raisamo 2015). In both quantitative and qualitative analysis, using the self-identification of GRHPs as a means for assessing problems performed at least equally to other validated measures, in addition to which the brevity of the method makes it easy and efficient to apply in almost any context. In summary, much more research is needed to develop improved (clinically) validated measures. Meanwhile, a high frequency of self-reported problems can be used for screening individuals who may need support. We leave an extra note on the exploratory findings regarding financial problems: it appears that some individuals specifically have problems with using too much money on gaming. This phenomenon is best described as a type of impulsive shopping, thus not directly related to gaming or gambling *per se*. Needless to say, this new area requires more research.

Secondly, the project asked: (***RQ2)*** *How do gaming-related health problems affect work life, especially in Finland?* For this question, answers split between individual and population domains. On the latter level, the prevalence of gaming disorder in the Finnish working population—when measured by the ICD-11 criteria or problems being self-reported on the highest frequency—was low: approximately 0.4 %. For instance, compared to gambling disorder that currently has a prevalence of 1.4 % in the Finnish population (Castrén 2023), gaming disorder represents but less than a third. On the other hand, as highlighted earlier, the measures remain

underdeveloped and better knowledge will accumulate once clinically and otherwise validated instruments enter public usage. For individual life contexts, however, the results are in line with the premise that gaming can be related to health problems in some vulnerable groups. Based on the presently available data, in these groups gaming appears to serve primarily as an unsuccessful coping mechanism that is used to alleviate various underlying (mental and social) health challenges or trauma. Because of this, most people with notable GRHPs seem to suffer from marginalisation and social exclusion, and thus do not have major occupational responsibilities or careers.

Finally, we asked: *What is an optimal line of action in the current situation affected by "gaming disorder"?* In the light of the above findings, the current evidence implies that adverse gaming cycles—which represent the most notable GRHPs (hypothetically the identified 0.4 %)—begin primarily in adolescence and early adulthood in disadvantaged social contexts. This is typically a time when young people accrue valuable educational and initial work experience, and it is specifically these early resources that can be left unharvested for those to whom gaming is among their unsuccessful coping tools. Interventions that successfully combat this issue early on can improve the work ability and wellbeing in Finnish work life in the long run. At the same time, providing supportive gaming-related activities for those employees to whom gaming is successfully integrated in their lives can improve workplace wellbeing and enrich the employer's tool set for positive social engagement.

References

Adamkovič, M., Martončik, M., Karhulahti, V. M., & Ropovik, I. (2022). Network Structures of Internet Gaming Disorder and Gaming Disorder: Symptom Operationalization Causes Variation (in review). https://doi.org/10.31234/osf.io/g3jpt

von Bonsdorff, M. B., Seitsamo, J., Ilmarinen, J., von Bonsdorff, M. E. & Rantainen, T. (2012). Work ability as a determinant of old age disability severity: Evidence from the 28-year Finnish longitudinal study on municipal employees. *Aging Clinical and Experimental Research*, 24. 354–360.

Castén, S. (2023) Peliriippuvuus. *Duodecim*. https://www.terveyskirjasto.fi/dlk00406#

Chambers, C. (2017). The seven deadly sins of psychology. Princeton University Press. https://doi.org/10.1515/9781400884940

Chambers, C. D., & Tzavella, L. (2022). The past, present and future of registered reports. *Nature human behaviour*, 6 (1). 29-42. https://doi.org/10.1038/s41562-021-01193-7

Crüwell, S., van Doorn, J., Etz, A., Makel, M. C., Moshontz, H., Niebaum, J. C., ... & Schulte-Mecklenbeck, M. (2019). Seven easy steps to open science. *Zeitschrift für Psychologie*, 227 (4). 237–248. https://doi.org/10.1027/2151-2604/a000387

Flayelle, M., Brevers, D., King, D. L., Maurage, P., Perales, J. C., & Billieux, J. (2023). A taxonomy of technology design features that promote potentially addictive online behaviours. *Nature Reviews Psychology*, 2 (3). 136-150. http://dx.doi.org/10.1038/s44159-023-00153-4

Ilmarinen, J. (2009). Work ability – A comprehensive concept for occupational health research and prevention. *Scandinavian Journal of Work, Environment & Health*, 35 (1). 1–5. https://doi.org/10.5271/sjweh.1304

Johannes, N., Masur, P. K., Vuorre, M. & Przybylski, A. K. (2021). How should we investigate variation in the relation between social media and well-being? *PsyArXiv*. Retrieved from https://psyarxiv.com/xahbg.

John, L. K., Loewenstein, G., & Prelec, D. (2012). Measuring the prevalence of questionable research practices with incentives for truth telling. *Psychological science*, 23 (5). 524-532. https://doi.org/10.1177/0956797611430953

Karhulahti, V. M. (2021). Want the games industry to share data? Share yours. *Nature*, 592(7852), 26. https://doi.org/10.1038/d41586-021-00860-z

Karhulahti, V. M. (2022a). Registered reports for qualitative research. *Nature human behaviour*, 6(1), 4-5. https://doi.org/10.1038/s41562-021-01265-8

Karhulahti, V. M. (2022b). Reasons for qualitative psychologists to share human data. British *Journal of Social Psychology*. https://doi.org/10.1111/bjso.12573

Karhulahti, V. M. (2022c) Digipelaaminen ja työelämä. In H. Alho, M. Aalto, S. Castrén, & M. Pajula (Eds.), Peliriippuvuus (pp. 177). Kustannus Oy Duodecim.

Karhulahti, V. M., & Grabarczyk, P. (2021). Split-Screen: Videogame History through Local Multiplayer Design. *Design Issues*, 37 (2). 32-44. https://doi.org/10.1162/desi_a_00634

Karhulahti, V. M., Nerg, H., Laitinen, T., Päivinen, A., & Chen, Y. (2022a). Eight Hypotheses on Technology Use and Psychosocial Wellbeing: A Bicultural Phenomenological Study of Gaming during the COVID-19 Pandemic. *Current Psychology*. https://doi.org/10.1007/s12144-022-03586-x

Karhulahti, V. M., Siutila, M., Vahlo, J., & Koskimaa, R. (2022b). Phenomenological strands for gaming disorder and esports play: a qualitative registered report. *Collabra: Psychology*, 8(1), 38819. https://doi.org/10.1525/collabra.38819

Karhulahti, V. M., Vahlo, J., Martončik, M., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2022c). Ontological diversity in gaming disorder measurement: a nationally representative registered report. *Addiction Research & Theory*, 31 (3). https://doi.org/10.1080/16066359.2022.2115033

Karhulahti, V. M., Martončik, M., & Adamkovič, M. (2023a). Measuring Internet gaming disorder and gaming disorder: a qualitative content validity analysis of validated scales. *Assessment*, 30(2), 402-413. https://doi.org/10.1177/10731911211055

Karhulahti, V. M., Adamkovič, M., Vahlo, J., Martončik, M., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2023b). Reply to Billieux and Fournier (2022): collaborative shortcut to ontological diversity. *Addiction Research & Theory*, 31(3), 174-177. https://doi.org/10.1080/16066359.2022.2160448

Karhulahti, V. M., Vahlo, J., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2023c) Videopelaamisen, työkyvyn ja työstä palautumisen suhde: kansallisesti edustava rekisteröity tutkimusraportti. *Psykologia* 58 (2), 130–145. ISSN 2670-322X.

Karhulahti, V., Nuutinen, S., & Lukka, L. (2023d). Why do adults seek treatment for gaming (disorder)? A qualitative study. *Humanities and Social Sciences Communications*. DOI: 10.1057/s41599-023-01775-y

Karhulahti, V. M., Siutila, M., Vahlo, J., & Koskimaa, R. (2023e). Life Thinning and Gaming Disorder: A Longitudinal Qualitative Registered Report (in review). https://doi.org/10.31234/osf.io/rfbcu

Kinnunen, U. & Mauno, S. (2009) (ed.). *Irtiottoja työstä. Työkuormituksesta palautumisen psykologia*. Tampere University Press.

Kinnunen, J., Tuomela, M., & Mäyrä, F. (2022). *Pelaajabarometri 2022: Kohti uutta normaalia*. Tampereen yliopisto.

Kiraly, O., Sleczka, P., Pontes, H. M., Urban, R., Griffiths, M. D., Demetrovics, Z.. (2017). Validation of the Ten-Item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 internet gaming disorder criteria. *Addictive Behaviors*, 64. 253–260. https://doi.org/10.1016/j.addbeh.2015.11.005

Lemmens, J. S., Valkenburg, P. M., Peter, J. (2009). Development and validation of a game addiction scale for adolescents. *Media Psychology*, 12 (1). 77–95. https://doi.org/10.1080/15213260802669458

Mauno, S., Hirvonen, R. & Kiuru, N. (2018). Children's life satisfaction: The roles of mothers' work engagement and recovery from work. *Journal of Happiness Studies*, 19 (5). 1373–1393. https://doi.org/10.1007/s10902-017-9878-6

McCrory, E., Foulkes, L., & Viding, E. (2022). Social thinning and stress generation after childhood maltreatment: A neurocognitive social transactional model of psychiatric vulnerability. *The Lancet Psychiatry*, 9 (10). 828–837. https://doi.org/10.1016/s2 215-0366(22)00202-4

Reinecke, L. (2009). Games at work: The recreational use of computer games during working hours. *Cyberpsychology & Behavior*, 12 (4). 461–465. https://doi.org/10.1089/cpb.2009.0010

Ross, D. R., Finestone, D. H., & Lavin, G. K. (1982). Space invaders obsession. *JAMA*, 248 (10), 1177-1177. https://doi.org/10.1001/jama.1982.03330100017009

Schönbrodt, F., Gärtner, A., Frank, M., Gollwitzer, M., Ihle, M., Mischkowski, D., Phan, L. V., Schmitt, M., Scheel, A. M., Schubert, L., Steinberg, U., Leising, D. (2023). Responsible Research Assessment I: Implementing DORA for hiring and promotion in psychology. *PsyArXiv*. Retrieved from https://psyarxiv.com/rgh5b

Munafò, M. R., Nosek, B. A., Bishop, D. V., Button, K. S., Chambers, C. D., Percie du Sert, N., Simonsohn, U., Wagenmakers, E-J., Ware J. J., Ioannidis, J. (2017). A manifesto for reproducible science. *Nature human behaviour*, 1. https://doi.org/10.1038/s41562-016-0021

Pontes, H. M., Schivinski, B., Sindermann, C., Li, M., Becker, B., Zhou, M., Montag, C. (2021). Measurement and conceptualization of gaming disorder according to the World Health Organization framework: the development of the Gaming Disorder Test. *International Journal of Mental Health Addiction*. 19 (2). 508–528. https://doi.org/10.1007/s11469-019-00088-z

Salonen A., Raisamo S. (2015). Suomalaisten rahapelaaminen 2015: Rahapelaaminen, rahapeliongelmat ja rahapelaamiseen liittyvät asenteet ja mielipiteet 15-74-vuotiailla. THL.

Siutila, M. (2021) Gaming at the Workplace: Human Relations Perspectives. *Centre of Excellence Blog*. https://coe-gamecult.org/2021/08/30/miia-siutila-gaming-at-the-workplace-human-relations-perspectives/

Smaldino, P. E., & McElreath, R. (2016). The natural selection of bad science. *Royal Society open science*, 3 (9). https://doi.org/10.1098/rsos.160384

Stevens, M. W., Dorstyn, D., Delfabbro, P. H., & King, D. L. (2021). Global prevalence of gaming disorder: A systematic review and meta-analysis. *Australian & New Zealand Journal of Psychiatry*, 55 (6). 553–568. https://doi.org/10.1177/0004867420962851

Vahlo, J., Ollila, J. & Koponen, A. (2015). Digitaalinen pelaa-minen työhyvinvoinnin edistämisessä. Sarja A Tutkimusraportteja. Turku School of Economics, University of Turku.

Xiao, L. Y., & Henderson, L. L. (2021). Towards an ethical game design solution to loot boxes: a commentary on King and Delfabbro. *International Journal of Mental Health and Addiction*, 19 (1). 177-192. https://doi.org/10.1007/s11469-019-00164-4

Project publications

Adamkovič, M., Martončik, M., Karhulahti, V. M., & Ropovik, I. (2022). Network Structures of Internet Gaming Disorder and Gaming Disorder: Symptom Operationalization Causes Variation (in review). https://doi.org/10.31234/osf.io/g3jpt

Karhulahti, V. M. (2021). Want the games industry to share data? Share yours. *Nature*, 592(7852), 26. https://doi.org/10.1038/d41586-021-00860-z

Karhulahti, V. M. (2022a). Registered reports for qualitative research. *Nature human behaviour*, 6(1), 4-5. https://doi.org/10.1038/s41562-021-01265-8

Karhulahti, V. M. (2022b). Reasons for qualitative psychologists to share human data. British *Journal of Social Psychology*. https://doi.org/10.1111/bjso.12573

Karhulahti, V. M. (2022c) Digipelaaminen ja työelämä. In H. Alho, M. Aalto, S. Castrén, & M. Pajula (Eds.), Peliriippuvuus (pp. 177). Kustannus Oy Duodecim.

Karhulahti, V. M., Nerg, H., Laitinen, T., Päivinen, A., & Chen, Y. (2022a). Eight Hypotheses on Technology Use and Psychosocial Wellbeing: A Bicultural Phenomenological Study of Gaming during the COVID-19 Pandemic. *Current Psychology*. https://doi.org/10.1007/s12144-022-03586-x

Karhulahti, V. M., Siutila, M., Vahlo, J., & Koskimaa, R. (2022b). Phenomenological strands for gaming disorder and esports play: a qualitative registered report. *Collabra: Psychology*, 8(1), 38819. https://doi.org/10.1525/collabra.38819

Karhulahti, V. M., Vahlo, J., Martončik, M., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2022c). Ontological diversity in gaming disorder measurement: a nationally representative registered report. *Addiction Research & Theory*, 31 (3). https://doi.org/10.1080/16066359.2022.2115033

Karhulahti, V. M., Adamkovič, M., Vahlo, J., Martončik, M., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2023d). Reply to Billieux and Fournier (2022): collaborative shortcut to ontological diversity. *Addiction Research & Theory*, 31(3), 174-177. https://doi.org/10.1080/16066359.2022.2160448

Karhulahti, V. M., Martončik, M., & Adamkovič, M. (2023a). Measuring Internet gaming disorder and gaming disorder: a qualitative content validity analysis of validated scales. *Assessment*, 30(2), 402-413. https://doi.org/10.1177/10731911211055

Karhulahti, V. M., Vahlo, J., Munukka, M., Koskimaa, R., & von Bonsdorff, M. (2023b) Videopelaamisen, työkyvyn ja työstä palautumisen suhde: kansallisesti edustava rekisteröity tutkimusraportti. *Psykologia* 58 (2), 130–145. ISSN 2670-322X.

Karhulahti, V., Nuutinen, S., & Lukka, L. (2023c). Why do adults seek treatment for gaming (disorder)? A qualitative study. *Humanities and Social Sciences Communications*. DOI: 10.1057/s41599-023-01775-y

Karhulahti, V. M., Siutila, M., Vahlo, J., & Koskimaa, R. (2023d). Life Thinning and Gaming Disorder: A Longitudinal Qualitative Registered Report (in review). https://doi.org/10.31234/osf.io/rfbcu

Siutila, M. (2021) Gaming at the Workplace: Human Relations Perspectives. *Centre of Excellence Blog*. https://coe-gamecult.org/2021/08/30/miia-siutila-gaming-at-the-workplace-human-relations-perspectives/

Appendix: Unpublished manuscript in Finnish

Authors: Veli-Matti Karhulahti, Jukka Vahlo, Mikaela von Bonsdorff

Pelaamiseen liittyvät terveyden ongelmat ja työhyvinvointi Suomessa

Lähtökohdat: Vuodesta 2022 lähtien ICD-11 on tunnistanut sekä raha- että videopelaamiseen liittyvät mielenterveyshäiriöt. Ei ole tiedossa, mikä on näiden rooli Suomen työhyvinvoinnissa.

Menetelmät: Keräsimme kyselyaineiston (*N*=1000), joka on Suomen työväestöä kansallisesti edustava asuinalueen, iän ja sukupuolen mukaan. Hyödyntäen sekä raha- että videopelaamisen terveyden ongelmia mittaavia validoituja mittareita, tunnistimme aineistosta vastaavat riskiryhmät. Näitä vertailtiin muuhun väestöön varianssianalyysin avulla ahdistuksen, masennuksen, yksinäisyyden, työkyvyn, työhyvinvoinnin ja työstä palautumisen suhteen.

Tulokset: Sekä video- että rahapelaaminen mittareiden mukaisella riskitasolla oli yhteydessä heikompaan työhyvinvointiin ja terveyteen verrattuna muihin vastaajiin. Etenkin riskitason videopelaaminen oli negatiivisesti yhteydessä kaikkiin mitattuihin terveyden ja hyvinvoinnin osa-alueisiin ja efektikoot olivat ajoittain suuret.

Päätelmät: Tulokset indikoivat, että ongelmat kasaantuvat vaikeissa elämäntilanteissa: riskiryhmissä esiintyi niin ahdistuksen, masennuksen, yksinäisyyden, kuten myös heikon työkyvyn, työstä palautumisen ja työhyvinvoinnin oireita. Tulevassa tutkimuksessa on tarpeellista tarkastella ongelmien kausaliteettia sekä etiologiaa.

Gaming and Gambling Related Health Problems in Finnish Workplace Wellbeing

Background: Since 2022, both gaming and gambling disorders have been part of the ICD-11. It is not known yet what is the role of such health problems in Finnish workplace wellbeing.

Methods: We collected a nationally representative sample of the Finnish work population by age, gender, and region. Gaming and gambling based risk groups were identified by validated screening scales and ANOVA was utilised to map out their associations with anxiety, depression, loneliness, work ability, work engagement, and work recovery.

Results: Both gaming and gambling based risk groups were associated with lower health and work wellbeing scores, when compared to other respondents. Especially the gaming based risk group was negatively associated with all measured health domains with relatively large effect sizes.

Conclusions: The results imply that problems accumulate in difficult life situations: both risk groups reported symptoms of anxiety, depression, and loneliness, while also having lower work ability, work engagement, and work recovery scores. Future research should focus on investigating casualties and aetiology.

Terveydelle ongelmallisen pelaamisen erilaisia muotoja on tutkittu vuosikymmeniä. Pitkään kyseinen tutkimus koski lähinnä rahapelaamista, mutta vuoden 2022 alusta lähtien myös digitaaliseen viihdepelaamiseen (videopelaamiseen) liittyvät mielenterveyden ongelmat ovat kuuluneet ICD-11-diagnostiikan piiriin (https://icd.who.int). Suomessa videopelaamisesta on tullut suosittua myös aikuisten keskuudessa ja monille pelaaminen on harrastus, johon kuluu useita tunteja päivässä (1). Teknologian nopea kehitys ja verkko-ominaisuuksien leviäminen muuttavat ja yhdistävät raha- ja videopelaamisen kenttiä jatkuvasti (ks. 2). Vuosien 2007 ja 2019 välillä esimerkiksi internetpelaaminen on lisääntynyt kaikissa työssäkäyntiluokissa (3). Videopelaamisen yhteyttä työterveyteen ja työkykyyn on kuitenkin tutkittu vasta vähän (4). Sama pätee yllättäen rahapelaamiseen: vaikka lähes 60 prosenttia rahapelien ongelmapelaajista ovat työssäkäyviä kansalaisia, Suomessa ei ole julkaistu yhtään tutkimusta siitä, miten rahapeliongelmat näkyvät työpaikoilla ja miten niitä kohdataan (5). Tämän tutkimuksen tavoitteena oli rakentaa alustava käsitys siitä, missä määrin raha- ja videopelaamisen riskit liittyvät suomalaisten työhyvinvointiin ja työkykyyn.

Aineisto ja menetelmät

Tutkimukselle haettiin paikallisen eettisen toimikunnan puolto. Toteutimme sen jälkeen keväällä 2021 kyselyn Suomen työväestöä edustaville vastaajille hyödyntäen kyselyaineistojen keräämiseen erikoistuneen Bilendin palveluja. Kyselyyn (N=1000) vastasi 521 miesvastaajaa (52,1%), 477 naisvastaajaa (47,7%), yksi muunsukupuolinen sekä henkilö, joka ei halunnut kertoa sukupuoltaan. Vastaajien keski-ikä oli 41,8 vuotta, ja aineisto kerättiin siten, että viisi ikäryhmää (18-24-vuotiaat n=92, 25-34-vuotiaat n=230, 35-44-vuotiaat n=250, 45-54-vuotiaat n=240 ja 55-65-vuotiaat n=188) olivat tasaisesti edustettuina. Aineisto oli lisäksi maantieteellisesti edustava Suomen läänien mukaan.

Kyselyyn otettiin mukaan sekä koko- että osa-aikaisessa palkkasuhteessa olevia työntekijöitä sekä työttömiä. Aineistosta oli poistettu huolimattomat vastaajat (pictogram-tarkastus), liian nopeat vastaajat (alle puolet keskiarvoisesta vastausajasta), samaa linjaa toistavat vastaajat ja täysin ristiriitaiset vastaajat (kontrollikysymys). Tutkimus suoritettiin Stata/SE 16.1. -ohjelmalla ja seuraavilla mittareilla (Taulukko 1).

Taulukko 1. Käytetyt mittarit.

Mittari	Mitattu rakenne	Luotettavuus	Asteikko
Game Addiction Scale	Ongelmallinen videopelaaminen	Alkuperäinen validointi englanniksi (6) ja suomenkielinen versio testattu (7).	Seitsemän kysymystä (korkeampi arvo indikoi ongelmia), ohjeen mukainen riskiryhmän raja-arvo 4/7.
Brief Biosocial Screen for Gambling	Ongelmallinen rahapelaaminen	Alkuperäinen validointi englanniksi (8) ja suomenkielinen versio testattu (9).	Kolme kysymystä (korkeampi arvo indikoi ongelmia), ohjeen mukainen riskiryhmän raja-arvo ⅓.
PROMIS Global Physical Health	Fyysinen terveys, yleinen	Alkuperäinen validointi englanniksi (10) ja suomenkielinen versio testattu (11).	Korkeampi T-arvo indikoi parempaa terveyttä, esim. USA:n suositus 42–50 (hyvä) ja 35–41 (kelvollinen).
PROMIS Global Mental Health	Mielenterveys, yleinen	Alkuperäinen validointi englanniksi (10) ja suomenkielinen versio testattu (11).	Korkeampi T-arvo indikoi parempaa terveyttä, esim. USA:n suositus 40–48 (hyvä) ja 28–40 (kelvollinen)
Beck Depression Inventory	Masennus	Alkuperäinen validointi englanniksi (12) ja suomenkielinen versio testattu (13).	Korkeampi arvo indikoi masennusta.
Generalized Anxiety Disorder 7	Ahdistus	Alkuperäinen validointi englanniksi (14) ja suomenkielinen versio testattu (15).	Korkeampi arvo indikoi ahdistusta.
Perceived Loneliness	Koettu yksinäisyys	Alkuperäinen validointi englanniksi (16) ja suomenkielinen versio testattu (17).	Korkeampi arvo indikoi yksinäisyyttä.
Työstä palautuminen	Työstä palautuminen	Kehitetty ja validoitu suomenkieliseen käyttöön (18).	Korkeampi arvo indikoi hyvää palautumista.
Työkykyindeksi	Työkyky	Useita validointeja sekä suomeksi että muilla kielillä (19). Käytämme lyhyttä versiota, joka on todettu toimivaksi aiemmassa tutkimuksessa (20).	Korkeampi arvo indikoi hyvää työkykyä.
Utrecht Work Engagement Scale	Työn imu	Alkuperäinen monikansallinen validointi (21) ja suomenkielinen versio testattu (22).	Korkeampi arvo indikoi hyvää työhyvinvointia.

Rakensimme kahden ensimmäisen mittarin perusteella pelaamisen suhteen riskiryhmässä olevien vastaajien joukot sekä muiden vastaajien ryhmän, ja sovelsimme näiden ja muiden vastaajien vertailuun yksisuuntaista varianssianalyysia. Osa vastaajista kuului sekä video-

että rahapelaamisen ongelmien riskiryhmiin. Selvitimme kahden ryhmän välisessä vertailussa erojen merkitsevyyttä myös *t*-testillä käyttäen Welchin korjausta. Kolmen ryhmän (rahapelaamisen ja videopelaamisen riskiryhmät sekä muut vastaajat) vertailuasetelmasta ja useista mittareista johtuen valitsimme *p*-arvon alfa-tasoksi 0,025.

Tulokset

Jokaisen tutkimukseen valitun mittarin keskiarvossa oli tilastollisesti merkitsevä ero ryhmien välillä yksisuuntaisella varianssianalyysilla mitattuna (Taulukko 2). Laskimme seuraavaksi keskiarvojen efektikoon ja tilastollisen voiman ryhmien välillä selvittääksemme näiden erojen merkityksellisyyttä. Terveyden vertailussa keskiarvojen erot olivat suurimmat ja merkityksellisimmät videopelaamisen riskiryhmään kuuluneiden ja muiden vastaajien välillä ahdistuneisuuden (*d*=1,07, 95% LV 0,81-1,34, tilastollinen voima 1.00), masentuneisuuden (*d*=0,77, 95% LV 0,52-1,01, tilastollinen voima 1,00) ja yksinäisyyden (*d*=0,50, 95% LV 0,27-0,73, tilastollinen voima 0,96) osalta. Työhyvinvoinnin kohdalla videopelaamisen riskiryhmän arvot olivat muita vastaajia selvästi alhaisemmat työn imun (*d*=0,57, 95% LV 0,33-0,80, tilastollinen voima 0,99) ja työkyvyn (*d*=0,46, 95% LV 0,23-0,69) kohdalla.

Taulukko 2. *Video- ja rahapelaamisen riskiryhmien terveyden ja työhyvinvoinnin vertailu muiden kyselyyn osallistuneiden vastauksiin. Yksisuuntaiset varianssianalyysit ryhmien välillä *p<0,025, **p<0.01, ***p<0.001. KA=keskiarvo, KH=keskihajonta*

	Videopelaaminen, riskiryhmä (*n*=89)		**Rahapelaaminen, riskiryhmä (*n*=110)**		**Muut vastaajat (*n*=835)**	
	KA	KH	KA	KH	KA	KH
Viikoittainen videopelien peliaika tunteina***	13,70	8,05	6,53	8,49	4,41	8,45
Fyysinen terveys**	42,55	8,05	43,72	6,98	44,29	7,78
Mielenterveys***	44,48	8,89	45,08	8,54	47,23	8,50
Ahdistuneisuus***	2,21	0,93	1,98	0,92	1,48	0,64
Masentuneisuus***	2,01	0,93	1,89	0,83	1,48	0,66
Yksinäisyys**	1,78	0,70	1,67	0,72	1,46	0,61
Työstä palautuminen**	2,73	1,12	2,42	1,00	2,35	1,05
Työkyky***	6,60	2,18	7,24	2,09	7,56	2,08
Työn imu***	4,15	1,68	4,68	1,74	5,10	1,65

Kun lisäksi riskiryhmän videopelaajien itsearvioitu terveys oli muita vastaajia alhaisempi myös yleisen fyysisen terveyden (*d*=0,25, 95% LV 0,03-0,47, tilastollinen voima 0,38) ja yleisen mielenterveyden osalta (*d*=0,36, 95% LV 0,13-0,58, tilastollinen voima 0,70) sekä työstä palautumisen suhteen (*d*=0,36, 95% LV 0,14-0,59, tilastollinen voima 0,78), voidaan heidän terveyden ja työhyvinvoinnin tason sanoa olevan yleisesti ottaen muita työssäkäyviä alhaisempi.

Rahapelaajien riskiryhmän ja muiden vastaajien vertailu osoitti myös näiden kahden ryhmän välisen terveyden ja työhyvinvoinnin eroavan toisistaan. Kuitenkin kaikkien mittareiden osalta nämä erot olivat maltillisemmat kuin videopelaajien riskiryhmän ja muiden vastaajien väliset erot. Terveyden osalta rahapelaamisen riskiryhmäläisten arvot olivat heikommat ahdistuneisuuden (*d*=0,73, 95% LV 0,51-0,95, tilastollinen voima 1,00), masentuneisuuden (*d*=0,61, 95% LV 0,40-0,82, tilastollinen voima 0,99), yksinäisyyden (*d*=0,33, 95% LV 0,13-0,54, tilastollinen voima 0,74) ja yleisen mielenterveyden (*d*=0,29, 95% LV 0,09-0,49, tilastollinen voima 0,71) kohdalla. Sen sijaan fyysisen terveyden osalta ero näiden ryhmien välillä ei ollut tilastollisesti merkitsevä (t-testi Welchin korjauksella $p>0,025$). Rahapelaamisen riskiryhmässä työhyvinvointi ei poikennut muiden työssäkäyvien vastaavista tilastollisesti merkitsevällä tavalla työstä palautumisen (*d*=0,04, 95% LV -0,23 ja 0,16, *p*=0,720) tai työkyvyn osalta (*d*=0,11, 95% LV -0,09 ja 0,31, *p*=0,266). Työstä imun osalta arvo kuitenkin poikkesi muista vastaajista, mutta eron efekti oli pieni (*d*=0,24, 95% LV 0,05-0,48, tilastollinen voima 0,53).

Koska videopelaajien riskiryhmällä oli huomattava yhteys terveyden ongelmiin, laskimme tulosten varmistamiseksi kyseiselle ryhmälle myös logistisen regression (Liite 1). Analyysin mukaan etenkin ahdistuneisuus ja mies-sukupuoli ovat yhteydessä videopelaamiseen liittyvien terveysongelmien riskiryhmään kuuluvuuteen.

Päätelmät

Tämä kansallisesti edustava tutkimus on pelaamisen ja työhyvinvoinnin suhteen ensimmäinen laatuaan Suomessa. Tulosten mukaan sekä video- että rahapelaaminen psykometristen mittareiden mukaisella riskitasolla oli yhteydessä heikompaan työhyvinvointiin ja terveyteen verrattuna muihin vastaajiin. Etenkin videopelaamisen kohdalla efektikoot olivat ajoittain niin suuret (ahdistuneisuus, $d = 1,07$; masentuneisuus, $d = 0,77$), että niihin tulee suhtautua vakavasti. Samaan aikaan on hyvä pitää mielessä, että poikkileikkaustutkimus ei mahdollista kausaliteetin tarkastelua ja relevanttien mittareiden kliinisen validiteetin tutkimus on vasta alussa (23).

Näyttää siltä, että erilaiset ongelmat kasaantuvat vaikeissa elämäntilanteissa: samassa pelaajien ryhmässä esiintyi yhtä aikaa niin ahdistuksen, masennuksen, yksinäisyyden, kuten myös heikon työkyvyn, työstä palautumisen ja työhyvinvoinnin oireita. Riskitason videopelaaminen oli negatiivisesti yhteydessä kaikkiin mitattuihin terveyden ja hyvinvoinnin osa-

alueisiin (vrt. 24). Tämä indikoi, että terveyden ja hyvinvoinnin haasteet kyseisessä ryhmässä eivät ole helposti ratkaistavissa. Tulevassa tutkimuksessa olisi tarpeellista tarkastella laadullisin menetelmin ja pitkittäisseurannan keinoin yhteyden tarkempaa etiologiaa. Miten ihminen päätyy tilanteeseen, jossa kaikki terveyden ja työhyvinvoinnin osa-alueet ovat heikentyneet ja miten nämä yhteydet kehittyvät pidemmällä aikavälillä? Kyseinen tutkimus voi auttaa paremmin ymmärtämään, mikä on sekä video- että rahapelaamisen rooli näissä elämänkaaren eri kohdissa. Joitain teoreettisia malleja on jo olemassa, mutta ne ovat edelleen kiisteltyjä (ks. 25).

Eräs varteenotettava hypoteesi on, että ongelmallinen suhde pelaamisen eri muotoihin tuo mukanaan monenlaisia terveyden ongelmia; toisaalta on myös ehdotettu, että monilla pelaaminen toimii olemassa olevien ongelmien omatoimisena "lääkityksenä" tai opittuna pakokeinona (26). Sekä laadullisten että määrällisten aineistojen pohjalle tulevaisuudessa rakennettavat verkostomallit tulevat todennäköisesti löytämään monisuuntaisia yhteyksiä, jotka yksinään ovat harmittomia, mutta tietyissä kontekstissa voivat johtaa lumipallon tavoin kasvaviin ongelmiin (27). Suosittelemme työnantajia ja työhyvinvoinnin ammattilaisia kiinnittämään huomiota työntekijöiden terveyteen ehkäisevästi, jotta pelaamiseen yhteydessä olevat mielenterveyden ongelmat voidaan tunnistaa ja hoitaa ennaltaehkäisevästi ja työkyvyn säilyttävällä tavalla.

Lähteet

1. Vahlo J, Karhulahti VM, Koponen A. Tasavallan core-gamer: videopelaamisen piirteet Suomessa, Kanadassa ja Japanissa. Pelitutkimuksen vuosikirja. 2018:35-59.
2. Macey J, Cantell M, Tossavainen T, Karjala A, Castrén S. How can the potential harms of loot boxes be minimised?: Proposals for understanding and addressing issues at a national level. Journal of Behavioral Addictions. 2022 Apr 20.
3. Salonen, A, Lind, K, Hagfors, H, Castrén, S & Kontto, J. Rahapelaaminen, peliongelmat ja rahapelaamiseen liittyvät asenteet ja mielipiteet vuosina 2007-2019: Suomalaisten rahapelaaminen 2019. Helsinki: THL; 2020.
4. Karhulahti, V. Digipelaaminen ja työelämä. Teoksessa *Peliriippuvuus*. Hannu Alho, Mauri Aalto, Sari Castrén, Mari Pajula (toim.). Duodecim; 2022.
5. Jaakkola, T & Alho, H. Rahapeliongelman vaikutus työkykyyn ja työpanokseen. Teoksessa *Peliriippuvuus*. Hannu Alho, Mauri Aalto, Sari Castrén, Mari Pajula (toim.). Duodecim; 2022.
6. Lemmens JS, Valkenburg PM, Peter J. Development and validation of a game addiction scale for adolescents. Media psychology. 2009 Feb 26;12(1):77-95.
7. Männikkö N, Billieux J, Kääriäinen M. Problematic digital gaming behavior and its relation to the psychological, social and physical health of Finnish adolescents and young adults. Journal of behavioral addictions. 2015 Dec 21;4(4):281-8.
8. Gebauer L, LaBrie R, Shaffer HJ. Optimizing DSM-IV-TR classification accuracy: A brief biosocial screen for detecting current gambling disorders among gamblers in the general household population. The Canadian Journal of Psychiatry. 2010 Feb;55(2):82-90.

9. Castrén, S, Salonen, AH, Alho, H ym. Past-year gambling behaviour among patients receiving opioid substitution treatment. Substance Abuse Treatment, Prevention & Policy. 2015 Jan;10(4).
10. Hays RD, Schalet BD, Spritzer KL, Cella D. Two-item PROMIS® global physical and mental health scales. Journal of patient-reported outcomes. 2017 Dec;1(1):1-5.
11. THL (2021) Kansallinen PROMIS-keskus. https://thl.fi/fi/web/toimintakyky/toimintakyvyn-arviointi/kansallinen-promis-keskus
12. Beck AT, Steer RA, Brown GK. Beck depression inventory (BDI-II). London, UK: Pearson; 1996.
13. Aalto AM, Elovainio M, Kivimäki M, Uutela A, Pirkola S. The Beck Depression Inventory and General Health Questionnaire as measures of depression in the general population: a validation study using the Composite International Diagnostic Interview as the gold standard. Psychiatry research. 2012 May 15;197(1-2):163-71.
14. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of internal medicine. 2006 May 22;166(10):1092-7.
15. Kujanpää T, Ylisaukko-Oja T, Jokelainen J, Hirsikangas S, Kanste O, Kyngäs H, Timonen M. Prevalence of anxiety disorders among Finnish primary care high utilizers and validation of Finnish translation of GAD-7 and GAD-2 screening tools. Scandinavian journal of primary health care. 2014 Jun 1;32(2):78-83.
16. Weiss, RS. The experience of emotional and social isolation. Cambridge, MA: MIT Press; 1973.
17. Tilvis R, Pitkälä K, Jolkkonen J, Strandberg T. Feelings of loneliness and 10-year cognitive decline in the aged population. Lancet. 2000;356:77-8.
18. Mauno S, Hirvonen R, Kiuru N. Children's life satisfaction: The roles of mothers' work engagement and recovery from work. Journal of Happiness Studies. 2018 Jun;19(5):1373-93.
19. Ilmarinen J. The work ability index (WAI). Occupational medicine. 2007 Mar 1;57(2):160.
20. Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a short questionnaire: A cross-national study. Educational and psychological measurement. 2006 Aug;66(4):701-16.
21. von Bonsdorff MB, Seitsamo J, Ilmarinen J, von Bonsdorff ME, Taina R. Work ability as a determinant of old age disability severity: evidence from the 28-year Finnish Longitudinal Study on Municipal Employees. Aging Clinical and Experimental Research. 2012 Aug;24(4):354-60.
22. Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a short questionnaire: A cross-national study. Educational and psychological measurement. 2006 Aug;66(4):701-16.
23. Hakanen J. Työn imun arviointimenetelmä–työn imu-menetelmän (Utrecht Work Engagement Scale) käyttäminen, validiointi ja viitetiedot Suomessa. Helsinki, Finland: Finnish Institute of Occupational Health. 2009.
24. Karhulahti VM, Martončik M, Adamkovič M. Measuring Internet gaming disorder and gaming disorder: a qualitative content validity analysis of validated scales. Assessment. 2021 Nov 2:10731911211055435.
25. Davidson BI, Shaw H, Ellis DA. Fuzzy constructs in technology usage scales. Computers in Human Behavior. 2022 Aug 1;133:107206.

26. West, R & Brown, J. Theory of addiction. Toinen painos. Hoboken, NJ: Wiley; 2013.
27. Kardefelt-Winther D. Conceptualizing Internet use disorders: Addiction or coping process? Psychiatry and Clinical Neurosciences. 2017 Jul;71(7):459-66.
28. Borsboom D, Deserno MK, Rhemtulla M, Epskamp S, Fried EI, McNally RJ, Robinaugh DJ, Perugini M, Dalege J, Costantini G, Isvoranu AM. Network analysis of multivariate data in psychological science. Nature Reviews Methods Primers. 2021 Aug 19;1(1):1-8.

Liite 1. *Logistinen regressio, jossa videopelaamisen ongelmien riskiryhmään kuuluvuutta selitetään terveyden ja työhyvinvoinnin mittareilla, iällä ja sukupuolella (R2=0.183). Mallissa ahdistuneisuus, nuorempi ikä (ryhmässä 25-34-vuotiaat) sekä mies-sukupuoli ovat yhteydessä siihen, kuuluuko vastaaja videopelaamisen terveyden ongelmien riskiryhmään.*

Videopeliongelmaryhmä (n=89)	Regressiokerroin	Keskivirhe	z	P>z	95% luottamusväli	
Ahdistuneisuus	1,028	0,201	5,110	0,000	0,634	1,422
Masentuneisuus	-0,009	0,232	-0,040	0,968	-0,465	0,446
Koettu yksinäisyys	0,120	0,219	0,550	0,585	-0,310	0,550
Yleinen mielenterveys	0,034	0,023	1,530	0,127	-0,010	0,079
Yleinen fyysinen terveys	-0,023	0,024	-0,970	0,331	-0,070	0,024
Työstä palautuminen	-0,058	0,136	-0,420	0,672	-0,324	0,209
Työkyky	-0,010	0,073	-0,130	0,897	-0,153	0,134
Työn imu	-0,138	0,085	-1,620	0,105	-0,305	0,029
Ikäryhmä 1 (18-24-vuotiaat)	0,972	0,537	1,810	0,070	-0,079	2,024
Ikäryhmä 2 (25-34-vuotiaat)	1,246	0,447	2,790	0,005	0,371	2,122
Ikäryhmä 3 (35-44-vuotiaat)	0,724	0,454	1,600	0,111	-0,166	1,614
Ikäryhmä 4 (45-54-vuotiaat	0,114	0,514	0,220	0,824	-0,894	1,123
Ikäryhmä 5 (55-65-vuotiaat)	0,000	(määritelty puuttuvaksi muuttujaksi)				
Nais-sukupuoli	-1,246	0,276	-4,510	0,000	-1,787	-0,704

Ydinasiat

- Sekä raha- että videopelaaminen psykometristen mittareiden mukaisella riskitasolla on yhteydessä heikompaan työhyvinvointiin ja terveyteen
- Tulosten valossa lukuisat terveysongelmat *kasaantuvat* vaikeissa elämäntilanteissa ja riskitason pelaaminen voi olla osa kyseisiä ongelmien ryppäitä
- Pelaamisen terveysongelmien mittauksen kehitys on vasta alussa, joten tulokset ovat alustavia ja tulvassa tutkimuksessa on tärkeää tarkastella ilmiötä laadullisin menetelmin

Authors

Veli-Matti Karhulahti, PhD, Docent, Department of Music, Art, and Culture Studies, University of Jyväskylä, ORCID ID: 0000-0003-3709-5341

Miia Siutila, MA, PhD Researcher, Department of Music, Art, and Culture Studies, University of Jyväskylä, ORCID ID: 0000-0003-0287-808X

Valtteri Kauraoja, MA, Department of Music, Art, and Culture Studies, University of Jyväskylä, ORCID ID: 0000-0002-3573-5555