

Hietajärvi, Lauri (2021):
Digital media, addiction and wellbeing. In Science Advice Initiative of Finland (ed.) (2021). Phenomenon map: The impacts of digital media on children, young people and senior citizens, p. 50–58.
www.acadsci.fi/sofi/phenomenon-map-the-impacts-of-digital-media

EVIDENCE SUMMARY

DIGITAL MEDIA, ADDICTION AND WELLBEING

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Summary

- Problematic and excessive use of digital media is known to exist. The problems related to digital media use are linked to challenges in wellbeing, particularly symptoms of depression and anxiety.

In which area is there still a lack of knowledge?

- Efforts to clearly determine the problems related to media – whether this is a matter of a behavioural addiction or something else – have failed. There is variation in diagnoses, assessments of the prevalence of problems, and in care guidelines.
- Causal relations are not known. Are the problems in wellbeing the cause or the effect of problematic media consumption?

Recommendation

- Qualitative understanding of the problematic media use must be increased.
- Concepts must be used precisely, and the differences between various online services and content must be taken into consideration (for example, there is a significant difference between email, Facebook and pornography).
- It is also important to include exclusion criteria to the diagnostic criteria for addiction, as these enable ruling out an addiction.
- Causal relations must be determined to correctly target a diagnosis and treatment measures.

PROBLEMATIC DIGITAL MEDIA USE has been characterised and studied from the perspectives of addiction, obsessive behaviour and excessiveness. Studies have concerned areas such as the internet (both at a general level and in further detail in relation to topics such as online shopping, pornography and other online content), digital games, social media and smartphones

(see table on the following spread). While this behaviour is commonly referred to as an addiction, from a research perspective, the definitions of problematic use of digital media are still rather incomplete, and the field of research is plagued by the diversity of concepts and methodological problems¹. Although there have been efforts to include problematic media use in the field of

1 Ellis et al., 2018; Griffiths, 2018; Panova & Carbonell, 2018; Ryding & Kaye, 2018; Starcevic et al., 2018

behavioural addictions (DSM-5, 2013), the criteria and diagnostic methods of this area have been prepared for gambling addictions, and are deficient or incomplete, which may not make them appropriate for determining such an extensive and complex phenomenon².

The following theoretical models have been used in an aim to describe problematic media use:

1. In accordance with the so-called **components model of addiction**, generalised internet addiction is perceived as a consequence of biopsychosocial processes similar to those found in substance addiction: addictive behaviour is caused by an activation of the dopaminergic reward system of the brain which elicits pleasure in the user³. In other words, using the internet makes the user feel good or experience pleasure, resulting in repetitive behaviour.
2. Various **cognitive behavioural models** assume that media use is a consequence of a need to fulfil some more fundamental psychological need or a form of escapism, a desire to escape reality⁴.
3. According to **the model of compensatory internet use**, excessive digital media use results from compensating for challenges in other areas of life or for mental health symptoms⁵ rather than an addiction caused by digital media or a technological device.
4. According to the **I-PACE model** (Interaction of Person-Affect-Cognition-Execution)⁶, individual differences (person) and related factors exposing individuals to addiction (mental health symptoms, personality factors, genome) play a crucial role in the early stages of developing an addiction.

The development of addiction-like behaviour results from experiences of pleasure or appropriateness caused by interaction between environmental and situational factors.⁷

Despite these different theoretical models, it remains unclear whether the term addiction can describe problematic consumption of digital media sufficiently comprehensively. It at least appears that there are no grounds for referring to problematic smartphone use as addiction⁸. Many models for problematic behaviour would seem to be related to digital media use and no single explanatory model is universally applicable.

PROBLEMATIC GAMING is at least partly perceived as a stand-alone phenomenon, and is so far the only type of behaviour included in the ICD-11 (6C51.0 Gaming disorder, predominantly online); however, there is also no consensus of this among researchers⁹. For instance, withdrawal symptoms, characteristic to addictions, have not been described in detail in previous research¹⁰. There is no clear understanding of what all of this is about, and differing definitions make it more difficult to understand the meaning of the phenomenon at the practical level (see table on the following page). It would be important to determine behavioural addiction without pathologizing it, i.e. diagnosing normal human behaviour as a disease. The [OSF website](https://osf.io/q2vva/)¹¹ has a currently ongoing project for this definition development.

In addition to the lack of clarity in definitions, the research in problematic media use is marked by a poor level of evidence: The majority of research is based on data collected in a cross-sectional setting, which involves respondents personally assessing their media use. Most of the samples are non-representative convenience samples using data from most conveniently available subjects, which may lead to various biases in the biased sample

2 Billieux et al., 2019; Kardefelt-Winther et al., 2017; Kuss & Billieux, 2017

3 Kuss & Billieux, 2017

4 Griffiths, 2018; Ryding & Kaye, 2017

5 Kardefelt-Winther et al., 2017

6 Brand et al., 2019

7 *Affective-cognitive response guides execution*, which responds by further increasing individual differences.

8 Panova & Carbonell, 2018

9 Rumpf et al., 2019; Van Rooij et al., 2018

10 Kaptis et al., 2016

11 <https://osf.io/q2vva/>

META-ANALYSES AND SYSTEMATIC REVIEWS EXAMINING THE EXCESSIVE USE OF DIGITAL MEDIA

Source	Type	Operationalisation of excessive use	Number of studies	Total number of participants (N)
Fumero et al. (2018)	meta-analysis	<i>excessive internet use</i>	28	48,090
Fumero et al. (2019)	meta-analysis	<i>internet addiction</i>	23	35,684
Ioannidis et al. (2019)	meta-analysis	<i>problematic internet use</i>	40	2,922
Lanthier-Labonté et al. (2020)	systematic review	<i>problematic internet use</i>	44	357,964
Anderson et al. (2017)	systematic review	<i>problematic internet use</i>	29	36,808
Cheng et al. (2018)	meta-analysis	<i>internet gaming disorder</i>	69	58,834
Gonzalez-Bueso et al. (2018)	systematic review	<i>internet gaming disorder</i>	24	53,889
Paulus et al. (2018)	systematic review	<i>internet gaming disorder</i>	252	(not known)
Männikkö et al. (2020)	meta-analysis	<i>problematic gaming behaviour</i>	50	129,430
Casale & Banchi (2020)	systematic review	<i>problematic social media use</i>	21	30,657
Marino et al. (2018)	meta-analysis	<i>problematic Facebook use</i>	23	13,929
Sohn et al. (2019)	meta-analysis	<i>problematic smartphone use</i>	41	41,871
Mac Cárthaigh et al. (2020)	systematic review	<i>problematic smartphone use</i>	9	6,923

(not representative of the population). The used indicators and their interpretation may vary. Thus far, there has been rather limited utilisation of objective data depicting the actual quantity and quality of media consumption. Nevertheless, studies conducted using objective data indicate that, overall, the self-report data does not correspond to measured use¹², which reduces the reliability of most studies. As this is a topic that the general public may find interesting, there is also a major risk of selective reporting. So far, few studies have involved pre-registration of research questions and methods or open distribution of data and related materials. This has been mainly done

in the context of research in problematic gambling and only very recently¹³, as a result of which reviews on these topics are not yet available.

PREVALENCE OF PROBLEMATIC USE

Due to the methodological and diagnostic shortcomings presented above, no reliable information is available of the prevalence of problematic use. Estimates vary depending on the used battery of questions and the applied criteria. The following table presents the results concerning Finland in the WHO's most recent survey of

12 Ellis, 2019

13 Carras & Kardefelt-Winther, 2018; Weinstein, Przybylski & Murayama, 2017

health behaviour in school-aged children¹⁴. The survey used a battery of questions including nine statements to assess the prevalence of problematic social media use¹⁵.

SHARE OF CHILDREN MEETING THE CRITERIA FOR PROBLEMATIC SOCIAL MEDIA USE

	girls	boys
11-year-olds	6%	5%
13-year-olds	13%	11%
15-year-olds	14%	10%

Source: WHO, 2020

In a review by Fumero et al. (2018) the share of people with excessive internet use was estimated to be over 13 per cent. A review by Sohn et al. (2019) indicated that the prevalence of people with problematic smartphone use was up to more than 23 per cent. These differences highlight the dependency of the prevalence estimates of the used methods and sample. A problem emerges in the reviews from summaries compiled based on different scales and non-representative samples. The prevalence estimates in the reviews concerning digital gambling were lower as the number of gamers is lower than that of overall internet users. Based on representative samples, on average around 2 per cent of young

people feel that their gaming is at a problematic level¹⁶. Estimates were similar (2.2 per cent) in a pre-registered extensive and representative study that involved collecting data from seven European countries¹⁷. Depending on the used battery of questions and analysis method, non-representative samples collected in Finland indicated that either 0.9 per cent^{18, 19} or, based on the same data, 1.3–2.8 per cent had problematic use, depending on the method of analysis^{20, 21, 22}.

LINK BETWEEN PROBLEMATIC DIGITAL MEDIA USE AND PSYCHOLOGICAL WELLBEING

It is fairly likely that the psychological wellbeing of individuals reporting problematic use of digital media is also below average in other areas. Taking the above limitations into account, the level of evidence in this area is primarily poor but stable: a weak or average link has been repeatedly found between problematic media use and psychological wellbeing. In the context of problematic gaming behaviour, results also appear to be coherent at the international level²³. However, the strength of this relation appears to vary considerably from one study to another: the sampling method, definitions of psychological wellbeing, used scales and approaches all affect results. Most research on psychological wellbeing

14 www.hbsc.org

15 The Social Media Disorder Scale (van den Eijnden et al., 2016): The scale includes nine questions investigating symptoms of the problematic use of social media (for example: "Within the past year, have you made any attempts to reduce the time you spend on social media but failed in doing so?"), with "yes" and "no" response alternatives. Selecting the "yes" alternative at least five times indicated that the respondent's social media use is problematic.

16 Paulus et al. 2018

17 n = 7,865; Carras & Kardefelt-Winther, 2018

18 n = 465; Männikkö et al., 2020

19 The Problematic Online Gaming Questionnaire (POCQ) investigates problematic gaming based on six DSM-5 criteria (preoccupation, overuse, immersion, social isolation, interpersonal conflicts and withdrawal) and a total of 18 statements examining these (e.g. "How often do you unsuccessfully try to reduce the time you spend on gaming?"). Respondents select a response alternative on a scale of 1–5, and a respondent's gaming is considered problematic if they score at least 66 points on a scale of 18–90.

20 n = 773; Männikkö et al., 2019a; 2019b (NB. same data used)

21 The Internet Gaming Disorder Test (IGD) scale investigates internet gaming disorders and is based on the nine symptom criteria of the definition for a gaming problem in the DSM-5 and ten statements (e.g. "Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming?"). The response alternatives are 0 (never), 1 (sometimes) and 2 (often). Selecting the alternative "often" for at least five of the symptoms is considered to indicate problematic gaming. The scales often follow the criteria also included in the suggestion for the DSM-5 definition (<https://www.psychiatry.org/patients-families/internet-gaming>), but there is considerable variation in the number of statements, response scale and criteria used for scoring and analysis methods.

22 For more detail on the topic, see: [Kuuluvainen, S. & Mustonen, T. \(2019\). Digitaalinen viihdepelaaminen ja digipeli-riippuvuus. Katsaus pelaamisen eri ulottuvuuksiin](#) (in Finnish; second edition), Sosiaalipedagogiikan säätiö, Helsinki and [Tanner, N., Radwan, R., Korhonen, H. & Mustonen, T. \(2020\). Sosiaalinen media, ongelmallinen sosiaalisen median käyttö ja someriippuvuus](#) (in Finnish), Sosiaalipedagogiikan säätiö, Helsinki.

23 Cheng et al., 2018

is concerned with depression and anxiety symptoms (see table on the following page), and there is in fact a moderate level of evidence available in this context.

META-ANALYSES AND SYSTEMATIC REVIEWS EXAMINING PSYCHOLOGICAL WELLBEING			
Source	Operationalisation of excessive use	Degree of evidence for symptoms of depression	Degree of evidence for symptoms of anxiety
Fumero et al. (2018)	excessive internet use	medium	poor
Gonzalez-Bueso et al. (2018)	internet gaming disorder	medium	medium
Männikkö et al. (2020)	problematic gaming behaviour	poor	poor
Marino et al. (2018)	problematic Facebook use	medium	medium
Sohn et al. (2019)	problematic smartphone use	medium	medium

There is significant heterogeneity in all of these studies, i.e. the results of different studies (included in a single review) differ considerably.

Nevertheless, the connection between excessive media use and psychological wellbeing is not unambiguous. According to the reviews, the young people with mental health issues or self-destructive behaviour reporting excessive media use also received significant help and support for their problems²⁴.

There is also a weak connection between internet addiction and a lower amount of sleep and increased sleeping problems²⁵ and this also appears to be the case with excessive smartphone use²⁶. However, there is little evidence available of the correlation with sleeping problems, as most studies are based on retrospective

questionnaire surveys instead of the objective measurement of smartphone use or sleep or even diary data. A weak relation has also been detected between internet addiction and self-reported alcohol and cannabis use, but the level of evidence is also low in this context²⁷.

CAUSES AND EFFECTS OF PROBLEMATIC MEDIA USE

So far, research has failed to reliably demonstrate cause-and-effect relationships. Few longitudinal analyses have been conducted, and most studies have also failed to take mutual, intermediary or external factors affecting the connections into consideration. However, there is moderately strong evidence of a connection between lower self-regulation or executive function (nonconscious regulation of actions, and conscious planning, coordination and monitoring) capacity and problematic internet use²⁸, and these can be considered to constitute a neurobiological background exposing individuals to excessive use in accordance with the I-PACE model. There are no clear gender differences, although problematic gaming behaviour has been found to be more common among boys²⁹.

It appears that both mental health symptoms and a negative attitude towards studying can be perceived as both a factor predicting problematic media consumption and vice versa³⁰. Similar results have also been obtained in Finland. Symptoms of depression and academic burnout predicted an increase in excessive internet use; correspondingly, excessive internet use predicted increasing symptoms of depression and academic burnout³¹. A bidirectional link has also been observed between problematic gaming and loneliness and symptoms of depression³². There is a weak correlation between loneliness and compulsive internet use³³. Poor self-esteem can be considered both a factor predicting compulsive internet

24 Marchant et al., 2017; Sedgwick et al., 2019

25 Alimorad et al., 2019

26 Mac Cárthaigh et al., 2020; Sohn et al., 2019

27 Lanthier-Labonté et al., 2020

28 Ioannidis et al., 2019

29 Anderson et al., 2017

30 Anderson et al., 2017

31 12–14 yrs., n = 1,702; 16–18 yrs., n = 1,636; Salmela-Aro et al., 2018

32 n = 2,059; Krossbakken et al., 2018

33 n = 1,200; Savolainen et al., 2020; Tóth-Király et al., in print

use³⁴, but also its consequence³⁵. The level of evidence related to self-esteem is also limited.

Factors protecting against problematic media consumption include a family that is supportive of a person's autonomy and has a positive attitude³⁶ and the fulfilment of psychological basic needs in line with the self-determination theory³⁷. The same factors also reduce problematic gaming³⁸.

IN CONCLUSION

Research has demonstrated that problems related to digital media exist. These cause behaviours and harm clearly diverging from normal, balanced behaviour. There is no need to deny this and necessary help and support must be available for those in need. However, there is hardly any more knowledge of the topic beyond this. This is a complex phenomenon. In fact, the diversity of activities people engage in in the context of digital media is a key challenge in creating cohesive definitions and charting prevalence. In the context of digital media use, separating active use from problematic behaviour is relevant – making a distinction based on time alone does not suffice. There may not be common denominators in the different types of problematic digital behaviour; instead, different functions are based on different needs, and the degree to which these reward and addict users vary³⁹.

A larger problem lies with a threat of pathologizing normal behaviour, i.e. determining it as a disease. Just because a person engages in an activity in great amounts does not automatically mean that the person has an addiction or some other problem, and it may not have any significant consequences. Similarly, problematic use of digital media does not automatically mean that a person has an addiction. In addictions, a person's behaviour is clearly causing them harm and mental suffering and differs from normal behaviour. In order to ensure that those with problems related to media use are provided with the support or treatment they need, diagnoses

must be correct and true causes identified. As a result, exclusion criteria must be included in the criteria determined for an addiction: it is crucial to identify when a case does not concern an addiction but the person's media use is a symptom of some other problem⁴⁰.

The current research evidence indicates that excessive media use is mostly concerned with compensating for challenges in one's personal wellbeing. This may partly be a case akin to behavioural addiction. While there are always serious harms related to addiction, overuse of the term will lead to inflation, which can easily result in underestimating the needs for help of individuals experiencing serious harm. Excessive use of digital media may be related to a variety of factors, and it is important to distinguish between these. Media use may be simply part of a person's studies, work or hobby. It may also be a symptom of problems, a tool or target of problematic behaviour. Nevertheless, it is not possible to reliably distinguish between these. Instead, concepts are used haphazardly and generalisation is common.

Research evidence does not indicate that excessive media use has significant consequences on its own. Indeed, the discussion about harms could shift from excessive use to focusing on how the daily use of digital media required by today's society and the related constant interruptions can cause exhaustion and impair people's ability to concentrate. Digital media use can also bring about disagreements in families and has been statistically found to increase a person's susceptibility to encounter harmful media content or exposure to disadvantageous treatment. It may also expose people to negative impacts, including financial ones. However, individuals are not responsible for preventing these. Indeed, different attractive and addictive solutions developed to increase media use⁴¹ and their regulation at the societal level should be examined in more detail. While there are problems associated with digital media, insufficient understanding of their root causes, mechanisms and targets inhibits both preventive and corrective measures. ■

34 Anderson et al., 2017

35 n = 2,809; Donald et al., 2018

36 Anderson et al., 2017; Fumero et al., 2018

37 Anderson et al., 2017

38 Przybylski & Weinstein, 2019; Weinstein et al., 2017

39 Ryding & Kaye, 2018

40 Kardefelt-Winther et al., 2017

41 Neely, 2019

An evidence summary is a systematic review that summarises the latest and strongest evidence related to a specific topic. Instead of forming arguments or speculating, evidence summaries are as objective as possible. They present the consensus of the researcher community, knowledge of the strongest level of evidence. An evidence summary must pass an assessment process. The evidence synthesis method has been described in more detail on page 17–18.

This evidence summary is based on a list of international systematic reviews compiled by an information specialist based on a systematic information search and Finnish case studies on the effects of digital media on young people (more detailed description of the information search on p. 20–21). For this synthesis, reviews and studies concerning the problematic use of media, related definitions, prevalence and connection with wellbeing or health were systematically selected from the list based on their title and abstract. For instance, no sources concerning non-problematic use or describing the treatment of problematic use were selected. Another criterion for selecting reviews providing evidence included a low risk of bias. In other words, the reviews had to include assessment of the level of evidence in original studies, and the methodological level of Finnish original studies had to be at least acceptable (for the assessment criteria, see p. 15). Moreover, this synthesis refers to theoretical discussion papers and selectively to the latest high-quality international studies. The evidence summary was assessed by Professor Kimmo Alho, University Lecturer Janne Matikainen, Professor Mika Pantzar and Professor Katariina Salmela-Aro (all from the University of Helsinki).

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* = quality-assessed Finnish study

** = quality-assessed review

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