



**HAL**  
open science

## Internet Addiction Disorder (IAD)

Birgitta Dresp

► **To cite this version:**

Birgitta Dresp. Internet Addiction Disorder (IAD). Encyclopedia, section Psychiatry and Mental Health Studies, 2020. hal-02615330

**HAL Id: hal-02615330**

**<https://hal.science/hal-02615330v1>**


Submitted on 22 May 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Internet Addiction Disorder (IAD)

Subjects: Psychiatry & Mental Health studies

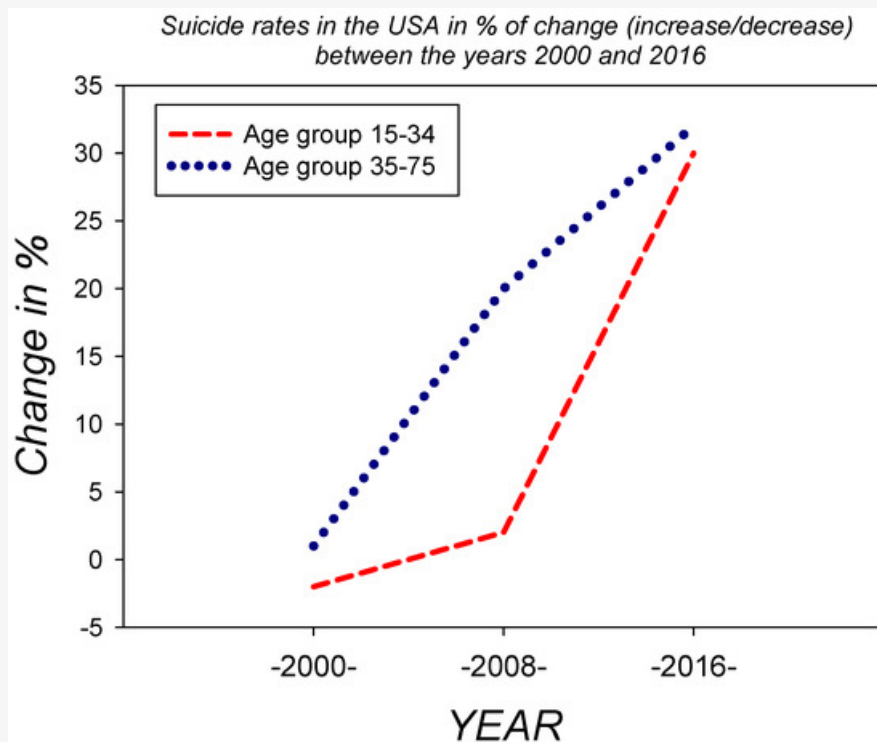
Created by:  Birgitta Dresplangley

Internet Addiction Disorder (IAD) is a disabling condition that calls for full consideration as it has a severe impact on young people's brain function. Internet addiction disorder (IAD), sometimes also called pathologic/problematic internet use (PIU), is widely defined in terms of an impulse control disorder characterized by uncontrolled Internet use. The disorder is associated with significant functional impairment and/or clinically measurable distress, anxiety, depression, and other psychopathological symptoms. Current neurobiology points towards altered punishment-reward sensitivity and deregulation of the dopamine transmitter pathways in the brain as behavioural and neurophysiological correlates of IAD.

Internet Addiction Disorder (IAD) is a disabling condition that calls for full consideration as it has a severe impact on young people's brain function. Internet addiction disorder (IAD), sometimes also called pathologic/problematic internet use (PIU), is widely defined in terms of an impulse control disorder characterized by uncontrolled Internet use [1–18]. The disorder is associated with significant functional impairment and/or clinically measurable distress, anxiety, depression, and other psychopathological symptoms [2–12]. IAD is not (yet) classified as a mental disorder in the Diagnostic and Statistical Manual of Mental Disorders—Fifth edition (DSM-5), but a subtype of IAD, internet gaming disorder (IGD), which specifically refers to videogame addiction, has been included in Section 3 of the DSM 5 [12]. It is currently envisaged to include IAD and IGD also in the *International Classification of Diseases for mortality and morbidity statistics* ICD-11 [13]. A meta-analysis on IAD performed six years ago [6] and involving more than 89,000 participants from 31 nations reported a global prevalence estimate for IAD of 6% worldwide. The highest estimates for IAD prevalence were scored for the Middle East in terms of about 12% of the reference population, the lowest for Northern and Western Europe, with about 2.5% of the reference population. These estimates were made six years ago. A study conducted on Indian college students [7] identified male gender, continuous online availability, and predominant use of the internet for new friendships/relationships as major risk factors. Higher computer skills and easy Internet access in teenagers and young adults represent an augmented risk for IAD [7–9]. Internet addiction (IA) has emerged as a universal issue, but its international estimates vary considerably.

Two factors have been considered to explain cross-national variations [3-8]. One is internet access, which varies between continents and nations and predicts that IA prevalence should be positively related to the internet penetration rate per capita. The other factor, referred to as real life quality, predicts that IA prevalence should be inversely related to the global national index of life satisfaction and/or other specific national indices of environmental and lifestyle quality. Personal Technology Usage (PTU) has hit young people in the USA “fast and hard”, with 92% internet penetration, which is currently the highest in the world, as pointed out in an article on the effects of PTU on children and youth [18]. This recent online article published by the US Naval Institute Proceedings describes the internet in terms of a virtual hypodermic mechanism that delivers a digital drug content in a highly effective manner, particularly via the smartphone. This drug seems to hamper children's ability to manage and balance time, energy, and attention and thereby leads to lifestyle changes and behavioral deficits. The mediating effects of insomnia and associations between problematic Internet use including Internet Addiction (IA), Online Social Networking Addiction (OSNA), and depression among adolescents [1-10] have been highlighted in a population of more than one thousand secondary school students from Guangzhou in China [10], which has about 70% internet penetration, i.e., about 30% less than the USA or Europe. Levels of depression, insomnia, IA, and OSNA were assessed using the Center for Epidemiological Studies Depression Scale (CESDS) [19], the Pittsburgh Sleep Quality Index (PQI) [20], Young's Diagnostic Questionnaire for Internet Addiction (YDQIA) [21], and the Online Social Networking Addiction Scale (OSNAS) [22]. The results from this cross-sectional study reveal that a high prevalence of IA and OSNA is associated with an increased risk of developing depression among adolescents, both directly and/or as a consequence of insomnia associated with the addictive behaviour [9,10]. Insomnia, therefore, is a factor that may be a trigger for or a chronically developing consequence of IA and OSNA. Likely, depression predicts IA and OSNA, and vice versa, among subjects who were free from either problem at baseline [9-12]. Conclusions from this study suggest that it may be effective to consider problematic Internet use, insomnia, and depression jointly as all three seem to be clearly interdependent in light of these and other findings. The high incidence of depression and increasing suicide rates in teenagers has become a worldwide concern that calls for

urgent scrutiny. Depressed individuals might go into online social networking as a secure and non-threatening means of communication with the outside world and as a means for alleviating anxiety related to personal problems. Thus, excessive internet use appears to be a maladapted coping strategy that accelerates the development of digital addiction on the one hand and augments the withdrawal from interpersonal offline activities that could lead to effective coping with real world problems. As a consequence, the young person, instead of coping or learning to cope with problems through real-world interaction with others, spirals further and further down the slippery slope of depression, insomnia, and ultimately, isolation and loneliness. A study published in 2017 by the American Journal of Epidemiology [23] has shown that teenagers are particularly vulnerable in this respect and that the trend towards online technology-induced teenage depression and associated symptoms may well reach epidemic proportions if nothing gets done to stop it. The national statistics made available in a US Naval Institute Publication [18] show estimates for suicide rates in individuals for two age ranges across the years 2000–2019 in terms of % of change per annum. The curves reveal an alarming trend towards an increase, which has been particularly steep for ages 15–34 between the years 2008 and 2016 (Figure 1). The publication explicitly links this trend to digital addiction.



**Figure 1.** Estimates for suicide rates in the USA, which has an internet penetration index of 92% of the global population, between the years 2000 and 2016. Estimates are expressed herein as the % of change (increase/decrease) per annum, showing an alarmingly steep increase for the age group of 15 to 34 year old individuals. The key data shown here have been replotted on the basis of a report published by the US Naval Institute in 2018 [18], which points towards a link between the increase shown here and digital addiction, especially in younger individuals. The hypothesis is consistent with data from scientific studies, summarized above, showing a tight connection between internet addiction, insomnia, and depression in young males and females.

MRI studies suggest structural changes in the frontal cortex associated with functional abnormalities in Internet addicted subjects [15]. Nuclear imaging findings indicate that IA is associated with dysfunction of the brain dopaminergic systems [14,15], indicating that de-regulation of the prefrontal cortex may underlie reward specific uncontrolled behavior in internet overuse in addicted subjects. Results from a set of independent studies [24–28], mostly conducted in East Asia on young male subjects with internet gaming disorder, were recently analyzed in a comprehensive metareview [29]. This analysis led to conclude on functional alterations, similar to those observed in substance abuse, in brain regions involved in cognitive control functions [24–29], and reward/punishment sensitivity balance [26]. A working model pointing towards interrelated neurophysiological correlates of this new syndrome was recently suggest in [30].

## References

[1] Shaw, M, Black, D. W. Internet addiction: definition, assessment, epidemiology and clinical management. *CNS Drugs*,

2008; 22:353–365.

- [2] Cao F, Su, L. Internet addiction among Chinese adolescents: prevalence and psychological features. *Child Care and Health Development*, **2006**; 33: 275–281.
- [3] Fu KW, Chan WS, Wong, PW, Yip, PS. Internet addiction: prevalence, discriminant validity and correlates among adolescents in Hong Kong. *Br J Psychiatry*, **2010**; 196:486–492.
- [4] Nalwa K, Anand AP. Internet addiction in students: a cause of concern. *Cyberpsychol Behav*, **2003**; 6:653–656.
- [5] Cheng C, Li AY. Internet addiction prevalence and quality of (real) life: a meta-analysis of 31 nations 766 across seven world regions. *Cyberpsychol Behav Soc Netw*, **2014**;17:755–760.
- [6] Krishnamurthy S, Chetlapalli SK. Internet addiction: Prevalence and risk factors: A cross-sectional study among college students in Bengaluru, the Silicon Valley of India. *Indian J Public Health*, **2015**; 59:115–121.
- [7] Kim, K *et al.* Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: a questionnaire survey. *Int J Nurs Stud*, **2006**; 43:185–192 .
- [8] Dalbudak E *et al.* Relationship of internet addiction severity with depression, anxiety and alexithymia, temperament and character in university students. *Cyberpsychol Behav Soc Netw*16, **2013**; 16:272–278.
- [9] Lau JTF, Walden DL, Wu AMS, Cheng KM, Lau MCM, Mo PKH. Bidirectional predictions between Internet addiction and probable depression among Chinese adolescents. *J Behav Addict*, **2018**; 7(3):633-643.
- [10] Li JB, Lau JTF, Mo PKH, Su XF, Tang J, Qin ZG, Gross DL. Insomnia partially mediates the association between problematic Internet use and depression among secondary school students in China. *J Behav Addict*, **2017**; 6(4):554-563. 778
- [11] American Psychiatric Association. *DSM-5 - Manuel diagnostique et statistique des troubles mentaux*, **2019** ;Elsevier Holland. Reference 9782294743382
- [12] World Health Organization. *International classification of diseases for mortality and morbidity statistics* (11th Revision), **2020**; Retrieved from <https://icd.who.int/browse11/l-m/en>
- [13] Ojeda J and Ávila A. Early Actions of Neurotransmitters During Cortex Development and Maturation of Reprogrammed Neurons. *Front Synaptic Neurosci*, **2019**; 11:33.
- [14] Kim SH *et al.* Reduced striatal dopamine D2 receptors in people with Internet addiction. *Neuroreport*, **2011**; 22, 407–411.
- [15] Hou H, Jia S, Hu S, Fan R, Sun W, Sun T, Zhang H. Reduced striatal dopamine transporters in people with internet addiction disorder. *J Biomed Biotechnol*, **2012**; 854524.
- [16] Li, B *et al.* Impaired Frontal-Basal Ganglia Connectivity in Adolescents with Internet Addiction, *Scientific Reports*, **2014**, 4/1:srep05027.
- [17] Rumpf, H *et al.* Including gaming disorder in the ICD-11: The need to do so from a clinical and public health perspective, *Journal of Behavioral Addictions*, **2018**; 7/3:556-561.
- [18] Ryan P. Technology: The New Addiction. US Naval Institute Publications, *Proceedings*, **2018**; 144: 387, online: <https://www.usni.org/magazines/proceedings/2018/september/technology-new-addiction>
- [19] *The Center for Epidemiological Studies Depression Scale Revised*, **2020**; available online: <https://cesd-r.com/>
- [20] *The Pittsburgh Sleep Quality Index*, **2020**; available online:

- [21] Young's Diagnostic Questionnaire for Internet Addiction, **2020**; available online: <https://journals.plos.org/plosone/article/file?type=supplementary&id=info:doi/10.1371/journal.pone.01073799.06.s001>
- [22] Faraci P, Craparo G, Messina R, Severino S. Internet Addiction Test (IAT): which is the best factorial solution? *J Med Internet Res*, **2013**; 15(10):e225.
- [23] Shakya HB, Christakis NA. Association of 'Facebook' use with compromised well-being: A longitudinal study, *American Journal of Epidemiology*, **2017**; 185 (3): 203–211.
- [24] Dong G, Hu Y, Lin X, Lu Q. What makes Internet addicts continue playing online even when faced by severe negative consequences? Possible explanations from an fMRI study. *Biol Psychol*, **2013**; 94:282–289.
- [25] Dong G, Shen Y, Huang J, Du X. Impaired error-monitoring function in people with Internet addiction disorder: an event-related FMRI study. *Eur Addict Res*, **2013**; 19:269–275.
- [26] Dong G, Huang J, Du X. Enhanced reward sensitivity and decreased loss sensitivity in Internet addicts: an fMRI study during a guessing task. *J Psychiatr Res*, **2011**; 45, 1525–1529.
- [27] Dong G, Lin X, Zhou H, Lu Q. Cognitive flexibility in Internet addicts: fMRI evidence from difficult-to-easy and easy-to-difficult switching situations. *Addict Behav*, **2014**; 9, 677–683.
- [28] Dong G, Lu Q, Zhou H, Zhao X. Impulse inhibition in people with Internet addiction disorder: electrophysiological evidence from a Go/NoGo study. *Neurosci Lett*, **2010**; 485, 138–142.
- [29] Brand M, Young KS, Laier C. Prefrontal control and internet addiction: a theoretical model and review of neuropsychological and neuroimaging findings. *Front Hum Neurosci*, **2014**; 8:375.
- [30] Dresch-Langley, B. Children's Health in the Digital Age. *Int. J. Environ. Res. Public Health* **2020**; 17, 3240.

## Keywords

---

internet addiction;adolescents;sleep loss;anxiety;depression;punishment-reward circuitry;dopamine transmitter pathways;brain

---