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INTERNET/VIDEO GAMING: THE RELEVANCE OF A NEW PHENOMENON IN THE YOUTH

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ABSTRACT

The high level of technological growth in contemporary society, beside benefits, provokes different kinds of damages, especially among the worldwide youth population. World statistics have recognized that video and internet game addiction is a growing problem. In this context, it is supposed that 0.3 to 1.0 percent of the general population might be qualified as a potential sufferer of internet gaming disorder. However, youth between 18-34 years are the highest risk population.

New research has shown the need of early identification of at-risk young people for internet addiction. Adverse experience in children of different forms of stress, negative life circumstances and especially negative, hostile parenting can lead to depression, social and cultural problems, together with significant boredom and loneliness levels. These are all confirmed to be related with addictive behaviour.

Some neural correlates are discussed as the possible background of game addiction. Finally, therapeutic possibilities are presented.

Keywords: game addiction, internet, young people, neural correlates

INTRODUCTION

The high level of technological growth in contemporary society, beside benefits, provokes different kinds of damages, especially among the worldwide youth population. Today, several millions of people worldwide are playing video and internet games. While most of them who enjoy these types of games do not develop problematic behaviours, it is possible that this form of entertainment can have negative impacts on daily functioning, especially in the youth.

The understanding of this form of "behavioural" addiction is still disputable, especially the knowledge about the explanation of the pathophysiology of and treatments for these conditions.

However, the DSM-5 diagnostic criteria for this problem is renamed as Internet gaming disorder (IGD) despite a term "pathological gambling" which has already been listed in the DMS-IV. Additionally, the World Health Organization has included gaming disorder in the 11th Revision of the International Classification of Diseases (ICD-11) [1, 2].

Gambling disorder is classified as a non-substance-related disorder within "Substance-Related and Addictive Disorders" in the DSM-5 [3, 4].

It is interesting to note, that criteria addressing tolerance, withdrawal, and especially changes in brain interference in major areas of life function

in both disorders, such as substance-use and gambling. A diagnosis of gambling disorder requires at least four of the following symptoms during the past year:

• Need to gamble with increasing amounts to achieve the desired excitement.

• Restless or irritable when trying to cut down or stop gambling.

• Repeated unsuccessful efforts to control, cut back on or stop gambling.

• Frequent thoughts about gambling (such as reliving past gambling or planning future gambling).

• Often gambling when feeling distressed.

• After losing money gambling, often returning to get even. (This is referred to as "chasing" one's losses.)

• Lying to hide gambling activity.

• Risking or losing a close relationship, a job, or a school or job opportunity because of gambling.

• Relying on others to help with money problems caused by gambling

Considering the incidence of this behaviour in children and adolescents worldwide, I will now discuss some relevant knowledge related to this condition, based on hundred published articles.

INCIDENCE

World statistics have recognized that video and internet game addiction is a growing problem worldwide. Still, most people are not aware of this addictive behaviour, whereas others are naming video games as “the new drug.” In the ICD-11 during 2022, Gaming Disorder was recognized as a mental health condition with strictly defined symptomatology. Statistics showed that 0.3 to 1.0 percent of the general population might be qualified as a potential sufferer of internet gaming disorder. In this context, over two billion people are registered as playing video games, and the number is likely to surpass three billion in 2023. From this number even 3-4% of gamers are really addicted to this behaviour. The systematic review and meta-analysis in 2021 showed that 3.05% of people manifest gaming disorder, which means that as many as 60 million people (or more) are suffering from this behaviour. The more important fact is that youths between 8-18 y.o. suffer from gaming disorder, translating to 8.5% of the youth population. However, whereby 49% of all American adults have played video games, only 10% consider themselves “gamers.” Picture 1, shows the age distribution of video gaming [6].



Fig. 1. *Gaming statistics by age*
[Aust N Z J Psychiatry. 2021 Jun; 55(6): 553–568.]

Symptomatology of gaming disorder has been mentioned before as a diagnostic criterion. However, the main problems with gaming disorder are related to academic or work achievement, withdrawal, sadness, anxiety or irritability where gaming is not possible, as well as decline in personal hygiene and life obligations. Because of the importance of gaming disorder worldwide, in the following year (2024) my team in MASA will explore the parental knowledge of their children’s video gaming and the microtransactions related to these games in our country. Parents from different secondary and high schools will be tested online with an international adapted questionnaire related to internet gaming.

NEURAL CORRELATES OF GAMBLING DISORDER

The new findings of Orsolini L et al. 2023 [7] suggest the need of early identification of young people at-risk for internet addiction. Research confirmed that young people manifesting significant boredom and loneliness levels are at risk for gaming disorder. The study emphasizes the need to modify the psychopathological trajectory towards the exclusion of problematic use of technological tools by the parents. Additionally, depressive young people, being a vulnerable population, should be evaluated regarding their boredom and social isolation. This could be provocative in averting the onset of addiction.

The authors proposed the mediation role of boredom and loneliness between depression and addictive internet gaming in schema presented in Fig.2.

The assessment of paternal involvement in childcare was inconsistent across studies. With more social pressure and education for fathers to be actively involved in childcare, public interest for the influence would be heightened [8,9,10].

In other similar studies [11,12,13,14] the relationship between adverse childhood experiences and problematic internet use, especially the feeling of loneliness, was also confirmed. Different forms of stress, negative life circumstances and negative feelings like loneliness are provoking internet use to compensate or escape.

A scientific approach towards explaining this problematic behaviour has recently gained great interest. It is supposed that Gambling disorder is related to the possible dysfunction in different cognitive facets with potential underlying neural regions of importance in all forms of behavioural addiction. The evaluation of patterns of dysfunction allows for a more in-depth understanding of similarities and differences between groups of addicted and normal subjects.

Electrophysiological studies based on qEEG, and tasks related to event-related potentials (ERPs), offer a better understanding of the neural function linked to sensory or cognitive processing. In addicted subjects, lower P3 amplitude and dominant theta-band activity are found to be general responses to addiction [Oberg et al., 2011] [15].

The activity of event related potentials (ERP), evaluated through Go/No-Go and Stroop task, show impulsivity and error processing. In a Go/No-Go task, N2 amplitude was lower in addicted and P3 amplitude was larger with a longer latency. Additionally, decreased activity in conflict detection was observed, when compared to healthy subjects [16].

The neural correlates of this mental state are additionally evaluated using fMRI. Resting-state fMRI studies offer an understanding of functional brain connectivity [17]. In this context, Tschernegg et al., 2014 [18] showed that supplementary motor area and paracingulate cortex have reduced connectivity in addictive subjects. It is interesting that the right caudate appears more involved and the hippocampus less involved in information integration in addictive versus control subjects. These data suggest differences in networks involved in self-regulation and reward processing between control and addicted examinees.

Additionally, it was found that similar grey matter volumes in gambling subjects as in subjects with other addictions like alcohol and nicotine addiction: lower volumes in left superior frontal cortex, bilateral precentral cortex, right insula, left thalamus, bilateral superior parietal cortex, and right supramarginal cortex [19].

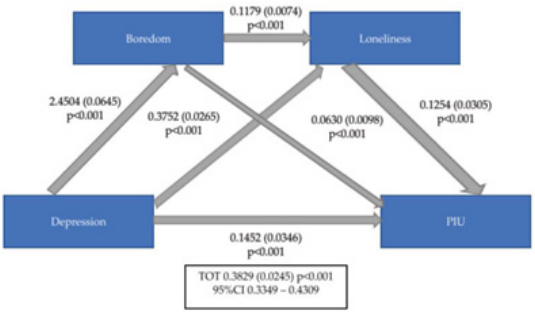


Fig. 2. *Mediation role of boredom and loneliness between depression and problematic use of internet [7]*
(PIU: Problematic Use of Internet; TOT: Total; CI: Confidence Interval).

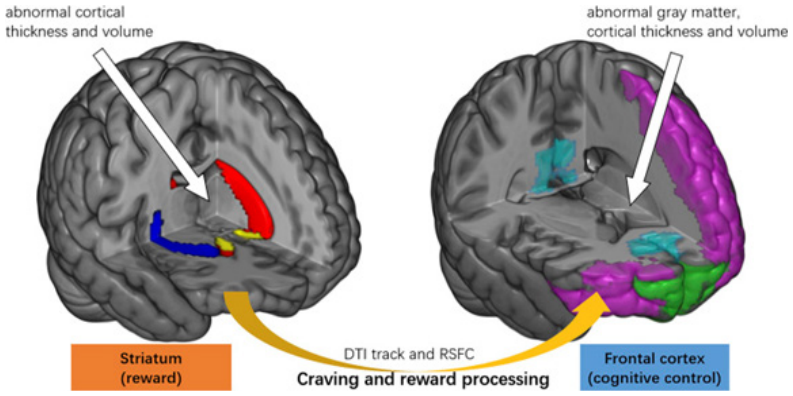


Fig. 3. *The frontal-striatal circuits in nicotine addiction and internet gaming disorde*r [20]
[J Behav Addict. 2022 Jan 19; 11(1: 26–39]

Neurotransmitters are known to play an essential role in neuronal processing and connection. Especially the role of dopamine and serotonin (5-HT) are evaluated in this condition. It is supposed that dopamine is implicated in substance addictions and reward processing, among other behaviours. Additionally, the serotonin system is linked to the problem-gambling severity [21,22,23].

In the modern neuroscience the role of genetics is also considered. In such a way, polymorphisms in genes encoding for dopamine-related components, including DRD1 Ddel, DRD2 Taq I A, and DRD4 (exon III), have been reported. It was additionally supposed that genes are involved in the coding for the serotonin transporter, 5HTTLPR, and MAO enzymes (e.g., MAO-A, MAO-B). An association between the C/C genotype of the 5-HT-2A receptor gene and addictive gambling has also been reported [24]. Additionally, genetic contribution has been found to influence on the age of onset the gambling [25]. However, a complicated relationship between genetic contributions, environmental influences, sex, and gambling behaviours is apparent.

The emotional bond between mother and child, as well as parental styles are shown to be essential for the further development and behaviour of children. In addition, parenting style, which comprises how parents respond to the children's needs, according to the cultural and traditional standards, is also important for a child's development. A child's confidence to face important and challenging problems is related to the parenting style. In this context, the child's maturity and cognitive development as well as proper emotional management for emotional regulation are both supported by sensitive and supportive parenting. Positive parenting also helps the child face non-social or social problems. To the contrary, negative, hostile parenting leads to depression and social and cultural problems. We are currently convinced that parenting styles (authoritative, authoritarian, permissive, and uninvolved parenting) have an important psychological effect on a child's behaviour [26].

In this context, Lukavská K. et al. 2020 [27] demonstrated the effects of parental control and enthusiasm on problematic internet use in adolescents. Parental responsiveness was negatively and moderately associated with internet misuse, while maternal rigidity showed a weak positive association. The authoritative parenting style in both parents decreases problematic internet use with a probability of 3.21%, while a combination of maternal authoritarian and paternal neglectful style was found to be associated with higher (20.9%) internet misuse [28]. The model of parenting style influencing the problematic internet use is presented in Fig. 4.

The question about the relation between problematic internet use and some other addictions, like cannabis or alcohol use in young population, is provocative. According to some new studies [29] it was not determined that problematic use of internet is linked with cannabis and alcohol use among the youth. However, Tóth-Király I. et al. 2021[30] documented that social and individual antecedent and some outcome implications (loneliness, maternal and paternal behaviours, depressive symptoms, substance use, academic achievement) are important for problematic internet use trajectories. In this context, problematic internet use could be predicted by

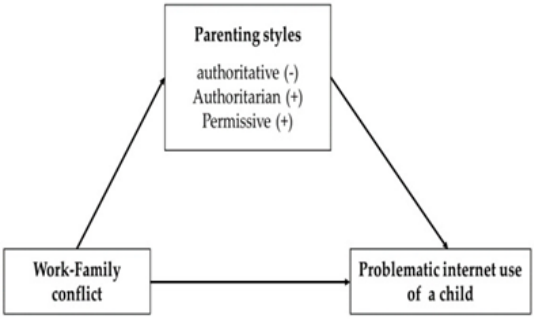


Fig. 4. *Hypothetical model of mediating of parenting styles on the association between work-family conflict and the problematic internet use of a child. [Int J Environ Res Public Health. 2021 Jun; 18(11): 5774].*

loneliness, paternal neglect, maternal care, depressive symptoms, and male gender. In turn, problematic internet use trajectories, per se, could increase in those with depressive symptoms and substance use and can also decrease these subjects' academic achievement.

Malak MZ [31] suggests that policymakers and instructors develop health education programs or health training programs on how to use social support as a coping method when experiencing psychological problems, including stress and anxiety. Also it is important for these to adopt social support in management programs for excessive use of internet gaming. In this context the following schema is proposed (Fig. 5)

Problematic internet use together with gambling rarely could be overcome spontaneously. Consequently, in most cases, the need for profes-

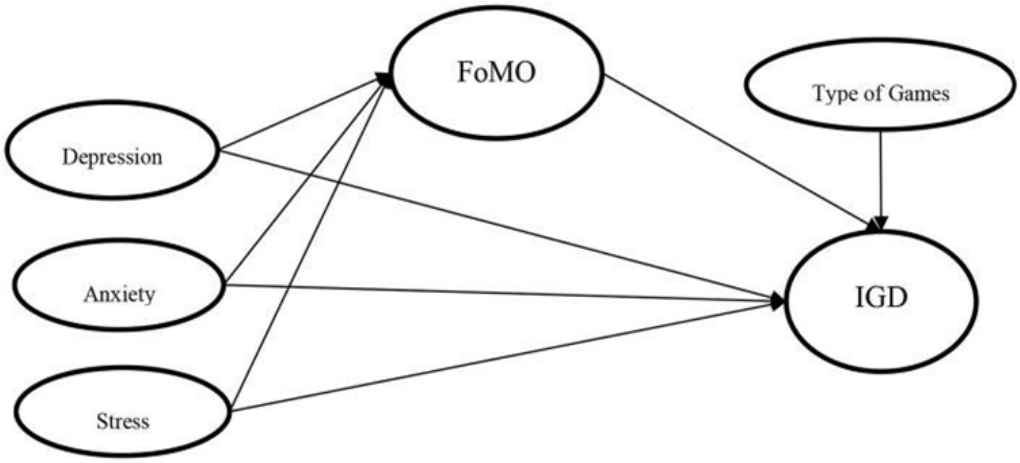


Fig. 5. *Diagram of various variable involved in internet gaming disorder [31]*
(FoMo= fear of missing out, IGD= Internet gaming disorder)

sional aid is indicated. Generally, treatment could be behaviour therapy or medication. Treatment strategies are particularly important for the youth, considering the prevalence of problematic internet use among this population.

Several types of therapy are used to treat gambling disorders, including cognitive behavioural therapy (CBT), psychodynamic therapy, group therapy, and family therapy. Cognitive-behaviour therapy was shown to give positive effects together with family counselling. Other behavioural interventions (e.g., solution-focused brief therapy, mindfulness-based interventions) are also proposed for addiction model of internet misuse. Psychostimulants, opioid-receptor antagonists, antiepileptics, antidepressants are also used. However, success is linked with changes in specific domains (depression, cognitive flexibility) and comorbidity. In my own experience, neurofeedback and peripheral biofeedback modalities used for emotional regulation are very suitable. Further studies addressed to emotional regulation, impulse control, motivation-based interventions in risk population are needed.

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Резиме

ИНТЕРНЕТ/ВИДЕОИГРИ: РЕЛЕВАНТНОСТА НА ЕДЕН НОВ ФЕНОМЕН КАЈ МЛАДИТЕ

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Високото ниво на технолошки раст во современото општество, покрај добробитта, провоцираше разни видови оштетувања, особено кај младата популација низ светот. Светската статистика потврди дека адиктивните видео- и интернетските игри се растечки проблем во светот. Во тој контекст, се претпоставува дека 0,3 до 1 процент од општата популација може да се смета за зависна од интернетски игри. Сепак, младите на возраст 18–34 години се најризична популација.

Новите истражувања нагласуваат дека е неопходно да се идентификуваат младите луѓе што се ризични за развивање интернетски зависности. Во таа смисла, искуства со разни форми на стрес, негативни животни искуства, особено негативни и непријателски родителства, водат до депресија, социјални и културни проблеми, кои заедно со чувството на осаменост и здодевност, се ризични за адиктивно однесување.

Дискутирани се некои неврални корелати што се во заднината на адиктивното однесување. На крајот, дискутирани се некои терапевтски можности.

Клучни зборови: зависност од игри, интернет, млади луѓе, неврални корелати