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# The Role of Peer-group Influence and Neurobiological Factors in Internet Gaming Disorder

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**ABSTRACT**

Internet game disorder (IGD) is characterized as an excessive and uncontrolled game designed for functional problems or difficulties. During the last discussion, limitless internet games have resulted in public health and social issues around the world. Although brave games are more accessible in young adulthood, brave game disturbances are more experienced by teens. Teenagers and young adults are strong predictors of overcoming the challenges of online game addiction, besides peer-group factors in adolescents, and neurobiological factors that influence the influence of internet gaming disorders. This literature review will discuss the impact of peer groups and neurobiological factors that underlie the expenditure of internet games in their teens.

## 1. Introduction

Gaming disorder is defined in International Classification Disease-11 (ICD-11) as a pattern of game behaviour ("digital games" or "video games") that is characterized by disruption of control over the game, where there is an increase in priority in the game over other activities, game activities take precedence over hobbies and other daily activities, and always wants to continue playing despite adverse consequences. For game disorders to be diagnosed, the pattern of behaviour must have a level of severity sufficient to produce a significant reduction in personal, family, social, educational, work or other essential areas and usually has been proven for at least 12 months.[1]

Some studies report that the Prevalence of men with disorders due to online play is higher than women. Although online games are more accessible in young adulthood, online game disruption is more experienced by teenagers. Adolescents and young adults are strong predictors for the emergence of online game addiction behaviour.[2] Besides, peer-group factors in adolescents and neurobiological factors are thought to influence the occurrence of internet gaming disorder. This literature review will discuss the role of peer group influence and neurobiological factors that underlie the presence of internet gaming disorder in adolescence.

## 2. Peer-group influences on internet gaming disorder

Peers are the primary source of influence on adolescents, for example, in terms of substance use/drugs. It is believed that best friends also influence each other's attitudes and behaviour. Teenagers are significantly similar to friends when it comes to action,

characteristics, attitudes and personality. The group accepts youth if group members have the same features as the teenager or the teenager who enters the group, adopts the group's behaviour and attitude. Group members tend to exhibit lousy behaviour more quickly, especially by taking courage with one another. Also, group members, especially group leaders, tend to adopt the behaviour and attitudes of dominant group members.[3,4]

There are several theories put forward to explain the effect of social relationships and peer relationships on their attitudes towards each other. Social learning theory shows that behaviour is developed through modelling of family members, peers, media and other social sources. Teenagers spend more time with peers than to their parents. Higher exposure levels result in adolescents who are more likely to imitate peers who have modelled positive gifts from the internet and games. According to Social Identity Theory, an individual generally chooses groups according to his self-concept. Each group has a specific identity. If the individual is a person who uses the internet and plays digital games, he wants to be a member of a group of members who are interested in the internet and digital games. According to this theory, in general, the group is expected to be homogeneous. In other words, members who are addicted are expected to form a group or make close friends with other members who are addicted and members who are not addicted to other non-addicted. The Main Socialization Theory proposes that norms regarding behaviour are transmitted through social sources. The primary social sources are parents and peers. These social resources are combined with individual factors to increase the likelihood of participating in behaviour. In related literature, several other studies examine the influence of peers on drug use and drug use. The importance of friends appears as an essential factor in understanding adolescent behaviour.[5,6]

During development age, adolescents generally have peer groups that are very influential in everyday life. Following its development, the need to be accepted in peer groups is an essential requirement in adolescence, which determines satisfaction in fulfilling self-identity. This condition causes unwanted online gameplay behaviour to be quite contractive with the fulfilment of adolescent developmental tasks for social life. Lo et al. research show that adolescents with online gameplay behaviour have weak social interaction with peer groups. In the study, it was revealed that teens with a tendency to play online games have anxiety in building physical relationships.

However, recent research on the role of peer group relationships in online gaming disorder in adolescents shows different results. A study in the US that used a nationally representative sample of school-age adolescents showed that the influence of peer groups could increase the time spent playing online games in adolescent boys.[7] The possibility why peer groups in adolescents have more authority on internet gaming disorder is that there are more opportunities for male gamers to interact and influence the habits of each other than female players.

Another possibility is that men and women have different motivations for playing video games, with men more motivated by the opportunity to socialize (and therefore influenced and influenced by peers) compared to women. [8] The finding supports this notion that boys use violent games or sports as social tools that allow for socialization through competition and cooperation. Men also dominate LAN (Local Access Network) games, where players bring their computers to the specified location to play online and face to face. The main satisfying property of LAN shows is the opportunity to perform before each other.

Besides, in a study of men and women in America found that young men are more likely to play games that are challenging. Social interactions, such as war/shooting games, roleplaying games, and sports and strategy games. [9] On the other hand, adolescent girls are more interested, especially in puzzle games, adventure, fighting, and managerial games, which

indicate "the main reasons for women to play include challenges and passions". Men were also found to have higher scores on social interactions compared to women in the explorative survey conducted among The Sims2 players.[10]

**3. The neurobiological aspects of internet gaming disorder**

Internet game disruption (IGD) is characterized as excessive and uncontrolled gaming behaviour that ultimately leads to functional interruption or difficulty. Over the past decade, the unchecked behaviour of internet games has resulted in public health and social problems throughout the world. Several studies have been conducted to find out about the neurobiological basis of the ED. The role of reward-sensitivity changes, dopaminergic-reward system deficits, deficits in cognitive-emotional processes, impulsivity, signal reactivity and impaired decision-making abilities that have been proven to be associated with IGD.[11-12]

The role of dopamine in the reward system has been established. Addictive behaviours such as excessive and uncontrolled use and internet play and drug abuse change the structural and functional areas in the dopaminergic reward system, which ultimately leads to behavioural changes that contribute to desires, risk-taking, and prediction errors. Also, interactions between dopamine and glutamate are related to drug search behaviour and relapses in animal studies, and dopamine-glutamate co-transmission appears to occur in the processing of gifts in addiction.[13-14]

IGD is associated with a decrease in peripheral glutamate levels, which involves changes in glutamate neurotransmission. Glutamate signalling has been implicated as necessary in addictive disorders. In substance addiction, illegal drugs change the transmission of glutamate; nicotine increases extracellular glutamate levels, opiates reduce excess synaptic glutamate, and alcohol has a mixed effect on extracellular glutamate levels.[15] Drug-related cues give rise to wicked increases in the firing of the ventral tegmental area of dopamine neurons and ultimately lead to the release of dopamine and glutamate in the prefrontal cortex and nucleus accumbens.

Glutamate is involved in the learning process and memory through the N-methyl-D-aspartate (NMDA) receptor. Altered transmission of glutamate has been thought to play a role in reconciling drug-related memories and thus in recurrence of addiction disorders. Besides, glutamate excitotoxicity is involved in the motivational process and reduces the capacity of the prefrontal cortex to provide executive control over drug-seeking. [16] As in substance addiction, changes in glutamate neurotransmission can modify dopaminergic gift processing and re-consolidate memories related to addictive behaviour in the IGD.

Most research shows that the following aspects may be involved in internet gaming disorder: first, the game's built-in reward system may be the cause of the game disruption. For example, many games, especially online role plays that are played online multiplayer, depend on "Compulsion loop", a cycle of activities that involves rewarding players and encouraging them to continue through another period, maintaining them in the game. [17-20] Many players refuse to quit the game because they are valued in the game. Hopes for these rewards can increase dopamine in the brain, activate the reward system, and once the player is rewarded, he can become addicted in the long run. This mechanism is similar to the neurobiological mechanism of gambling disorders. Besides, in the virtual world generated by games, people with game disorders can gain trust and satisfaction that cannot be obtained in the real world.[4] Also, high testosterone burden may be a risk factor for adults with game disorders

In neuroimaging studies, studies using fMRI and rs-fMRI show that there appear to be significant neurobiological differences between healthy controls and individuals with ED. Recent studies have shown that game addicts have reduced emotional inhibition and regulation, impaired PFC function and cognitive control, poor working memory and decision-making

abilities decreased visual and auditory functions and deficiencies in their neuronal reward system. This deficiency is similar to that found in individuals with substance-related addictions, suggesting that substance-related habits and behaviours have the same predisposing factors and can be part of addiction syndrome. For example, research in the context of alcohol abuse has found that the amplitude of P300 is reduced in individuals who have an increased genetic risk for alcoholism. This might suggest that findings similar to the reduction in P300 amplitude in individuals with ED have a high genetic risk for developing addiction-related problems. As a result, future research needs to assess the possibility of genetic susceptibility for developing ED-related problems to verify these allegations. However, in the fMRI and rs-fMRI studies, no differences were found in attention control and error processing between IGD individuals and healthy controls. Also, more brain activity was found in-game addicts relative to healthy controls, indicating increased sensory-motor coordination in the ED. Recent research shows that ordinary games can have therapeutic benefits and games can be used to improve a variety of cognitive and motor skills, and are successfully used in the training of professionals, such as soldiers and surgeons.[20-22]

**4. Conclusion**

Peer group and neurobiological factors have a role in the occurrence of internet gaming disorder in adolescents.

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