Chapter 58
Neuropsychological Features of Gaming Disorder and Psychiatric Comorbidities

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ABSTRACT

This article highlights current research on gaming disorder (GD), focusing primarily on neuropsychological features. Advances in digital technology have made gaming more accessible, realistic, and competitive than ever before, leading to a rise in GD prevalence. Pathological gaming is frequently associated with poor inhibitory processing, decision-making, self-control, as well as exaggerated automatic, attentional, and emotional processing of gaming-related cues. Many of the core cognitive features of GD, including executive function (EF) dysfunction, associated deficits in cognitive flexibility, empathy, and social skills, are also observed in other addictions as well as seemingly unrelated psychiatric disorders such as autism spectrum disorder. Accordingly, recent brain-imaging studies of these disorders have repeatedly reported abnormal EF concomitant with altered activity in frontal regions subserving reward processing and self-control. These neuropsychological features may provide important clues to GD pathogenesis and improved clinical intervention.

INTRODUCTION

Positive and Negative Aspects of Game Playing

Play is essential for motor, social, and cognitive development across mammalian species. Thus, humans are "born to play," and various competitive and noncompetitive forms of play and recreation are integral

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to all cultures (Kuss & Griffiths, 2012; Wood & Reiners, 2015). Ideally, play promotes physical health and socially appropriate civilized human behavior (e.g., following set rules and cooperation) (Rand et al., 2014; Peterson, 2013). Humans may use a game-based mindset to improve various outcomes, termed "gamification" (Landers & Callan, 2011). Common examples of gamification include trivia and workout games in education, and augmented reality marketing in business. For instance, some coffee businesses offer mobile phone loyalty apps that allow customers to collect points redeemable for prizes (e.g., free drinks).

Video games have grown immensely in popularity over the past several decades, both as recreation and for specific applications, such as physical, mental, and cognitive training (Maldonado-Murciano et al., 2022; Stanmore et al., 2017). In addition to pure entertainment, these games can promote relaxation by allowing participants to step outside of their regular duties, routines, and social roles, and experience other ways of life or fantastical environments (Kuss & Griffiths, 2012).

Despite these benefits, however, video or online gameplay can become an obsession that replaces human interactions; it may even impair physical and mental health (King, Wölfling, & Potenza, 2020). In parallel with advances in digital technologies, including computer-generated imagery, information science, and industrial cyberspace modules, gaming has become increasingly popular, immersive, and monetized (King et al., 2020). Increased play despite distress is due in part to modern design features that compel greater investments in time and money to obtain desired in-game outcomes (King et al., 2020; Alimoradi et al., 2022). The popularity of online gaming has been further promoted by recent humanitarian and natural disasters, such as the COVID-19 pandemic, and many people are currently spending more time playing online games than in conventional face-to-face social interactions (Han et al., 2022; Alimoradi et al., 2022).

Gaming and Addiction

Such preoccupation with games can develop into a gaming disorder (GD), a behavioral addiction associated with physical and psychological comorbidity (e.g., poor sleep hygiene, obesity, depression, and anxiety) (Ohayon & Roberts, 2021). In response to this increasing prevalence, the World Health Organization recently included GD in the latest International Classification of Diseases (ICD, 11th revision). Here, GD is defined as excessive online gaming despite its negative impacts on daily living, including neglect of important social or financial duties, unsuccessful attempts to reduce or stop gaming, and clinically significant impairment lasting at least 12 months, as assessed by clinical interviews (World Health Organization, 2018, 2019). Screening and diagnostic assessment of GD and its comorbidities utilize self-report questionnaires and neurocognitive tests. The treatment of GD may incorporate medication and behavioral therapies such as cognitive behavioral therapy, virtual/digital therapies, and treatment camps (King & Delfabbro, 2018; Petry et al., 2015; Aboujaoude & Gega, 2020).

Prevalence of GD

A recent meta-analysis showed that the global prevalence of GD is approximately 3.05% (Stevens et al., 2021; Király et al., 2022). However, the prevalence rates vary widely among studies from different countries, and there is a notably higher incidence in Asia than in Europe. The prevalence of GD is significantly higher in males than females (approximately 2.5:1) and is more severe in adolescents and children than in adults (Paulus et al., 2018; Király et al., 2022). Furthermore, GD is considered as one