

Chapter 15

ADHD, Gaming Disorder, and Beyond



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Case Example

Renee is a 16-year-old tenth grader in high school. She has ADHD and has been treated successfully with a long-acting methylphenidate for many years. She and her father enjoy playing video games together, but she now plays with others after he goes to sleep. She is awake until 3–4 AM, hard to wake for school, and falling asleep in school. She refuses to stop earlier, indicating that she has friends online and “needs the downtime.” Her parents are reluctant to remove her devices, as she needs them for school and socialization. They do not want to turn off the wireless connection or cellular service during the night so that her older sister in college can call if she needs anything. Her parents don’t know what to do.

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Background

Adolescence is not what it used to be. Today's youth grow up in an increasingly engaging and efficient technological environment. Nearly limitless access to ideas, information, and tools for creativity and interaction can be held in the palm of one's hand, resulting in new approaches to education, social connection, and entertainment. Eight- to 12-year-old tweens spend nearly 6 hours per day, and teens aged 13 to 18 spend almost 9 hours a day engaging with electronic screen media [1]. The family television in a shared living space has been superseded by each family member having access to multiple screens, many of them mobile. Not only are adolescents spending significant time in front of a screen, but also they are often spending that time in front of more than one screen simultaneously [2]. Alone in their rooms, adolescents can be found doing homework on a laptop on which a music video is playing, while their cell phones are alternating between group chats and posts on social media. For the adolescent with attention-deficit/hyperactivity disorder (ADHD), the quantity and complexity of easily available screen media make focusing thoughts, controlling impulses, and completing tasks even more difficult.

Disorders of Problematic Interactive Media Use

During the 1950s, television rapidly penetrated American homes, becoming a part of and shaping our daily activities. As television viewing increased, displacing physical activities and public events, clinicians and researchers began to consider the effects on children's health and development of increasing amounts of time spent using screens [3]. The rising popularity of video games in the 1980s raised concerns about some children losing control of their interactive media use [4]. Psychodynamic formulations involving social alienation and attempts to control aggression were proposed, with associations made to obsessive-compulsive disorder [5]. By the 1990s, uncontrolled use of Internet and video games came to be formulated as a behavioral addiction [6, 7]. Subsequent research and commentary referred to electronic media use problems with a variety of names, frequently including terms like "compulsive" or "addiction." However, controversy surrounds how best to categorize uncontrolled media use [8]. As uses of the Internet broadened, so did the ways in which some individuals lost the ability to regulate their use of interactive media. In addition to disordered console and Internet-based video game use, forms of problematic media use described in research literature have included social media use disorders [9], dysregulated online pornography use [10], binge-watching of streaming video [11], and smartphone dependence [12].

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is the primary reference in the United States for behavioral health problems [13]. Rapid development in personal media technology occurring during the decade between publication of the fourth and fifth editions of the DSM led to dramatic increases in

interactive media use. In response to rising clinical concerns about uncontrolled use leading to psychological and social impairment, the *Conditions for Further Study* section of the DSM-5 contains proposed diagnostic criteria for “Internet gaming disorder” (see the proposed diagnostic criteria in Table 15.1) [14]. In 2018, the World Health Organization added “gaming disorder” to the International Classification of Diseases, Eleventh Edition (ICD-11) (see criteria in Table 15.2) [15]. The DSM-5 characterizes Internet gaming disorder as a form of behavioral addiction, and in the ICD-11, gaming disorder is grouped under a parent section titled “Disorders due to substance use or addictive behaviors.” Official recognition by the medical community of dysfunctional interactive media use represents an important step in furthering our understanding of these new types of behavior problems. However, both descriptions are limited as they reinforce the questionable concept of addiction and they neglect to recognize and describe dysfunctional social media, pornography, information-bingeing, and other problems beyond video

Table 15.1 Proposed diagnostic criteria for Internet gaming disorder (DSM-5)

Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:

1. Preoccupation with Internet games. (The individual thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life.) *Note:* This disorder is distinct from Internet gambling, which is included under gambling disorder

2. Withdrawal symptoms when Internet gaming is taken away. (These symptoms are typically described as irritability, anxiety, or sadness, but there are no physical signs of pharmacological withdrawal.)

3. Tolerance—the need to spend increasing amounts of time engaged in Internet games

4. Unsuccessful attempts to control the participation in Internet games

5. Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games

6. Continued excessive use of Internet games despite knowledge of psychosocial problems

7. Has deceived family members, therapists, or others regarding the amount of Internet gaming

8. Use of Internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety)

9. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games

Note: Only nongambling Internet games are included in this disorder. Use of the Internet for required activities in a business or profession is not included nor is the disorder intended to include other recreational or social Internet use. Similarly, sexual Internet sites are excluded

Specify current severity:

Internet gaming disorder can be mild, moderate, or severe depending on the degree of disruption of normal activities. Individuals with less severe Internet gaming disorder may exhibit fewer symptoms and less disruption of their lives. Those with severe Internet gaming disorder will have more hours spent on the computer and more severe loss of relationships or career or school opportunities

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Table 15.2 6C51 Gaming disorder (ICD-11)

<i>Description</i>
Gaming disorder is characterized by a pattern of persistent or recurrent gaming behavior (“digital gaming” or “video gaming”), which may be online (i.e., over the Internet) or offline, manifested by the following:
1. Impaired control over gaming (e.g., onset, frequency, intensity, duration, termination, context)
2. Increasing priority given to gaming to the extent that gaming takes precedence over other life interests and daily activities
3. Continuation or escalation of gaming despite the occurrence of negative consequences
The behavior pattern is of sufficient severity to result in significant impairment in personal, family, social, educational, occupational, or other important areas of functioning. The pattern of gaming behavior may be continuous or episodic and recurrent. The gaming behavior and other features are normally evident over a period of at least 12 months in order for a diagnosis to be assigned, although the required duration may be shortened if all diagnostic requirements are met and symptoms are severe
<i>Exclusions</i>
• Hazardous gaming (QE22)
• Bipolar type I disorder (6A60)
• Bipolar type II disorder (6A61)

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gaming. To accurately and comprehensively reflect empirical evidence from the clinic, we use the nomenclature problematic interactive media use (PIMU), as it is inclusive of the various presentations and focuses concern on problematic interactive behavior rather than the device or operation. Recognizing associations of dysfunctional interactive media use with known pathologies will help characterize PIMU as a diagnosis, multiple diagnoses, or a syndrome of known pathologies, enhancing efforts to develop effective, evidence-based treatments for these problems in their current and potential future forms.

PIMU and Attention-Deficit/Hyperactivity Disorder

A consistent finding of studies from the United States, Europe, Southwest Asia, and East Asia is an increased prevalence of PIMU among children and adolescents with ADHD [16–23].

Individuals with more severe ADHD symptoms are likely to experience more severe problems related to interactive media use; this “dose-response” relationship appears most notable in the relation between hyperactive-impulsive symptoms of ADHD and disordered media use [24, 25]. Increased prevalence of PIMU has been found among individuals with impulsivity, or inhibitory control weakness [26, 27], and

those with relative deficits in working memory [28] as dimensional traits isolated from diagnosed ADHD. Prospective longitudinal research has found that individuals with diagnosed ADHD were more likely to develop problematic gaming [29] and Internet addiction (IA) [30] but that those with these forms of PIMU were not more likely than those without PIMU to develop ADHD. However, recent research found that 15- and 16-year-old high-frequency social media users with no symptoms of ADHD at baseline were more likely to develop ADHD symptoms over the next 24 months [31].

As children with ADHD develop into and through adolescence, they begin to accrue a burden of multiple experiences of under-functioning, negative consequences, and alienation. Untreated ADHD increases one's risks for academic underachievement, impairments in family and social functioning, underemployment, imprisonment, motor vehicle accidents, criminality, and substance use disorders [32]. Youth with ADHD suffer disproportionately when struggling to negotiate social expectations established for stronger attention and impulse control capabilities. For example, youth with ADHD experience less reward and more punishment for their frequent late arrivals, not completing tasks, or saying the wrong thing because their impulsivity outpaces their ability to stop and think.

Development of PIMU occurs over time. Interactive computer software has long been used by educators as an effective means of engaging and maintaining the attention of students with ADHD because it limits distractions and reinforces focus on educational material [33, 34]. For different types of learners, electronic screen media provide an opportunity to deliver information in engaging formats using written and spoken words, images, video, sound, and music, potentially lessening boredom typical of ADHD [35]. Similarly, these technologies offer new ways to create and produce. A person with ADHD may struggle to write an essay but be more successful recording a podcast or shooting a video that demonstrates understanding of the material. Advances in interactive technology have created a digital environment that offers educational "work-arounds" for those with ADHD but simultaneously placed them at increased risk for impaired functioning if they cannot extricate themselves from engagement.

Children and adolescents with ADHD thrive in this immersive environment, and their mastery of it results in feelings of competence.

Interactive electronic games provide distraction and entertainment. When youth with ADHD are able to isolate with their devices, relief comes in a virtual space where a stimulating interface paired with high enjoyment engages, activates, and measurably improves their brain attentional functions [36]. Their impulsivity, in the form of rapid, reflexive response to stimuli, is rewarded. They find freedom from the confusion and discomfort experienced in the more complex, chaotic physical world. The variable rewards of gaming and social media continuously draw them in, increasing use builds greater skill, and enhanced performance is rewarded in an ongoing cycle. "Locked in" gamers become disinhibited, achieving a soothing flow state. When parents ask these gamers to shut down to do homework or sleep, it is

experienced as an intrusion, a noxious separation from their domain of mastery to the discomfort of real-life demands. Their reaction, unimpeded by inhibitory control, is angry and aggressive and can become physically violent.

PIMU Comorbidities

With broader knowledge of mental conditions that have been associated with PIMU, we can develop a more nuanced understanding of the pathways to developing PIMU and identify prevention and intervention opportunities. While PIMU is prevalent among youth with ADHD, other psychiatric disorders also manifest themselves as dysfunctional interactive media behavior. Negative emotions, in the form of both anxiety and depressed mood, are consistently shown to be associated with PIMU [16, 24, 37]. Specifically, social anxiety, along with social difficulties such as loneliness and social isolation, is diagnosed more frequently among those who present with dysregulated media use [38–40]. One prospective research study found that social phobia predicted subsequent development of PIMU [30]. Relational problems among problematic interactive media users are not isolated to interactions with peers; those struggling with PIMU experience increased problems with connectedness and engagement with family and supports as well [41, 42]. Increased aggression toward others has been found among problematic interactive media users [43], particularly among males who play “first-person shooters” and other violent interactive games [44–46]. Suicide represents the second leading cause of death among adolescents [47]. Adolescents struggling with PIMU are more likely to endorse suicidal thinking [20], including planning for suicide [48] and suicide attempts [49].

Most concerning is the strong association of PIMU with serious safety risks.

Treatment

Many parents believe that their children are spending too much time with interactive media. Their children explain that everyone else is doing the same. The difficulty is determining which young people need clinical intervention. Frequently, the first sign that a young person’s interactive media use has impaired them is excessive daytime sleepiness, poor sleep quantity or quality, or indirect effects of sleep disruption or deprivation such as academic deterioration [50, 51]. PIMU can decrease effective sleep through one or more mechanisms:

- Intentional delay of sleep to pursue interactive media activities [52]
- Prolonged sleep latency due to arousal from screen content and melatonin suppression resulting from exposure to blue light [53]
- Increased frequency of early morning awakening and sleep disturbances such as nightmares or sleepwalking [54]

The strong association between ADHD and PIMU provides an initial basis on which to develop treatment strategies for those struggling with these conditions. Children with diagnosed ADHD and PIMU treated with methylphenidate, a central nervous system stimulant, have shown improvements in both ADHD and disordered media use symptoms [55]. Improvement in ADHD and PIMU was also achieved in adolescents treated with either methylphenidate or atomoxetine, a non-stimulant medication approved for the treatment of ADHD [56]. When both conditions are identified in the same person, treatment planning and determination of response to treatment should include consideration of changes in media use, such as reducing maladaptive nighttime media use habits for a person treated for ADHD with stimulant medications.

The risks presented by negative emotion can also be an appropriate target for medical treatment. Selective serotonin reuptake inhibitors (SSRIs) are first-line medication interventions for clinical depression and anxiety. Medication trials of the SSRI escitalopram showed reductions in PIMU [57, 58]. Bupropion, an atypical antidepressant, has been shown to improve symptoms of ADHD [59]. A well-designed, blinded, placebo-controlled study of bupropion for male patients suffering from both depression and PIMU resulted in improvements in both conditions [60].

Research and development of best approaches to psychological therapy for media use disorders is ongoing. Cognitive behavioral therapy (CBT) is an active, structured psychotherapy involving therapist guidance toward the development of skills needed to improve functioning. Specifically, CBT aims to improve awareness of the self and surrounding circumstances, consciousness of one's feelings and thoughts that occur in response to those circumstances, and ultimately acquisition of skills needed to achieve control over unpleasant thoughts, feelings, and resultant behaviors [61]. CBT interventions for PIMU have shown to be effective at reducing problematic media use behaviors that exist in formal trials [62, 63].

The entire family is affected when a child or adolescent struggles with PIMU.

Treatment strategies frequently include changing the family environment, including the locations of devices, device-free zones like bedrooms and eating areas, durations and times of day for interactive media use, and sibling and parental media use behaviors. Family therapy can address intrafamily relationships and modeling of dysregulated media use, develop effective communication and problem-solving strategies, and repair and support adolescent-parent relationships. Improvement has been demonstrated in adolescents with PIMU treated with family therapy [64–67].

The most effective approach to prevention of and intervention on PIMU is for parents and caregivers to recognize the importance of children's interactive screen media use for education, communication, or entertainment and have limiting, rather than restrictive or permissive, expectations for media use. The rapid penetration of electronic technology into every aspect of our daily lives has outpaced efforts to establish standard guidance for parents, educators, and other caregivers. Proactively

establishing rules surrounding media use with clear limits, including when and where electronic media may be accessed, is an actionable step in support of adaptive media use patterns [68, 69]. For all young people, but especially those with ADHD whose educational adaptations use interactive media, the goal is not to abstain from or blindly restrict interactive media, but to optimize outcomes through mindful and focused use.

Case Revisited

Renee's intentional delay of sleep to pursue interactive media activities is a common sign of impairment caused by interactive media. Ideally, she and her family would have received proactive psychoeducation regarding the increased risk for PIMU in those with ADHD, so that household rules and expectations for interactive media use were established. At this point, Renee should be screened for anxiety and depression, comorbidities of both ADHD and PIMU, and other social challenges or stressors. She would benefit from a referral for CBT to improve awareness of her circumstances, of her own feelings, and of the thoughts that occur in response. During CBT, she can ultimately acquire skills needed to achieve control over unpleasant thoughts. Concomitant SSRI treatment is appropriate for moderate to severe levels of anxiety or depression. Her family dynamics and modeled dysregulated media use should be explored, as family therapy may be a useful addition to her treatment plan.

Conclusions

As interactive screen media have rapidly been incorporated into every aspect of our lives, some children, adolescents, and adults are suffering from dysregulated use of these powerful technologies. While much is being learned about media use disorders, the clinical community has yet to determine whether PIMU is a distinct new diagnosis or a syndrome, the signs and symptoms of known diagnoses that are manifesting themselves in the interactive media environment. Anticipating that newer, faster, and more engaging technologies are yet to come, we must maintain a dynamic, rapidly adapting approach to investigation, identification, and intervention.

Understanding the increased risk of individuals with ADHD to develop PIMU helps to recognize and treat children and adolescents suffering from disordered media use. A prior diagnosis of ADHD should be a cue to screen for PIMU, but PIMU may also be the first presentation of previously unrecognized ADHD. Whether comorbid with ADHD or not, anxiety and depression associated with PIMU must be addressed. Optimal treatment of mood and anxiety disorders may reduce maladaptive media use and promote the child's ability to succeed in real-life activities, which, in turn, can improve mood and anxiety.

As in all aspects of child health, prevention of PIMU and other media-related disorders is the ideal. It is most effective to establish—proactively—household rules and expectations for interactive media use. Establishment of clear expectations reduces temptation for the parent and child to negotiate norms or values at the moment of attempted limit setting. The American Academy of Pediatrics provides a Family Media Use Plan [70] that parents can customize to their own lifestyles, circumstances, and values. Media use limits and expectations can, and should, be modified from time to time as the child or adolescent proceeds through development. In families with multiple children, this can require different rules for children of different ages, needs, and developmental capabilities, making equity more complicated and oversight more difficult. Media use disorders are experienced, and resolved, by all members of a household. With effective anticipatory guidance, prevention, and treatment as needed, we can promote healthy family relationships and communication; nurture development of the skills needed for mindful, self-regulated use of interactive media; and support children to be healthy, productive, and happy in the digital age.

Tips

- Screen all adolescents, especially those with ADHD, for problematic interactive media use.
- Psychoeducation should include explanation of how “locked in” gamers become disinhibited, achieve a soothing flow state, and experience interruptions as a noxious separation from their domain of mastery to the discomfort of real-life demands.
- Look hard for co-occurring ADHD, anxiety, and/or depression in adolescents with problematic interactive media use.

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