Problematic Online Gaming

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HISTORY AND TYPOLOGY OF ONLINE GAMES

Since their appearance in the 1990s, online video games have become widely popular and accessible. Nowadays, they are one of the most widespread recreational activities irrespective of culture, age, and gender. Parallel with this, dangers of problematic use have begun to arise. Video games can be played on many different platforms, such as personal computers (PCs), video game consoles, handheld game consoles, or smartphones—all of which can be played via access to the Internet. In this chapter, these games are referred to simply as *online games,* although several different names (e.g., *online video games, Internet video games*) can be found in the literature. Another important point to be made is that online gaming differs from online gambling, because there is no money staked during these games in an attempt to win further money.

Video games can be divided into two main groups—online and offline video games—a distinction that can significantly influence player behavior. Offline games are usually (but not always) played alone, they have a well-defined start and finish point, and the goals of the game can usually be achieved by the players themselves without external help from any other player. However, online games are typically played simultaneously by players who can communicate with one another in real time, cooperating or competing at will. Because of their inherent structural characteristics, these games do not usually have a predetermined end point. Furthermore, new tasks and quests are frequently added by the game developers and/or game operators. Subsequently, there is no real loss, and tasks can be repeated several times. Some goals can be achieved alone or together with other players, while others can be completed only by players working together in highly cooperative groups. Competing with fellow players is also possible and leads to immediate social comparison (Griffiths, 2010b; Kim & Kim, 2010;

Williams, Ducheneaut, Xiong, & Yee, 2006). Consequently, online games are distinguished from offline games mostly by their social nature (Charlton & Danforth, 2007; Choi & Kim, 2004; Kim & Kim, 2010). Although in some games the aforementioned characteristics blend, most of them can clearly be specified as offline or online games. Due to these characteristics, the popularity of these game types can differ greatly. De Prato et al. (2010) indicate that 70% of gamers prefer online as opposed to offline games.

Online gamers spend more time gaming than those who play offline games, mostly because of the social nature of these games. They find online games more pleasant and satisfying than offline games and sometimes prefer playing games to real-life activities (Ng & Wiemer-Hastings, 2005). These motives may also account for the findings showing that online games trigger the appearance of problematic use more often than offline games do (Griffiths, Davies, & Chappell, 2004; Griffiths & Meredith, 2009; Rehbein, Psych, Kleimann, Mediasci, & Mossle, 2010).

The first prototypical online games were the text-based virtual worlds called multi-user domains (referred to as MUDs) that appeared in the 1970s (Bartle, 2003). These were persistent[1] digital worlds where several players could "be present" and interact with each other at the same time (using their own imagination instead of graphics). This new environment created so many new possibilities (e.g., real-time chat, interaction between the players, parallel activities, cooperation, competition, social comparison) that the popularity of MUDs continued to increase as the number of Internet users rose. During the same period, table-top role-playing games (RPGs) appeared in which players threw dice to determine the outcomes of moving small figures around a player-drawn map. In both types of game (MUDs and RPGs), players created characters with attributes and skills to help them fight together through dungeons filled with dangerous beasts to acquire magical items (Barnett & Coulson, 2010).

Out of these text-based virtual worlds and table-top role-playing games arose the surprisingly complex (two- and three-dimensional) graphical virtual worlds, known today as MMOGs (massively multiplayer online games), or MMOs for short. The *massively* component indicates that hundreds or even thousands of players can be present in the same virtual game world at any given moment. The *multiplayer* word refers to the fact that people play simultaneously in the same online world, not in an individual copy of it, while the word *online* indicates that the game can be played only

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[1] *Persistence* refers here to the fact that these digital worlds not only are generated when some players enter the game but exist continually independently of the players' actual presence.

through a platform with an Internet connection (Barnett & Coulson, 2010). The three mosaic words also hint at the degree of complexity. For the time being, MMOGs are the most complex games and offer persistent virtual spaces for the hundreds of thousands of players that inhabit them. Multiplayer online games (MOGs) are arguably simpler. These are also played by groups of players together, but do not offer synchronic spaces, and the number of players is highly limited (e.g., 4–16 players). An online game (OG) simply refers to the fact that such games are played in an Internet-based environment, and the multiplayer mode is not a condition.

MMOs vary in terms of content, challenges, and setting, but all MMOs share six technical and design characteristics that collectively differentiate them from other types of games: persistence, physicality, avatar-mediated play, vertical game play, perpetuity, and social interaction (Chan & Vorderer, 2006). *Persistence* refers to the fact that the game world exists and changes even when a player is not actively playing (i.e., he or she is away from the keyboard), and as a result the game world may have been altered between two gaming sessions. *Physicality* means that the game models a more or less realistic world with a consistent set of physical rules, so for example a player's character will die when falling into a precipice. The player's character, or avatar, allows for *avatar-mediated play*, in which the player uses his or her character to interact with the game world and other players. *Vertical game play* and *perpetuity* refer to the fact that MMOs—unlike single-player games—cannot be completed; they can be played almost endlessly. After attaining the highest level, players may still remain in the game world and complete more challenges or just participate in the social activities. Even though players can play alone, *social interaction,* cooperation, and rivalry between the players form an essential part in an individual's game play (Chan & Vorderer, 2006), and provide the opportunity to make friends, overcoming physical distance and other limitations by way of a variety of specialized communication channels.

MMOs can be divided in three major groups and an "other" category (Nagygyörgy et al., 2012; Rice, 2006):

1. *Massively multiplayer online role-playing games* (MMORPGs) and their variations: As in traditional role-playing games, players control an avatar that becomes their virtual game self. Players choose a profession that determines their role and abilities. Through fulfilling different tasks or missions in the game, the avatars develop (a vertical development called "leveling up") and acquire precious objects that lead to the differentiation in status between avatars.

2. *Massively multiplayer online first person shooters* (MMOFPSs) and their variations: These are skill-demanding action games, in which the player controls a single avatar from a first-person perspective. They mostly rely on reaction time and attention abilities and offer several ways of cooperation and competition—on an individual or group level—between the players.

3. *Massively multiplayer online real-time strategy* (MMORTSs) games and their variations: As opposed to the first two game types, here the players typically oversee large troops and/or territories in a virtual world, engage in battles, or conclude alliances with other players. Through successful management, players establish status in the game world and gain esteem from other players.

4. *Other online games*: This category includes all the other online games, such as sport and racing games, music/rhythm games, multiplayer online social games, or turn-based strategy games. Because this is a mixed category, all the specific and idiosyncratic characteristics cannot be outlined. Compared to the other three game types, these games attract fewer players, but at the same time the proportion of female players is much higher (Nagygyörgy, Urbán et al., 2012).

Recent research has shown that 79% of online gamers have a clear gaming preference which might suggest that specific games fulfill specific psychological needs (Nagygyörgy, Urbán et al., 2012).

DEFINING PROBLEMATIC ONLINE GAMING

Despite the increasing amount of empirical research into problematic online gaming, the phenomenon sadly lacks a consensual definition (Blaszczynski, 2008; Griffiths & Meredith, 2009; Wood, 2007). One group of researchers consider video games as the starting point for examining the characteristics of this specific pathology (Charlton & Danforth, 2007; Griffiths, 2005a; Griffiths & Meredith, 2009; Peters & Malesky, 2008), whereas others consider the Internet as the main platform that unites different addictive Internet activities, including online games (Van Rooij, Schoenmakers, Vermulst, Van den Eijnden, & Van de Mheen, 2011; Young, 2009b). Recent studies make an effort to integrate both approaches (Demetrovics et al., 2012; Kim & Kim, 2010). Therefore, problematic online gaming can be seen either as a specific type of video game addiction, as a variant of Internet addiction, or as an independent diagnosis. In the following, each of these approaches is discussed.

Griffiths (2005a) notes that although each addiction has several particular and idiosyncratic characteristics, they have more commonalities than differences that may reflect a common etiology of addictive behavior. On the grounds of his "components" model of addiction, within a biopsychosocial framework (2005a), he considers online game addiction a specific type of video game addiction that can be categorized as a nonfinancial type of pathological gambling (Griffiths, 2005b). Griffiths (2010a) developed the components of his video game addiction theory by modifying Brown's (1991, 1993) six addiction criteria. These are (1) *salience*: This is when video gaming becomes the most important activity in the person's life and dominates his or her thinking (i.e., preoccupations and cognitive distortions), feelings (i.e., cravings), and behavior (i.e., deterioration of socialized behavior). (2) *Mood modification*: This is the subjective experience that people report as a consequence of engaging in video game play (i.e., they experience an arousing "buzz" or a "high" or, paradoxically, a tranquilizing and/or distressing feel of "escape" or "numbing"). (3) *Tolerance*: This is the process whereby increasing amounts of video game play are required to achieve the former effects, meaning that for persons engaged in video game playing, they gradually build up the amount of time they spend online engaged in the behavior. (4) *Withdrawal symptoms*: These are the unpleasant feeling states or physical effects that occur when video gaming is discontinued or suddenly reduced, for example, the shakes, moodiness, irritability. (5) *Conflict*: This refers to the conflicts between the video game player and those around him or her (i.e., interpersonal conflict), conflicts with other activities (e.g., job, schoolwork, social life, hobbies and interests), or conflicts from within the individual him- or herself (i.e., intrapsychic conflict and/or subjective feelings of loss of control) that are concerned with spending too much time engaged in video game play. (6) *Relapse*: This is the tendency for repeated reversions to earlier patterns of video game play to recur and for even the most extreme patterns typical at the height of excessive video game play to be quickly restored after periods of abstinence or control. Charlton and Danforth (2007, 2010) analyzed the six criteria presented here and found that tolerance, mood modification, and cognitive salience were indicators of high engagement, while the other components—withdrawal symptoms, conflict, relapse, and behavioral salience—played a central role in the development of addiction.

Porter et al. (2010) do not differentiate between problematic video game use and problematic online game use. They conceptualized problematic video game use as excessive use of one or more video games

resulting in a preoccupation with and a loss of control over playing video games, and various negative psychosocial and/or physical consequences. Their criteria for problematic video game use did not include other features usually associated with dependence or addiction, such as tolerance and physical symptoms of withdrawal, because in their opinion there is no clear evidence that problem video game use is associated with these phenomena.

Although Internet Addiction Disorder (IAD) had been a candidate for *DSM-5* inclusion, it was rejected due to lack of scientific justification. However, online gaming addiction, as a specific type of IAD, had been better documented and thus, included in Section III (an appendix of disorders for further study) of the *DSM-5* under the name of Internet Gaming Disorder (American Psychiatric Association, 2013b).

The most well-known representative of the approach that considers online games a specific subtype of Internet activities is Young (1998a), who developed her theoretical framework for problematic online gaming from her Internet addiction criteria, which were based on the *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition (*DSM-IV*) criteria for pathological gambling (American Psychiatric Association, 1994). Her theory states that online game addicts gradually lose control over their game play; that is, they are unable to decrease the amount of time spent playing while immersing themselves increasingly in this particular recreational activity and eventually develop problems in their real life (Young, 2009b). The idea that Internet/online video game addiction can be assessed by the combination of an Internet addiction score and the amount of time spent gaming (Han, Hwang, & Renshaw, 2010; Van Rooij et al., 2011) is also reflective of this approach.

Problematic Online Gaming as an Independent Diagnosis

Integrative approaches try to take into consideration both aforementioned approaches. For instance, Kim and Kim (2010) claim that neither the first nor the second approach can adequately capture the unique features of online games such as MMORPGs, therefore, it is absolutely necessary to create an integrated approach. They argue that "Internet users are no more addicted to the Internet than alcoholics are addicted to bottles" (p. 389), which means that the Internet is just one channel through which people may access whatever content they want (e.g., gambling, shopping, chatting, sex), and therefore users of the Internet may be addicted to the particular content or services that the Internet provides rather than the

channel itself. On the other hand, online games differ from traditional stand-alone games, such as offline video games, in important aspects such as the social dimension or the role-playing dimension that allow interaction with other real players. Their multidimensional Problematic Online Game Use (POGU) model reflects this integrated approach fairly well. It had been developed theoretically on the basis of several studies and theories such as those of Armstrong, Phillips, and Saling (2000), Brown (1991, 1993), Caplan (2002), Charlton and Danforth (2007), Griffiths (1998), Lee and Ahn (2002), and Young (1999) and resulted in five underlying dimensions: euphoria, health problems, conflict, failure of self-control, and preference of virtual relationship. Demetrovics et al. (2012) also support the integrative approach and stress the need to include all types of online games in addiction models to make comparisons between genres and gamer populations possible [such as those who play online real-time strategy (RTS) games and online first-person shooter (FPS) games in addition to the widely researched MMORPG players]. According to their model, six dimensions cover the phenomenon of problematic online gaming: preoccupation, overuse, immersion, social isolation, interpersonal conflicts, and withdrawal.

Problematic Online Gaming as a Behavioral Addiction

Examining the empirical evidence, one can argue that online game addiction can be defined as one type of behavioral addiction (Demetrovics & Griffiths, 2012; Grant, Potenza, Weinstein, & Gorelick, 2010), a specific group of mental and behavioral disorders that had not been present yet in *DSM-IV* (American Psychiatric Association, 1994) or *ICD-10* (World Health Organization, 1994) but has recently been included in *DSM-5* (American Psychiatric Association, 2013a) as the second part of the "Substance-Related and Addictive Disorders" section. At present, the sole behavior in this new category on behavioral addictions is problematic gambling disorder. However, *Internet gaming disorder* has also been included in *DSM-5*'s Section III (American Psychiatric Association, 2013b), with a list of proposed diagnostic criteria similar to factors discussed throughout this chapter, to encourage research to determine whether this particular condition should be added to the manual as a disorder in the future.

Nevertheless, the authors of this chapter propose to use the name *problematic online gaming*. This term describes both the quintessence of the phenomenon (i.e., not only that the behavior is excessive, but gaming-related problems are also expected to be present), while avoiding the notion

of dependency or disorder. The reason is that the precise future definition and diagnostic criteria need to be clarified and agreed upon on the basis of *DSM-5.*

SYMPTOMATOLOGY AND CONSEQUENCES

In the case of problematic online gaming, symptoms and consequences overlap to a significant extent and are therefore discussed together in this section. In the clinical understanding, problematic online gamers spend most of their time playing online games (or in many cases, one single online game) (e.g., Chappell, Eatough, Davies, & Griffiths, 2006; Griffiths, 2008; Porter et al., 2010). Although the amount of time spent on gaming is not predictive on its own (Griffiths, 2005a, 2010b), problematic gamers typically play much more than casual gamers (e.g., Gentile, 2009; Grusser, Thalemann, & Griffiths, 2007; Hussain & Griffiths, 2009). When they cannot play, they think, fantasize, and/or daydream about gaming instead of doing their usual daily activities. They may even dream about games and game playing (Griffiths, 2008; Porter et al., 2010). The activity gains a compulsive quality; namely, the player misses gaming, and as the feeling gets more intense and inner tension arises, the player gets restless, irritable, and moody (Chappell et al., 2006; Griffiths, 2008; Grusser et al., 2007; Hussain & Griffiths, 2009).

   In the most extreme cases, the increasing inner tension may turn into aggressive behavior. To decrease this unpleasant feeling, the gamer continues to play on and on (due to tolerance) in ever-increasing amounts (Griffiths, 2008; Hussain & Griffiths, 2009). Such individuals are typically unable to control the activity, and recognize that it causes problems in their lives (Hussain & Griffiths, 2009; Porter et al., 2010). Should they manage to quit, they typically restart the activity sometime later (i.e., relapse) with the same intensity (Chappell et al., 2006; Griffiths, 2008; Hussain & Griffiths, 2009). Problematic gamers gradually lose interest in other recreational activities and start neglecting their everyday obligations, which leads to poorer educational and/or professional performance (Chappell et al., 2006; Gentile, 2009; Griffiths, 2008; Kim & Kim, 2010; Peng & Liu, 2010). The game becomes the absolute priority that usually leads to interpersonal and intrapersonal conflicts. As a result, their real–life relationships may deteriorate and/or come to an end (Chappell et al., 2006; Griffiths, 2008; Peng & Liu, 2010; Porter et al., 2010), and these players can become lonely (Kim & Kim, 2010; Lemmens, Valkenburg, & Peter, 2011; Van Rooij et al., 2011). To avoid conflicts, some players lie about their online activities

and/or about the amount of time spent on gaming (Griffiths & Meredith, 2009; Young, 2009b).

In addition to psychological symptoms, somatic symptoms can also be observed in the case of problematic online gamers. These extend from ignoring basic biological needs such as eating, sleeping, and personal hygiene (Griffiths & Meredith, 2009; Peng & Liu, 2010; Porter et al., 2010) to different health problems such as gaining or losing weight, dry or strained eyes, headaches, back aches, carpal tunnel syndrome, repetitive strain injuries (RSIs), and general fatigue or exhaustion (Griffiths & Meredith, 2009; Peng & Liu, 2010; Porter et al., 2010).

Disease Process

Case studies and interviews (Allison, von Wahlde, Shockley, & Gabbard, 2006; Chappell et al., 2006; Griffiths, 2010a; Young, 2010) note that problematic online gaming—like other addictions or problematic behaviors—evolves gradually. Young (2010) calls the development of addiction a "downward spiral." At the initiation of the behavior, gaming is only a pleasant recreational activity, but slowly the player gets more and more involved until the activity becomes problematic. In Young's (2009b) opinion, the addiction process begins with a preoccupation with gaming. Gamers think about the game while they are offline when they should be concentrating on other things. This intensifies with time and slowly leads to a point when the game becomes the only priority that replaces all other recreational activities and everyday duties. At this time, other symptoms such as tolerance, withdrawal, and intrapersonal/interpersonal conflicts are present as well. To date, the duration of problematic use has been researched by a single longitudinal study. Gentile and his colleagues (2011) found that the problematic behavior existed 2 years later with the majority of children (84%) still being considered problematic gamers after the initial data collection. In the 2-year research period, only 1% of children became problematic gamers; therefore, the authors presume that problematic gaming might not be "simply a 'phase' that most children go through" (Gentile et al., 2011: pp. e325).

Regarding recovery, certain cases (Chappell et al., 2006; Young, 2010) suggest that—like other addictions—problematic online gamers reach a nadir when players become conscious of the problem itself and decide to change it. In such cases, they either seek external (e.g., professional) help or try to recover by themselves. However, given the potentially addictive nature of the problem, relapse appears to be quite frequent in these cases (Chappell et al., 2006; Young, 2010).

ASSESSMENT

The literature relating to the assessment of problematic online gaming shows there are many measures. Consequently, the aforementioned differences and uncertainties in definition must be continually kept in mind. The majority of researchers apply a theoretical approach. In several cases they have created new measures by modifying scales originally developed for the measurement of other behavioral addictions, but without careful psychometric analysis. For instance, the 20-item Internet Addiction Test/Scale (IAT/IAS) developed by Young (1998a, 1999) to measure Internet addiction has been taken as a basis for assessing online gaming addiction in a wide range of studies (Billieux et al., 2011; Jeong & Kim, 2011; Kim, Namkoong, Ku, & Kim, 2008; Kim et al., 2010; King, Delfabbro, & Griffiths, 2010a; Snodgrass, Lacy, Dengah, & Fagan, 2011; Wang & Chu, 2007; Whang, Heo, & Hur, 2004) even though the psychometric properties of the original scale were ambiguous (Demetrovics, Szeredi, & Rózsa, 2008; Koronczai et al., 2011). In other cases, researchers have assessed problematic online gaming by the combination of Internet addiction scores and weekly hours spent on Internet video gaming (Han et al., 2010; Van Rooij et al., 2011). This chapter's authors also consider this approach problematic because players do not necessarily view online gaming as an Internet activity but rather as "gaming." This may result in a lower Internet addiction score than is the actual case.

Other researchers propose not distinguishing problematic online gaming from problematic video gaming because the content is important, not the channel. In this approach, criteria for pathological gambling are often used as a starting point (Charlton & Danforth, 2007; Gentile, 2009; Gentile et al., 2011; Lemmens, Valkenburg, & Peter, 2009; Lemmens et al., 2011; Porter et al., 2010).

In addition to the previously discussed approaches, there are also measures that are based on the integrative approach, namely where both the special characteristics of video games and features of the channel (i.e., the Internet) are taken into consideration [i.e., Problematic Online Game Use Scale (POGU) (Kim & Kim, 2010), Online Game Addiction Diagnostic Scale (Lee & Han, 2007), Problematic Online Gaming Questionnaire (POGQ) (Demetrovics et al., 2012) and its short form (Pápay et al., 2013), which is reproduced in Appendix 4–1 of this chapter]. Of all the measures discussed, the POGU (Kim & Kim, 2010), the Game Addiction Diagnostic Scale (Lee & Han, 2007), and the POGQ (Demetrovics et al., 2012) and its short form (Pápay et al., 2013) show robust psychometric characteristics (see Table 4.1).

Table 4.1 Measures of Problematic Online Gaming

Source (Reference)	Measure	Definition of Problematic Online Gaming	Number of Items	Factors	Research Subjects, Method	Reliability/Validity
Young (2009a)	Obsessive Online Gamer-Diagnostic Questionnaire	Internet–based approach	8	No data	No data	No data
Charlton and Danforth (2007, 2010)	Addiction–Engagement Questionnaire	Video game approach	29/24	1. Addiction 2. Engagement	442 persons (2007); 388 persons (2010), online survey	EFA* (2007), Cronbach alpha (2010)
Gentile (2009)	Pathological–Gaming Scale	Video game approach	11	No data	1,178 American youth ages 8 to 18, national representative sample, online survey	Convergent and divergent validity analysis
Lemmens et al. (2009)	Game Addiction Scale for Adolescents	Video game approach	7	1 factor	Two independent samples of Dutch adolescents ($N_1 = 352$ and $N_2 = 369$), pen–and–pencil survey	EFA, convergent and criterion validity analysis
Porter et al. (2010)	Video Game Use Questionnaire, VGUQ	Video game approach	33	1 factor	1945 persons, online survey	No data

Table 4.1 Measures of Problematic Online Gaming—cont'd

Source (Reference)	Measure	Definition of Problematic Online Gaming	Number of Items	Factors	Research Subjects, Method	Reliability/Validity
Kim and Kim (2010)	Problematic Online Game Use Scale (POGU)	Integrative approach	20	1. Euphoria 2. Health problem 3. Conflict 4. Failure of self-control 5. Preference of virtual relationship	1,422 5th graders, 199 8th graders, and 393 11th graders from South Korea (pen-and-pencil survey)	EFA, CFA, ** reliability analysis, convergent and discriminant validity analysis
Lee and Han (2007)	Online game addiction diagnostic scale	Integrative approach	30	1. Psychological dependence 2. Daily life disorder 3. Interpersonal relationship toward online 4. Tolerance 5. Negative behavior and emotions 6. Mental disorder 7. Physical disorder	2,317 South Korean elementary school students (pen-and-paper survey)	EFA, criterion validity analysis

Study	Instrument	Theoretical approach	Items	Dimensions	Sample	Analysis
Zhou and Li (2009)	Online Game Addiction Index (OGAI)	Integrative approach	12	1. Control disorder 2. Conflict 3. Injury	195 students (age 18–24 years) (in-home surveys)	EFA
Demetrovics et al. (2012)	Problematic Online Gaming Questionnaire (POGQ)	Integrative approach	18	1. Preoccupation 2. Overuse 3. Immersion 4. Social isolation 5. Interpersonal conflicts 6. Withdrawal	3,415 online gamers (mean age 21 years, SD 5.9 years), online survey	EFA, CFA
Pápay et al. (2012)	Problematic Online Gaming Questionnaire Short Form (POGQ-SF)	Integrative approach	12	1. Preoccupation 2. Overuse 3. Immersion 4. Social isolation 5. Interpersonal conflicts 6. Withdrawal	2,774 9th–10th graders in Hungarian secondary general and secondary vocational schools (mean age 16.4 years, SD 0.9), national representative sample	CFA, criterion validity

*EFA= Exploratory Factor Analysis
**CFA = Confirmatory Factor Analysis

EPIDEMIOLOGY

Prevalence and Demographics of the Online Gamer Population

At present, it is quite difficult to estimate the prevalence of problematic online gaming due to the lack of a clear definition, the application of measures without proper psychometric characteristics, and studies using different samples and different research methodologies. Large sample studies generally report prevalence values below 10%. A study conducted in the United States on a national representative sample of teenagers (Gentile, 2009) as well as a large sample of Singaporean children (Gentile et al., 2011) reported a problematic game use of approximately 9%. Results of another representative study in Germany showed that 3% of the male and 0.3% of the female students were diagnosed as dependent on video games, while another 4.7% of male and 0.5% of female students were at risk of becoming dependent (Rehbein et al., 2010). On a large Hungarian online gamer sample, 3.4% of gamers belonged to the high-risk group of problematic gaming and another 15.2% to the medium-risk group (Demetrovics et al., 2012). A proportion of 4.6% of Hungarian adolescents (approximately 16 years old) belonging to a national sample were classified as high-risk users (Pápay et al., 2013) (see Table 4.2).

According to an online survey examining all types of online gamers (Nagygyörgy, Urbán et al., 2012) (*n* = 4374), the mean age was 21 years, and participants were mostly male (91%) and single (66%). Their average weekly game time varied between less than 7 hours (10%) and more than 42 hours (also 10%) with most of the gamers playing 15–27 hours weekly (35%). Furthermore, 16% of all gamers were playing professionally (i.e., they participate in competitions and earn money if they win). The majority of the sample (79%) had a clear gaming preference; namely, they played one single game type (e.g., MMORPG/MMORTS/MMOFPS/other online games) most of the time.

Data regarding the three main game types give a more nuanced view. The proportion of female gamers is the lowest in the case of massively multiplayer online first-person shooter (MMOFPS) games (1%–2%; Jansz & Tanis, 2007; Nagygyörgy, Urbán et al., 2012) and the highest between massively multiplayer online role-playing game (MMORPG) users (15%–30%; Cole & Griffiths, 2007; Nagygyörgy, Urbán et al., 2012; Yee, 2006a). MMOFPS users are the youngest (18–19.8 years; Jansz & Tanis, 2007; Nagygyörgy, Urbán et al., 2012), while both massively multiplayer online real-time strategy (MMORTS; 22 years; Nagygyörgy, Urbán et al., 2012) and MMORPG

Table 4.2 Prevalence of Problematic Online Gaming

Author(s) (reference)	Location	Research Subjects [Mean Age (M), Standard Deviation (SD)]	Method	Measure	Criteria of Problematic Use	Life-Prevalence Value
Yee (2006)	USA, Canada	3,166 persons, MMORPG gamers	Online survey	Direct question ("Do you consider yourself addicted to MMOR–PGs?" yes/no question)	Yes to the direct question	50%
Grüsser, Thalemann, and Griffiths (2007)	Germany	7,069 gamers (M: 21.1 years, SD: 6.4)	Online survey	6 criteria of key symptoms of a dependence syndrome as outlined in WHO's *ICD-10*	3 or more criteria fulfilled	11.9%
Gentile (2009)	USA	1,178 persons (adolescents age 8–18 years)	National representative survey (online)	Pathological Video-Game Use	6 or more yes answers	8.5%
Porter et al. (2010)	USA, Canada, Europe, Australia, New Zealand, Asia, Central and South America	1,945 persons, gamers older than 14 years	Online survey	Video Game Use Questionnaire, (VGUQ), 10 criteria: 3 (preoccupation), 7 (adverse consequences), yes/no answers	2 or more criteria (preoccupation) + 3 or more criteria (adverse consequences)	8%

Table 4.2 Prevalence of Problematic Online Gaming—cont'd

Author(s) (reference)	Location	Research Subjects [Mean Age (M), Standard Deviation (SD)]	Method	Measure	Criteria of Problematic Use	Life-Prevalence Value
Van Rooij et al. (2011)	Netherlands	4,559 persons (M: 14.4 years, SD: 1.2) (T1) and 3,740 persons (M: 14.3 years SD: 1.0) (T2)	pen-and-pen-cil survey	Compulsive Internet Use Scale (CIUS) + weekly hours online gaming	Latent profile analysis	1.6% (T1), 1.5% (T2) ~ 1.5%
Gentile et al. (2011)	Singapore	3,034 persons elementary and secondary school students	2 years longitudinal study, pen-and-paper survey	Pathological Video-Game Use	5 or more yes answer	7.6%–9.9%
Lemmens, Valkenburg, and Peters (2011)	Netherlands	543 adolescent gamers (M: 13.9 years, SD: 1.4)	Longitudinal pen-and pencil survey	Game Addiction Scale	Score of 3 or higher	6% (T1), 4% (T2)
Rehbein et al. (2010)	Germany	15,168 ninth graders (15.3 years, SD: 0.69)	Nationally representative survey	Video Game Dependency Scale (KFN–CSAS–II)	Score higher than 42 dependent players; score between 35 and 41: players at risk	Dependent: boys 3%, girls 0.3%; at risk: boys 4.7%, girls 0.5%

Study	Country	Sample	Method	Instrument	Criterion	Prevalence
Thomas and Martin (2010)	Australia	2,031 persons (705 university students, 1,326 secondary and college students)	Pen–and–paper survey	Adaptation of YDQ (Young's Diagnostic Questionnaire) to computer games	Score of 5 or higher	5%
Jeong and Kim (2011)	South Korea	600 persons (12–18 years)	Nationally representative pen–and–pencil survey	Young's Internet Addiction Test (IAT) modified by replacing the word *Internet* with *gaming*	Score above 80	2.2%
Demetrovics et al. (2012)	Hungary	3,415 persons, online gamers (M: 21 years, SD: 5.9)	Online survey	POGQ	Latent profile analysis	High-risk problematic online gamers: 3.4%; medium risk of problematic use: 15.2%
Pápay et al. (2012)	Hungary	5,045 students from secondary general and secondary vocational schools (M: 16.4, SD: 0.9)	Nationally representative survey (pen–and–pencil)	POGQ-SF	Latent profile analysis	4.6%

players (21–27 years; Nagygyörgy, Urbán et al., 2012; Yee, 2006a) are significantly older. Among the three main groups, MMORPG gamers spend the most time playing (Nagygyörgy et al., 2013). Because MMORPGs are the most researched games, there is additional information regarding such players that is still unknown in the case of other game types. For instance, half of MMORPG players work full time, 22.2% are students, and 14.8% are homemakers (89.9% of whom were female). Furthermore, 36% of the gamers are married, and 22% of them have children (Yee, 2006a, 2006d). Overall, the demographic composition of MMORPG users is quite varied and probably more diverse than the composition of MMORTS and MMOFPS users, although this needs to be empirically established.

Comorbidity

Problematic online gamers are twice as likely to be diagnosed with some kind of attention deficit disorder (ADD or ADHD) than gamers who play recreationally (Batthyany, Muller, Benker, & Wolfling, 2009; Bioulac, Arfi, & Bouvard, 2008; Chan & Rabinowitz, 2006; Gentile et al., 2011; Han et al., 2009). Depression is also a comorbid clinical disorder that appears in several studies (Gentile et al., 2011; Peng & Liu, 2010). In the case of MMORPG players, depressive symptoms (e.g., sadness, hopelessness, crying spells, insomnia, concentration problems) are related to habitual computer game playing at night (between 10 p.m. and 6 a.m.; Lemola et al., 2011). So far, it is unclear whether problematic online gaming is the reason for or the consequence of other psychiatric symptoms (Gentile, 2009). Although longitudinal data suggest that pathological gamers exhibit higher levels of depression, anxiety and social phobia during the follow-up period than normal gamers, the causal relation might be reciprocal (Gentile et al., 2011).

ETIOLOGY

As with other addictions, problematic online gaming is the consequence of many different integrated factors. Here the main aspects of gaming that contribute to the appearance and maintenance of problematic behavior in the academic literature are presented.

Neurobiological Aspects

Brain imaging is the newest area of behavioral addictions research and, for this reason, it is still in its infancy. Early studies suggest that cue-induced gaming urge activates the same brain regions (i.e., dorsolateral prefrontal cortex,

orbitofrontal cortex, parahippocampal gyrus, and thalamus) that are activated by gambling in the case of pathological gamblers and substance use in the case of substance use abusers (Han et al., 2011; Ko et al., 2009). Other results suggest that the effects of excessive online game playing on working memory may be similar to those observed in patients with substance dependence (Kim et al., 2012). Consequently, researchers assume that problematic online gaming might share the same neurobiological mechanism as pathological gambling and substance dependence (Kuss & Griffiths, 2012c). However, further research in this area is quite necessary and is almost certain to come.

Personality Aspects

Although it can be argued there is no such thing as an "addictive personality," some personality characteristics seem to favor the development of problematic game use. For instance, several studies examined the relationship between the Big Five personality traits and problematic gaming and found low emotional stability (Charlton & Danforth, 2010; Mehroof & Griffiths, 2010; Nagygyörgy, Mihalik, & Demetrovics, 2012; Peters & Malesky, 2008), low agreeableness (Charlton & Danforth, 2010; Peters & Malesky, 2008), and low extraversion (Charlton & Danforth, 2010) as being associated with the phenomenon. However, in relation to agreeableness and extraversion, the relationship does not seem to be as robust as with that of neuroticism. A possible explanation of these results could be that problematic gamers spend more time gaming to avoid real-life social situations that seem threatening because of low social abilities and/or low emotional stability. To such individuals, online environments may seem safe and be preferred to real-life situations. However, this is speculation on the authors' part, and empirical research is needed to investigate such a hypothesis.

In addition to personality traits, other characteristics have also been examined. A study examining social skills found that the quality of interpersonal relationships decreased and the amount of social anxiety increased as the amount of time spent playing online games increased (Lo, Wang, & Fang, 2005). Problematic gaming has been negatively correlated with offline social self-efficacy and positively correlated with online social self-efficacy (Jeong & Kim, 2011). This echoes with research showing problematic gamers finding it easier to meet people online and having fewer friends in real life than in games (Porter et al., 2010). Inadequate self-regulation (Seay & Kraut, 2007), low self-esteem (Ko, Yen, Chen, Chen, & Yen, 2005; Lemmens et al., 2011), low emotional intelligence (Herodotou, Kambouri, & Winters, 2011), above average state and trait anxiety (Mehroof & Griffiths,

2010), increased feeling of loneliness (Lemmens et al., 2011; Seay & Kraut, 2007), narcissistic personality (Kim et al., 2008), and aggression (Kim et al., 2008; Mehroof & Griffiths, 2010) have also been found to be correlated with problematic online gaming. Additional studies report that problematic online gamers have lower life satisfaction (Ko et al., 2005; Wang, Chen, Lin, & Wang, 2008) and decreased psychosocial well-being compared to other gamers (Lemmens et al., 2011).

Because all the findings from these studies are correlational in nature, causal relations are unknown. Thus, Lemmens et al.'s (2011) longitudinal study worked to address this issue. Their analyses indicated that diminished social competence, lower self-esteem, and increased loneliness predicted an increase in problematic gaming 6 months later. Thus, lower psychosocial well-being can be considered an antecedent of problematic gaming among adolescent gamers. The analyses further indicated that loneliness was also a consequence of problematic gaming. This suggests that displacement of real-world social interaction resulting from problematic game use may deteriorate existing relationships, which could explain the increase in adolescent gamers' feelings of loneliness.

Motivational Aspects

Empirical studies suggest that gaming motives also play an important role in the development and maintenance of problematic online gaming (Demetrovics et al., 2011; Kuss & Griffiths, 2012a, 2012b). Online gaming involves multiple reinforcements whereby different features might be differently rewarding to different people (what could be called "the kitchen sink approach" where game designers include a diverse range of gaming rewards in the hope that at least some of them will appeal to players; Griffiths, 2010a). The game developers' aim is to satisfy as many different psychological needs as possible, to motivate the widely heterogeneous gamer community to play continuously.

The first theoretical model of motivational aspects was developed by Bartle (1996), who examined early text-based virtual world (MUD) players. He proposed that MUD players can be classified in one of the following four motivational types: achievers, explorers, socializers, and killers. Achievers are motivated by fulfilling game-related goals, explorers try to find out as much as they can about the virtual world, socializers love to meet and befriend other players, and killers prefer to cause distress to others.

Bartle's theoretical model has been empirically tested by Yee (2006c) among MMORPG players. Using exploratory factor analysis, he

identified 10 motivational components that belong to three main factors labeled as achievement, social, and immersion. The components belonging to the achievement factor are advancement, mechanics, and competition. Socializing, relationship, and teamwork are the subcomponents belonging to the social factor and discovery, whereas role-playing, customization, and escapism contribute to the immersion dimension. Another important finding is that the 10 listed motivational dimensions do not suppress but complement each other depending on the gaming situation. Yee (2006c) found that escapism and advancement subcomponents were associated with problematic usage measured by a variation of Young's (1998b) diagnostic questionnaire. The escapism motivation referred to the use of the online environment to avoid thinking about real-life problems, while advancement referred to the desire to gain power, progress rapidly, and accumulate in-game symbols of wealth or status. Yee's research had been replicated on a European group (French, English, and Italian; Dauriat et al., 2011) and a Hungarian online MMORPG sample (Nagygyörgy, Mihalik et al., 2012) and yielded similar results (i.e., escapism and achievement main factor showed the strongest association with problematic online gaming). These models are not suitable for comparing different types of online gamers; therefore, Demetrovics et al. (2011) developed an empirically based motivational measure called the Motives for Online Gaming Questionnaire (MOGQ) comprising seven factors (i.e., social, escapism, coping, fantasy, skill development, recreation, and competition) and makes the comparison between online gamers possible (see Appendix 4–2).

All the aforementioned questionnaires have the structural characteristics of online games (or particularly MMORPGs) as their starting point. A different approach is applied by Ryan et al. (2006), who suggested that, as largely individual difference frameworks, these categories or typologies largely reflect the structure and content of current games, rather than the fundamental or underlying motives and satisfactions that can initiate and sustain participation across all potential players and game types. By contrast, they argued that a true theory of motivation should not focus on behavioral classification constrained by the structure of particular games, but instead address the factors associated with enjoyment and persistence across players and genres, and how games that differ in controllability, structure, and content might appeal to basic human motivational propensities and psychological needs. Therefore, they applied the Cognitive Evaluation Theory (CET) used in the research of intrinsic motivation in the

case of sports and other recreational activities which states that activities induce intrinsic motivation depending on their capacity of satisfying the three basic human needs of autonomy, competence, and relatedness. The results support their conception that the enjoyment of video games and the desire to play again was significantly correlated with the level of autonomy, competence, and relatedness experienced in games (Przybylski, Ryan, & Rigby, 2009; Ryan et al., 2006). However, a connection between the three basic human needs and problematic online gaming has not yet been explored.

Wan and Chiou (2006) developed a different approach. Their starting point was Maslow's hierarchy of human needs. Their results showed that the psychological needs of players of online games were closer to the two-factor theory that depicts satisfaction and dissatisfaction dimensions than to different one-dimensional approaches applied in other empirical studies. The lower hierarchy of human needs refers to "dissatisfactory needs" that includes physical needs, safety needs, belongingness, and self-esteem. The higher hierarchy of human needs means "satisfactory needs" that comprises self-actualization and self-transcendence. Addicted players' need-gratification was similar to the feature of dissatisfactory factor. That is, the absence of playing online games is more likely to generate a sense of dissatisfaction; the addicts' compulsive use of online games appears to stem from the relief of dissatisfaction rather than the pursuit of satisfaction. In contrast, online games tend to provide nonaddicted players with a sense of satisfaction rather than a sense of dissatisfaction. This result is in line with the results of Wang and Chu (2007), who differentiated harmonious and obsessive passion in online gaming and found that only obsessive passion (the state when the player is controlled by his player activity instead of controlling it himself) was related to problematic online gaming. Although players with harmonious passion enjoy and feel cheerful about gaming, players with obsessive passion feel fanatic over it and become angry or anxious when they cannot play. A case study of Griffiths (2010b) also demonstrated two excessive gamers: a healthy enthusiast who played for joy and recreation and a game addict who played to avoid his life problems and to ease the irresistible urge to play again.

The Role of Structural Characteristics in Problematic Online Gaming

In the gambling literature, a number of authors have examined the role of structural characteristics of different gambling activities (i.e., slot machines)

because they appear to be important in the acquisition, development, and maintenance of problem gambling behavior (Griffiths, 1993, 1999; Parke & Griffiths, 2007). A similar exploration regarding the structural characteristics of online games has also been suggested (King et al., 2010a; King, Delfabbro, & Griffiths, 2010b). In an early study, Wood et al. (2004) found that a high degree of realism (i.e., realistic sound, graphics, and setting), a rapid absorption rate, character development, the ability to customize the game, multiplayer features, winning and losing features, and the ability to save the game at regular intervals[2] were seen by most gamers as essential characteristics of video games.

King et al. (2010b) tried to enlarge and systematize Wood et al.'s (2004) list according to the gambling literature. They created a theoretical model that contained five main groups:

- *Social features* that refer to the socializing aspects of video games, such as how players can communicate with other players, and the features that create a cooperative and competitive community of players.
- *Manipulation and control features* that refer to the ways in which a player can interact with and control in-game properties using a physical control scheme.
- *Narrative and identity features* that refer to the ways in which players can take on another identity in the game (as a fictional character or a construction of the self).
- *Reward and punishment features* that refer to the ways in which players are reinforced for skillful play (i.e., winning) and punished for losing.
- *Presentation features* that refer to the aesthetic qualities of a video game, such as how the game looks and sounds to players.

In a follow-up empirical study, reward and punishment features, such as earning points, finding rare game items, and fast loading times, were rated by players among the most enjoyable and important aspects of video game playing. Problem video game players reported significantly higher enjoyment of features such as managing in-game resources, earning points, getting 100% in the game, and mastering the game than nonproblem players, which are features that typically take up more playing time than other features. In addition, the problem group identified

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[2] In Wood et al.'s study the possibility to save the game regularly clearly refers to the structural characteristics of offline video games. However, in the case of online games, this feature is present by default because one's account preserves the current state of the player's development. When players leave the game and then re-enter it later, they are usually able to continue playing from the same point where they had logged out.

features such as "leveling up," earning meta-game rewards (e.g., "Achievements"), and fast loading times as having a significantly greater impact on their playing behavior than other players (King, Delfabbro, & Griffiths, 2011).

The relationship between reward and punishment features and problematic use has also been stressed in theoretical literature. For instance, this is what Shavaun Scott (2007) refers to when she calls the MMORPGs "the most incredibly complex Skinner boxes that anyone could ever imagine" (for further information on the topic, see Clark & Scott, 2009, pp. 84–89). Similar to the case of slot machines, online game developers apply the principle of the partial reinforcement effect (PRE) to keep players playing. PRE is a critical psychological ingredient of gaming addiction whereby the reinforcement is instant but intermittent (i.e., people keep responding in the absence of reinforcement hoping that another reward is just around the corner). Magnitude of reinforcement (e.g., a high points score for doing something in-game) is also important. Large rewards lead to fast responding and greater resistance to extinction—in short to increased "addiction" (Griffiths, 2010a). The effectiveness of operant conditioning is responsible for those situations when gamers keep playing or even increase their gaming time in spite of the fact that they do not enjoy the activity any more (Yee, 2006b). Such states may easily lead to the appearance of problematic gaming.

The Amount of Gaming Time and Its Relation to Problematic Online Gaming

Although several studies have reported a strong correlation between the amount of time spent on gaming and problematic use (e.g., Dauriat et al., 2011; Gentile, 2009; Grusser et al., 2007; Hsu, Wen, & Wu, 2009; Porter et al., 2010), excessive game play is not a sufficient condition of addiction or problematic gaming (despite the common colloquial use of the word *addiction*). According to Griffiths (2005a, pp. 195), "the difference between an excessive healthy enthusiasm and an addiction is that healthy enthusiasms add to life whereas addictions take away from it"; that is, additional negative consequences should be present to make the behavior classified as problematic or an "addiction." However, knowing that the development of the problematic gaming behavior is always a process, special attention must be given to excessive gamers because they appear to be at higher risk than normal gamers to developing problematic behavior.

PREVENTION AND TREATMENT

Prevention

Articles on the topic of prevention (Griffiths, 2003, 2008; Griffiths & Meredith, 2009) recommend that family members and/or friends initiate direct conversation with excessive or problematic players by showing true interest toward the game, the gamer, and everything the gamer likes in the virtual environment. Often this is the only topic that the player is willing to talk about or talks about with pleasure, and thus, it facilitates communication and emotional attachment with the user. Getting familiar with the games also helps toward establishing the mutually acceptable rules regarding them. If the gamer is a child or a teenager, it is highly recommended that parents or other family members choose the games together with the child using the official ratings as a guide for age appropriateness (e.g., ESRB ratings). These should be suitable for children in terms of content (e.g., violent or adult content must be avoided) while at the same time providing entertainment. Parents should encourage their children to play together with real-life friends because this helps the developing of personal relationships. This way, communication and cooperation skills learned online can be transferred more easily to real–life situations.

It is also worth determining daily and weekly game time together and in mutual agreement with players themselves, because this way it is easier to ask them to abide by it. It is also important to follow the game manufacturers' recommendations regarding monitor brightness, distance from the monitor, the taking of short and frequent breaks if gaming for a long time, not playing in the case of fatigue, etc. It is also extremely important that the gamer pursues other recreational activities (e.g., sports) in addition to gaming. If gamers play suitable games for an appropriate amount of time, playing can have several positive effects such as increasing self-esteem; improving reflexes, reaction time, memory, logical and strategic thinking, social and communication skills; and more (Griffiths, 2008, 2010a).

Treatment

Treatment techniques are based on the ones applied successfully to other behavioral addictions but specified to the particular features of online games (Griffiths, 2008; Griffiths & Meredith, 2009). Several different types of online support forums deal with problematic online gaming and/or its treatment possibilities. Such forum types are (1) the ones run by the parents and other family members of problem gamers who mainly discuss the

nature of the problem, share their experiences, and support each other; (2) the self-help forums where the gamers themselves discuss similar topics and support each other; (3) and the ones established and administered by professional organizations where they offer information regarding the problem in general, provide some kind of criteria for self-assessment, and provide professionals to contact (Griffiths, 2008; Griffiths & Meredith, 2009). Much of the advice on these forums is based on behavioral reward and punishment systems. A self-help On-Line Gamers Anonymous Organization offers a supportive, Internet-based treatment approach based heavily on the Minnesota Model system of the 12 steps used by such groups as Alcoholics Anonymous and Gamblers Anonymous (Griffiths, 2008; Griffiths & Meredith, 2009).

There are some specialty addiction clinics in a few countries (e.g., United States, China, South Korea, United Kingdom), but few details of the therapeutic programs have been published in the academic literature. Most of the treatment clinics use a diverse range of interventions. The programs mainly follow two approaches: the total abstinence model (e.g., Broadway Lodge treatment center in Somerset, UK) and the harm reduction model that promotes moderation and balance and does not require the patient to completely stop game playing or using the computer altogether (e.g., Woog Laboratories, California). In addition, there are individual therapists such as Young (Center for On-Line Addiction) and, before her death, Orzack (Computer Addiction Services), who use multimodal elements but do not necessarily advocate total abstinence or moderation (Griffiths, 2008). The aim of all treatment programs is to increase game addicts' prosocial skills through social activities and real-life activities that replace time spent gaming. They also provide some form of psychotherapy to address comorbid or underlying issues such as depression and anxiety. Treatment programs also integrate management skills (i.e., goal setting or time keeping) to help players control their behavior (Griffiths, 2008).

Among therapies, those applied to other behavioral addictions [e.g., behavioral therapy, cognitive behavioral therapy (CBT), motivational interviewing] are mostly used with further specification. For instance, CBT teaches individuals to identify and eventually solve their underlying problem(s) and then to learn coping skills to prevent relapse. Although efficient, it is unlikely that CBT can cure addictive playing on its own because the online gaming addiction is likely to have biopsychosocial antecedents that require multimodal treatment interventions.

Therefore, CBT may also be accompanied by (online or *in vivo*) support groups and/or medication. Finding alternative ways to satisfy underlying needs that had been relieved by the problematic behavior is also quite important in avoiding relapse (Griffiths, 2008). In Young's (2010) opinion, therapy should use time management techniques that help the client structure and regulate online gaming sessions, and strategies that help gamers to develop alternative activities that take them away from the computer (e.g., spend more time with family, engage in hobbies or exercise programs). According to Young (2007), online gamers typically suffer interpersonal difficulties such as introversion or social anxiety, which is, in part, why they turn to virtual relationships and games, an issue that should also be addressed during therapy.

Griffiths (2008) sums up that therapeutic techniques appear to be based on CBT, skill training, and humanistic techniques. CBT is used for underlying psychological conditions such as social phobia, anxiety, and depression. Skills training is used for activities such as managing time, finding other rewarding activities, and developing other core life skills. Interpersonal therapy is used for developing personal skills and social functioning, and lastly, couples or family therapy is used for addressing problems caused between partners and family as a result of online gaming behavior.

Other treatment approaches include military-style boot camps in China and South Korea that aim to treat online game addiction by using high-intensity physical activity in natural surroundings to get problem gamers back into real life and find a substitute for the excitement of the cyberworld (Fackler, 2007; Griffiths, 2008). Unfortunately, there is no empirical or anecdotal evidence as to whether such methods are successful in treating online gaming addiction.

Pharmacotherapy

Han et al. (2010; 2012) presented some successful case studies regarding pharmacotherapeutic treatment. After a 6-week (Han et al., 2010) and a 12-week (Han & Renshaw, 2012) period of bupropion sustained-release treatment, problematic gamers showed significant improvement both in decreased problem behavior and decreased depression scores. The researchers' pharmacological choice had been driven by the similarities in neurological activity of substance dependence and behavioral addictions such as pathological gambling (Han et al., 2011; Ko et al., 2009; Kuss & Griffiths, 2012).

Case Vignette: Jeremy

Jeremy was a 38-year-old accountant who had been married 13 years and had two children. Over a period of a year and a half, his online playing of *Everquest* and (subsequently *Everquest 2*) had gone from about 3 or 4 hours of playing every evening to playing up to 14 hours a day. He claimed that his marital relationship was breaking down, that he was spending little time with his children, and that he constantly called in sick to work so that he could spend the day playing online games. When playing online, he claimed, "Life's worries go out of the window." He had tried to quit playing on a number of occasions but could not go more than a few days before he experienced "an irresistible urge" to play again—even when his wife threatened to leave him.

He claimed that giving up online gaming was worse than giving up smoking and that he was "extremely moody, anxious, depressed and irritable" if he was unable to play online. Over the next few months, things got even worse for Jeremy. He was fired from his job for being too unreliable and generally unproductive as a direct result of his excessive gaming (although his employers were totally unaware of his gaming behavior). As a result of Jeremy's losing his job, his wife also left him. This led to Jeremy "playing all day, every day." It was a vicious cycle in that his excessive online gaming was causing all his problems, yet the only way he felt he could alleviate his mood state and escape his life's stresses was to play online games.

Jeremy's behavior fulfills many of the characteristic signs of more traditional addictions. For Jeremy, online gaming was the most important thing in his life; he used gaming as a way of consistently modifying his mood (i.e., to escape other things in his life); he built up tolerance to gaming over time (escalating his gaming from 3 to 4 hours a day up to 14 hours a day); he suffered withdrawal effects if unable to play online (e.g., feelings of intense moodiness, anxiety, depression, and irritability); there was conflict in his life as a result of playing online games excessively (losing his family and job because he just could not stop playing); and he experienced relapse as he could not go more than a few days without an irresistible urge to play again. In an effort to reconcile with his family, Jeremy eventually asked his general practitioner to refer him to a psychologist who specialized in cognitive-behavioral therapy. However, his wife has now divorced Jeremy and, as far as the authors are aware, CBT treatment is still ongoing.

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APPENDIX 4-1. PROBLEMATIC ONLINE GAMING QUESTIONNAIRE (POGQ)

Please read the statements below regarding *online gaming*. The questionnaire REFERS TO ONLINE GAMES exclusively, but we use the expression "game" in each statement for simplicity's sake.

Please indicate on the scale from 1 to 5 to what extent, and how often, these statements apply to you!

	Never	Seldom	Occasionally	Often	Almost Always/ Always
1. When you are not gaming, how often do you think about playing a game or think about how would it feel to play at that moment?	1	2	3	4	5
2. How often do you play longer than originally planned?	1	2	3	4	5
3. How often do you feel depressed or irritable when not gaming only for these feelings to disappear when you start playing?	1	2	3	4	5
4. How often do you feel that you should reduce the amount of time you spend gaming?	1	2	3	4	5
5. How often do the people around you complain that you are gaming too much?	1	2	3	4	5
6. How often do you fail to meet up with a friend because you were gaming?	1	2	3	4	5
7. How often do you day–dream about gaming?	1	2	3	4	5

	Never	Seldom	Occasionally	Often	Almost Always/ Always
8. How often do you lose track of time when gaming?	1	2	3	4	5
9. How often do you get irritable, restless or anxious when you cannot play games as much as you want?	1	2	3	4	5
10. How often do you unsuccessfully try to reduce the time you spend on gaming?	1	2	3	4	5
11. How often do you argue with your parents and/or your partner because of gaming?	1	2	3	4	5
12. How often do you neglect other activities because you would rather game?	1	2	3	4	5
13. How often do you feel time stops while gaming?	1	2	3	4	5
14. How often do you get restless or irritable if you are unable to play games for a few days?	1	2	3	4	5
15. How often do you feel that gaming causes problems for you in your life?	1	2	3	4	5
16. How often do you choose gaming over going out with someone?	1	2	3	4	5
17. How often are you so immersed in gaming that you forget to eat?	1	2	3	4	5
18. How often do you get irritable or upset when you cannot play?	1	2	3	4	5

	Preoccu- -pation	Immersion	With- drawal	Overuse	Interpersonal Conflicts	Social Isolation
POGQ–18	1, 7	2, 8, 13, 17	3, 9, 14, 18	4, 10, 15	5, 11	6, 12, 16
POGQ–12	1, 7	2, 8	3, 14	4, 10	5, 11	6, 12

Note: More details on scoring and interpretation can be found in Demetrovics et al. (2012) and Pápay et al. (2013).

APPENDIX 4-2. MOTIVES FOR ONLINE GAMING QUESTIONNAIRE (MOGQ)

People play online games for different reasons. Some reasons are listed below.

Please indicate how often you play online games for the reasons listed below by circling the appropriate response—almost never/never (1), some of the time (2), half of the time (3), most of the time (4), almost always/ always (5). There is no right or wrong answer! We are only interested in your motives for gaming.

	I Play Online Games…	Almost Never/ Never	Some of the Time	Half of the Time	Most of the Time	Almost Always/ Always
1.	… because I can get to know new people	1	2	3	4	5
2.	… because gaming helps me to forget about daily hassles	1	2	3	4	5
3.	… because I enjoy competing with others	1	2	3	4	5
4.	… because gaming helps me get into a better mood	1	2	3	4	5
5.	… because gaming sharpens my senses	1	2	3	4	5
6.	… because I can do things that I am unable to do or I am not allowed to do in real life	1	2	3	4	5
7.	… for recreation	1	2	3	4	5
8.	… because I can meet many different people	1	2	3	4	5
9.	… because it makes me forget real life	1	2	3	4	5
10.	… because I like to win	1	2	3	4	5
11.	… because it helps me get rid of stress	1	2	3	4	5
12.	… because it improves my skills	1	2	3	4	5
13.	… to feel as if I was somebody else	1	2	3	4	5
14.	… because it is entertaining	1	2	3	4	5
15.	… because it is a good social experience	1	2	3	4	5

	I Play Online Games…	Almost Never/ Never	Some of the Time	Half of the Time	Most of the Time	Almost Always/ Always
16.	… because gaming helps me escape reality	1	2	3	4	5
17.	… because it is good to feel that I am better than others	1	2	3	4	5
18.	… because it helps me channel my aggression	1	2	3	4	5
19.	… because it improves my concentration	1	2	3	4	5
20.	… to be somebody else for a while	1	2	3	4	5
21.	… because I enjoy gaming	1	2	3	4	5
22.	… because gaming gives me company	1	2	3	4	5
23.	… to forget about unpleasant things or offenses	1	2	3	4	5
24.	… for the pleasure of defeating others	1	2	3	4	5
25.	… because it reduces tension	1	2	3	4	5
26.	… because it improves my coordination skills	1	2	3	4	5
27.	… because I can be in another world	1	2	3	4	5

Social	Escape	Competition	Coping	Skill Development	Fantasy	Recreation
1, 8, 15, 22	2, 9, 16, 23	3, 10, 17, 24	4, 11, 18, 25	5, 12, 19, 26	6, 13, 20, 27	7, 14, 21

Note: More details on scoring and interpretation can be found in Demetrovics et al. (2011).