Current PSYCHIATRY

Video games: When does play become pathology?

Most kids have fun and don't get 'hooked,' but some boys may be at particular risk

Nick, age 13, enjoys playing video games, but his parents think he may be "addicted." His primary care doctor has referred Nick to you for evaluation.

Nick has played video games since age 7 and likes to share ideas with friends about to "beat" difficult games. Lately, though, he plays an online role-playing game, mostly alone, on the computer in his bedroom. Nick hasn't seen his friends outside of school for 6 weeks.

Nick's parents say he is growing short-tempered, and his grades have fallen for several months. He seems to worry a lot but becomes angry and storms out of the room when they try to talk with him about it.

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Like Nick, 70% to 90% of American youths play video games, according to the American Medical Association (AMA).[1] Most boys and girls find the games fun, entertaining, or relaxing (***Table 1, page 28***) and do not encounter difficulties as a result of their play.[2] In some cases, however, they may:

- spend excessive time playing video games
- model inappropriate behavior from games
- over-invest in online relationships.

This article describes developmentally appropriate characteristics of play in general—and aspects of video game play in particular—to help you educate families about normative and excessive video game play.

An addiction?

Originally researchers believed video game play was not addictive and viewed excessive play as high en-

Video games

Clinical Point

For middle-school students, playing video games >1 hour per day on average could be considered excessive, based on normative play

Table 1

Top 10 reasons why children say they play video games

Boys
1. It's just fun
2. It's exciting
3. Something to do when bored
4. Challenge of figuring things out
5. To compete and win
6. Helps me relax
7. Nothing else to do
8. Like guns and weapons*
9. Create my own world
10. Learn new things
Girls
1. It's just fun
2. Something to do when bored
3. It's exciting
4. Challenge of figuring things out
5. Nothing else to do
6. To compete and win
7. Create my own world
8. Learn new things
9. Helps me relax
10. To forget problems

* Response likely reflects the number of survey respondents living in a suburban/rural environment in which hunting is a popular leisure activity.
Source: Reference 1

gagement. More recently, efforts are being made to understand:

- how to classify excessive video game play that impairs psychosocial adjustment
- whether substance abuse models are appropriate for describing and treating pathologic video game play.

In June the AMA examined the emotional and behavioral effects of excessive video game play and decided that evidence is insufficient to conclude that this activity is an addiction.[1] The American Psychiatric Association (APA) stated that it does not consider "video game addiction" as a mental disorder at this time because it is not listed in DSM-IV-TR. The APA's DSM-V task force may consider whether to include this proposed disorder in the update due to be published in 2012.[3]

What is normative play?

Play is a motivating way for children to make sense of the world. By re-creating themes, relationships, places, or events in play children can control things that outside of play might be intimidating or overwhelming. Through play, children can explore situations in a setting that feels safe.[4,5] Video games offer children play opportunities to explore roles and worlds that otherwise are unavailable to them.[6]

Video game play is one of the most popular leisure-time activities for middle-school students. Our group[7] recently surveyed >1,200 students age 12 to 15 about their video game play and found:

- One-third of boys and two-thirds of girls played video games for ≤2 hours/week.
- One-third of boys and 11% of girls played video games 6 or 7 days each week.
- Boys played more than girls, with 45% of boys playing for ≥6 hours/week.
- 12.6% of boys played ≥15 hours/week.
- One-half listed ≥1 games rated M for mature (***Table 2***)[7] among 5 games they played most frequently in the preceding 6 months.[2]

These findings on the frequency of play are similar to those of a Kaiser Family Foundation national study of children and adolescents age 8 to 18.[8] Thus, for middle school students, we could define a normative range of time playing video games as 10 minutes to 1 hour/day. Averaging >1 hour/day could be considered excessive. M-rated video game play is common among adolescents and might be considered normative—although not necessarily developmentally appropriate.[2]

Pathologic behavior. Excessive video game playing can be viewed as pathologic if it involves an overwhelming need to play

Table 2

ESRB video game ratings system and content descriptions*

Rating	Content may be suitable for:	Examples
Early childhood	Age 3 and older; no material that parents would find inappropriate	Atari/others' *Dora the Explorer* (series), Knowledge Adventure/ Vivendi Universal's *Jump Start* (series)
Everyone	Age 6 and older; minimal cartoon, fantasy, or mild violence and/or infrequent use of mild language	Disney Interactive Studios/Buena Vista Games' *Hannah Montana* (series), Taito Corporation's *Bubble Bobble*
Everyone 10+	Age 10 and older; more cartoon, fantasy, or mild violence, mild language and/or minimal suggestive themes	Electronic Arts' *Need for Speed: ProStreet,* Ubisoft's *Rayman Raving Rabbids 2*
Teen	Age 13 and older; may contain violence, suggestive themes, crude humor, minimal blood, simulated gambling, and/or infrequent use of strong language	Midway Amusement Games' *Lord of the Rings Online: Shadows of Angmar* (MMO), Sony Online Entertainment's *EverQuest* (series; MMO)
Mature	Age 17 and older; may contain intense violence, blood and gore, sexual content, and/or strong language	Microsoft Corporation's *Halo* (series), Rockstar Games' *Grand Theft Auto* (most games in the series)
Adults only	Age 18 and older; may include prolonged scenes of intense violence and/or graphic sexual content and nudity	Vivendi Universal's *Leisure Suit Larry: Magna Cum Laude Uncut and Uncensored,* Rockstar Games' *Grand Theft Auto: San Andreas*

* On video game boxes, look for rating symbols on the front and content descriptions on the back.
ESRB: Entertainment Software Rating Board
MMO: massively-multiplayer online role-playing game
Source: Reference 7

video games, with negative feelings and behaviors related to this need that lead to distress or functional impairment.[9,10] Charlton et al[11] define pathologic video game play as incorporating high engagement plus core addiction characteristics such as interference with work or social life, failure to sleep, etc. In video game play, peripheral DSM addiction characteristics—such as high cognitive salience—may indicate high engagement. Characteristics of pathologic video game play, as identified by this group, are listed in ***Table 3***.[11]

CASE CONTINUED

Going with the 'flow'

Nick says he enjoys playing with people he's met through a massively-multiplayer online role-playing game (MMORG, or also called MMO or MMP). The "guild" he has joined is a small community that collaborates to complete quests in the game. Nick describes

Table 3

Characteristics of 'pathologic' video game play

Feeling agitated when not playing
Feeling "addicted" to play
Not being able to decrease time spent playing
Not sleeping because of video game play
Missing meals because of video game play
Being late because of video game play
Having arguments at home because of video game play
Letting video game play interfere with social relationships
Letting video game play interfere with schoolwork
Spending excessive amounts of money on video game play

Source: Reference 11

Clinical Point

Play is 'pathologic' if high engagement significantly impacts school or social life, prevents sleep, or has other core addiction characteristics

Video games

Clinical Point

Children who play video games in their bedrooms are twice as likely as others to play >15 hours/week and to play M-rated games

Table 4

Characteristics of flow experiences related to video games

Characteristic	Effect associated with video game play
Clear goals	Discernible objectives are appropriate to player's abilities
Highly focused concentration	Allows player to become absorbed within a limited field of attention
Lack of self-consciousness	Player's actions seem effortless
Distorted sense of time	Player lacks accurate sense of how long he/she has been playing
Direct and immediate feedback	Success and failure are quickly evident, allowing player to change strategies
Appropriate level of challenge	Difficulty is balanced with player's ability
Control	Player has sense of control and self-efficacy

Source: Reference 7

his character—a healer—as a key figure who supports fellow players by replenishing their in-game health. Everyone in the guild thinks he's important, and he likes to feel respected. Nick says this is quite different from how people treat him in "real" life. He says he often feels worthless and scared that his friends and family don't think he's good enough.

Sometimes Nick gets caught up in the game and plays for several hours past bedtime. The next day he feels tired and unprepared for school. One of his teachers has reprimanded him for not turning in homework on time, and his parents are frustrated by his behavior.

Video game play facilitates the experience of "flow"—a mental state of positive energy and effortless focus experienced while immersed in an activity over which one feels a sense of control. Video game play incorporates components of a flow experience (***Table 4***), including clear, focused goals that are attainable yet challenging and require a high level of concentration. Individuals who engage in artistic, athletic, or meditative activities often report experiencing flow.[12]

Flow can distort one's sense of time, setting the stage for frustration on both sides when parents want their video game-playing child to engage in other activities. Their efforts to redirect their child's attention—whether effective or not—disrupt the pleasurable feeling of flow.

Types of games and devices

Role-playing games (such as Square Enix's *Final Fantasy* series) involve players' assuming identities and managing role-specific tasks and resources to progress through the game (for instance, a ranger befriending animals and tracking enemies in the wilderness).

Turn-based and real-time strategy games (such as Take 2's *Civilization* series) and some simulation games (such as Atari's *RollerCoaster Tycoon* series) require players to manage resources to achieve larger goals—such as building an empire and negotiating with world leaders or constructing and maintaining a successful amusement park.

Video game play can be a social experience, involving friends or family in the same room or long-distance players online. Game consoles—such as Xbox 360, PlayStation 3, or Nintendo Wii—facilitate playing together in the same room, although they also support online play.

Games played on computers tend to be more solitary, although some games—particularly MMORPGs—also support online play. MMORPGs can connect hundreds or thousands of individuals around the world playing online. Examples include Blizzard Entertainment's *World of Warcraft or* Midway Amusement Games' *Lord of the Rings Online: Shadows of Angmar.* Most MMOs are intended for older audiences, but some (such as Walt Disney Internet Group's *Toontown*) are designed for children.[13]

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highest dose of oral olanzapine (15±2.5 mg/d). In controlled clinical trials of intramuscular olanzapine for injection, there were no statistically significant differences from placebo in occurrence of any treatment-emergent extrapyramidal symptoms, assessed by either rating scales incidence or spontaneously reported adverse events.

Other Adverse Events: Dose-relatedness of adverse events was assessed using data from this same clinical trial involving 3 fixed oral dosage ranges (5±2.5, 10±2.5, or 15±2.5 mg/d) compared with placebo. The following treatment-emergent events showed a statistically significant trend: asthenia, dry mouth, nausea, somnolence, tremor.

In an 8-week, randomized, double-blind study in patients with schizophrenia, schizophreniform disorder, or schizoaffective disorder comparing fixed doses of 10, 20, and 40 mg/d, statistically significant differences were seen between doses for the following: baseline to endpoint weight gain, 10 vs 40 mg/d; incidence of treatment-emergent prolactin elevations >24.2 ng/mL (female) or >18.77 ng/mL (male), 10 vs 40 mg/d and 20 vs 40 mg/d; fatigue, 10 vs 40 mg/d and 20 vs 40 mg/d; and dizziness, 20 vs 40 mg/d.

Vital Sign Changes—Oral olanzapine was associated with orthostatic hypotension and tachycardia in clinical trials. Intramuscular olanzapine for injection was associated with bradycardia, hypotension, and tachycardia in clinical trials (*see* PRECAUTIONS).

Weight Gain—In placebo-controlled 6-week schizophrenia studies, weight gain was reported in 5.6% of oral olanzapine patients (average 2.8-kg gain) compared to 0.8% of placebo patients (average 0.4-kg loss); 29% of olanzapine patients gained >7% of their baseline weight, compared to 3% of placebo patients. During continuation therapy (238 median days of exposure), 56% of patients met the criterion for having gained >7% of their baseline weight. Average gain during long-term therapy was 5.4 kg.

Laboratory Changes—Olanzapine is associated with asymptomatic increases in SGPT, SGOT, and GGT and with increases in serum prolactin and CPK (*see* PRECAUTIONS). Asymptomatic elevation of eosinophils was reported in 0.3% of olanzapine patients in premarketing trials. There was no indication of a risk of clinically significant neutropenia associated with olanzapine in the premarketing database.

In clinical trials among olanzapine-treated patients with baseline random triglyceride levels of <150 mg/dL (N=659), 0.5% experienced triglyceride levels of ≥500 mg/dL anytime during the trials. In these same trials, olanzapine-treated patients (N=1185) had a mean triglyceride increase of 20 mg/dL from a mean baseline of 175 mg/dL. In placebo-controlled trials, olanzapine-treated patients with baseline random cholesterol levels of <200 mg/dL (N=1034) experienced cholesterol levels of ≥240 mg/dL anytime during the trials more often than placebo-treated patients (N=602; 3.6% vs 2.2% respectively). In these same trials, olanzapine-treated patients (N=2528) had a mean increase of 0.4 mg/dL in cholesterol from a mean baseline of 203 mg/dL, which was significantly different compared to placebo-treated patients (N=1415) with a mean decrease of 4.6 mg/dL from a mean baseline of 203 mg/dL.

ECG Changes—Analyses of pooled placebo-controlled trials revealed no statistically significant olanzapine/placebo differences in incidence of potentially important changes in ECG parameters, including QT, QTc, and PR intervals. Olanzapine was associated with a mean increase in heart rate of 2.4 BPM compared to no change among placebo patients.

Other Adverse Events Observed During Clinical Trials—The following treatment-emergent events were reported with oral olanzapine at multiple doses ≥1 mg/d in clinical trials (8661 patients, 4165 patient-years of exposure). This list may not include events previously listed elsewhere in labeling, those events for which a drug cause was remote, those terms which were so general as to be uninformative, and those events reported only once or twice which did not have a substantial probability of being acutely life-threatening. *Frequent* events occurred in ≥1/100 patients; *infrequent* events occurred in 1/100 to 1/1000 patients; *rare* events occurred in <1/1000 patients. ***Body as a Whole***—*Frequent:* dental pain, flu syndrome; *Infrequent:* abdomen enlarged, chills, face edema, intentional injury, malaise, moniliasis, neck pain, neck rigidity, pelvic pain, photosensitivity reaction, suicide attempt; *Rare:* chills and fever, hangover effect, sudden death. ***Cardiovascular***—*Frequent:* hypotension; *Infrequent:* atrial fibrillation, bradycardia, cerebrovascular accident, congestive heart failure, heart arrest, hemorrhage, migraine, pallor, palpitation, vasodilatation, ventricular extrasystoles; *Rare:* arteritis, heart failure, pulmonary embolus. ***Digestive***—*Frequent:* flatulence, increased salivation, thirst; *Infrequent:* dysphagia, esophagitis, fecal impaction, fecal incontinence, gastritis, gastroenteritis, gingivitis, hepatitis, melena, mouth ulceration, nausea and vomiting, oral moniliasis, periodontal abscess, rectal hemorrhage, stomatitis, tongue edema, tooth caries; *Rare:* aphthous stomatitis, enteritis, eructation, esophageal ulcer, glossitis, ileus, intestinal obstruction, liver fatty deposit, tongue discoloration. ***Endocrine***—*Infrequent:* diabetes mellitus; *Rare:* diabetic acidosis, goiter. ***Hemic and Lymphatic***—*Infrequent:* anemia, cyanosis, leukocytosis, leukopenia, lymphadenopathy, thrombocytopenia; *Rare:* normocytic anemia, thrombocythemia. ***Metabolic and Nutritional***—*Infrequent:* acidosis, alkaline phosphatase increased, bilirubinemia, dehydration, hypercholesteremia, hyperglycemia, hyperlipemia, hyperuricemia, hypoglycemia, hypokalemia, hyponatremia, lower extremity edema, upper extremity edema; *Rare:* gout, hyperkalemia, hypernatremia, hypoproteinemia, ketosis, water intoxication. ***Musculoskeletal***—*Frequent:* joint stiffness, twitching; *Infrequent:* arthritis, arthrosis, leg cramps, myasthenia; *Rare:* bone pain, bursitis, myopathy, osteoporosis, rheumatoid arthritis. ***Nervous System***—*Frequent:* abnormal dreams, amnesia, delusions, emotional lability, euphoria, manic reaction, paresthesia, schizophrenic reaction; *Infrequent:* akinesia, alcohol misuse, antisocial reaction, ataxia, CNS stimulation, cogwheel rigidity, delirium, dementia, depersonalization, dysarthria, facial paralysis, hypesthesia, hypokinesia, hypotonia, incoordination, libido decreased, libido increased, obsessive compulsive symptoms, phobias, somatization, stimulant misuse, stupor, stuttering, tardive dyskinesia, vertigo, withdrawal syndrome; *Rare:* circumoral paresthesia, coma, encephalopathy, neuralgia, neuropathy, nystagmus, paralysis, subarachnoid hemorrhage, tobacco misuse. ***Respiratory***—*Frequent:* dyspnea; *Infrequent:* apnea, asthma, epistaxis, hemoptysis, hyperventilation, hypoxia, laryngitis, voice alteration; *Rare:* atelectasis, hiccup, hypoventilation, lung edema, stridor. ***Skin and Appendages***—*Frequent:* sweating; *Infrequent:* alopecia, contact dermatitis, dry skin, eczema, maculopapular rash, pruritus, seborrhea, skin discoloration, skin ulcer, urticaria, vesiculobullous rash; *Rare:* hirsutism, pustular rash. ***Special Senses***—*Frequent:* conjunctivitis; *Infrequent:* abnormality of accommodation, blepharitis, cataract, deafness, diplopia, dry eyes, ear pain, eye hemorrhage, eye inflammation, eye pain, ocular muscle abnormality, taste perversion, tinnitus; *Rare:* corneal lesion, glaucoma, keratoconjunctivitis, macular hypopigmentation, miosis, mydriasis, pigment deposits lens. ***Urogenital***—*Frequent:* vaginitis*; *Infrequent:* abnormal ejaculation,* amenorrhea,* breast pain, cystitis, decreased menstruation,* dysuria, female lactation,* glycosuria, gynecomastia, hematuria, impotence,* increased menstruation,* menorrhagia,* metrorrhagia,* polyuria, premenstrual syndrome,* pyuria, urinary frequency, urinary retention, urinary urgency, urination impaired, uterine fibroids enlarged,* vaginal hemorrhage*; *Rare:* albuminuria, breast enlargement, mastitis, oliguria. (*Adjusted for gender.)

The following treatment-emergent events were reported with intramuscular olanzapine for injection at one or more doses ≥2.5 mg/injection in clinical trials (722 patients). This list may not include events previously listed elsewhere in labeling, those events for which a drug cause was remote, those terms which were so general as to be uninformative, and those events reported only once or twice which did not have a substantial probability of being acutely life-threatening. ***Body as a Whole***—*Frequent:* injection site pain; *Infrequent:* abdominal pain, fever. ***Cardiovascular***—*Infrequent:* AV block, heart block, syncope. ***Digestive***—*Infrequent:* diarrhea, nausea. ***Hemic and Lymphatic***—*Infrequent:* anemia. ***Metabolic and Nutritional***—*Infrequent:* creatine phosphokinase increased, dehydration, hyperkalemia. ***Musculoskeletal***—*Infrequent:* twitching. ***Nervous System***—*Infrequent:* abnormal gait, akathisia, articulation impairment, confusion, emotional lability. ***Skin and Appendages***—*Infrequent:* sweating.

Postintroduction Reports—Reported since market introduction and temporally (not necessarily causally) related to olanzapine therapy: allergic reaction (eg, anaphylactoid reaction, angioedema, pruritus or urticaria), diabetic coma, jaundice, neutropenia, pancreatitis, priapism, rhabdomyolysis, and venous thromboembolic events (including pulmonary embolism and deep venous thrombosis). Random cholesterol levels of ≥240 mg/dL and random triglyceride levels of ≥1000 mg/dL have been reported.

DRUG ABUSE AND DEPENDENCE: Olanzapine is not a controlled substance.

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Maladaptive play

Children's video game play becomes maladaptive or dysfunctional if it prevents them from engaging in developmentally appropriate activities and relationships—either because of excessive time spent playing or the possible influences of developmentally inappropriate content.[14]

Associated factors. Boys may be at particular risk of video game overuse. Compared with girls, boys spend more time playing—even normatively—and are more likely to play M-rated games.[2] Sensation-seeking, boredom, animosity, poor academic achievement, and high family conflict also have been linked to excessive video game play.[15,16] The 20% of middle school students who have a computer, game console, or television in their bedrooms are twice as likely as others to play video games ≥15 hours/week and to play M-rated games.[2]

Children who have experienced negative life events—trauma, family conflict, or social rejection by peers—also may spend excessive time playing video games. Gaming can interfere with more adaptive ways of coping with adversity, such as seeking support from friends and family.[17,18] The draw of online relationships can be strong, especially for children who have grown up with video games and the Internet. Girls may be at particular risk for maladaptive online relationship patterns.[19]

Research has yet to show whether excessive video game play causes or results from these associated phenomena. Because any relationship that exists is probably transactional, pay attention to ways in which video game play may cause or result from distress or functional impairment when evaluating a patient for excessive video game play.

Violence and sexual content

Evidence is inconclusive but suggests that video games with violent content may influence children's perceptions of aggression and violence, which may increase their likelihood of behaving aggressively or violently.[20-22] Middle-school students who frequently play ≥1 M-rated games are somewhat more likely to:

- engage in physical fights
- beat someone up
- vandalize property for fun
- receive poor grades

- be threatened or injured with a weapon.[23]

Suggested mechanisms include desensitization toward violence over time[20] and adopting social learning cues from video games and applying them to life.[21] This raises the question of cause and effect:

- Does playing video games with violent content cause aggressive and violent behavior?
- Or does a tendency toward aggressive or violent behavior lead to the playing of video games with violent content?

State or trait aggression may influence children to choose a video game with aggressive or violent themes.[22] Alternately, children anxious about conflict may seek out violent games to obtain a sense of conflict resolution when real-life efforts are ineffective or impossible.

Video game play with violent content may be analogous to rough-and-tumble play in early adolescence. In this way, it may serve boys' developmentally appropriate needs for establishing social hierarchy—especially because video games with violent content often involve competition.[13] Predispositions toward aggressive or violent behavior—such as neurologic impairments that result in poor impulse control or conduct disorders—may be exacerbated by playing violent video games.[24]

Sexual stereotypes. As children develop into adolescence, they often become concerned about their physical appearance. Video game depictions of men and women frequently emphasize idealized body types, which may exacerbate disturbed body image tendencies in children. Children also may learn negative sexual stereotypes from video game play.[25] To counter these influences, recommend that parents:

- talk with children to learn how these stereotypes may be influencing concerns about body image
- compare the positive and negative aspects of how men and women are portrayed in video games with adults the children know who model desired attitudes and behavior
- encourage children to internalize healthy perceptions of their physical appearance through healthy eating and physical activity.

Table 5

Advice to parents for monitoring children's video game use

Keep computer and game consoles in a community area in the home
Check age-based ratings and content descriptors of games before renting or buying
Talk to your kids' friends' parents about the video games they play in their households
Talk with your kids about Internet safety, particularly if they play MMOs
Play games with your kids—have them teach you how to play and show you what they like about particular games
Engage in frequent casual conversations with your kids about the games they play and what the experience is like for them
Consult a mental health professional if you're concerned about changes in your child's mood, school performance, social relationships, or eating or sleeping habits

MMOs: massively-multiplayer online games

Recommended approach

Explore whether a child's behavior could be characterized as normative or excessive, in terms of how much time he or she spends playing video games. This can help put parents' concerns in context. Regardless of how much time the patient spends playing video games, pay attention to whether his or her thoughts, emotions, and behaviors seem pathologic.

Try to determine if the child is experiencing distress or functional impairment because of video game play or if excessive time spent playing video games is exacerbating symptoms of a comorbid mood, anxiety, or disruptive behavior disorder. Assess overall functioning, participation in activities, engagement in relationships, and how the child perceives his or her play. Investigate the family environment, peer relationships, and history of trauma.

continued

Clinical Point

Cognitive-behavioral methods may help children recognize the negative consequences of excessive video game play

Video games

Clinical Point

Work with parents to monitor video game exposure; keep computers in the home's community area instead of the child's bedroom

Address underlying issues, monitor and regulate video game play, and focus on how video game play changes as other problems are resolved. Work with parents to control children's video game exposure (***Table 5, page 37***). Consider cognitive-behavioral methods to help the child recognize the negative consequences of excessive video game play.

If these interventions fail to address excessive or pathologic video game play, or if comorbid disorders and functional impairment are severe, medication or residential treatment may be needed to effectively control video game exposure.

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Related Resources

- Entertainment Software Rating Board. Search for video game titles or publishers by rating, platform, and content descriptor. www.esrb.org.
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Bottom Line

Most children and adolescents do not encounter problems as a result of playing video games. Video game play is considered excessive when activity exceeds normative play and pathologic when it causes distress or functional impairment or exacerbates a comorbid disorder. Address comorbidities and family stress, and monitor to determine if video game play changes as other difficulties are resolved.