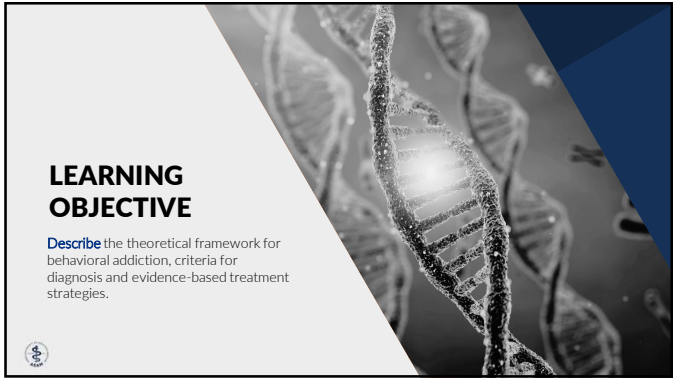




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Presentation Outline

- History
- Impulsivity/Compulsivity Spectrum
- Gambling Disorder
- Internet Gaming Disorder



4

History


- Classified as:
 - Obsessive-compulsive spectrum disorders
 - Impulse-control disorders
 - By-products of mood disorders
 - Now: substance-related and addictive disorder



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DSM-5

- Substance-related and Addictive Disorders
 - Gambling disorder
- Conditions for Further Study
 - Internet gaming disorder
- Not included at all ("insufficient evidence")
 - Other internet or technology-related behaviors (social media, TV, etc.)
 - Sex, exercise, shopping, food, etc.



Potenza, M: Non-substance addictive behaviors in the context of DSM-5. Addict Behav 2014.

6

Essential Features

- Failure to resist an . . .
 - impulse
 - drive
 - temptation

. . . to perform an act that is harmful to oneself or others.

Potenza, M. Non-substance addictive behaviors in the context of DSM-5. *Addict Behav* 2014.

7

Impulsivity vs. Compulsivity

- Both show inability to refrain from repetitive behaviors.
- Impulsivity is driven by an effort to obtain arousal and gratification.
- Compulsivity is driven by an effort to reduce anxiety.

8

Dimensional Approach

Risk aversiveness/impulsivity

Compulsive Impulsive

OCD BDD AN DEP HYP TS TTM Autism Binge eating Compulsive buying KLEP PG SIB SC BPD ASPD

Overexaggerated harm Underestimated harm

Adapted from Hollander E. *Clinical Manual of Impulse-Control Disorders*, 2006.

9

Compulsive End

- OCD
- Body Dysmorphic Disorder
- Anorexia Nervosa
- Depersonalization Disorder
- Hypochondriasis
- Tourette's Syndrome
- Trichotillomania
- Autism

Impulsive End

- Binge Eating
- Compulsive Buying
- Kleptomania
- Pathological Gambling
- Self-Injurious Behaviors
- Sexual Compulsions
- Borderline Personality Disorder
- Antisocial Personality Disorder

10

Gender Differences

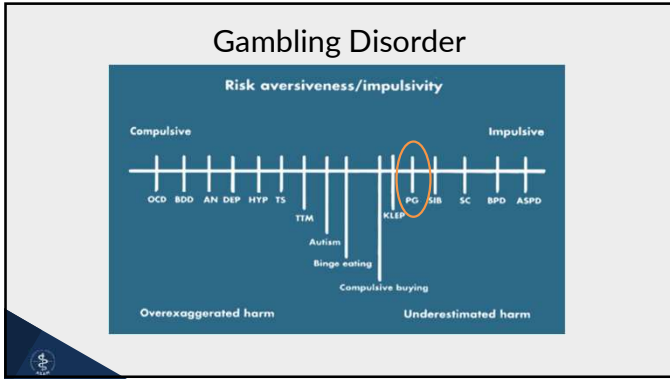
Women	Men
<ul style="list-style-type: none"> • Anorexia • Binge Eating • Kleptomania • Compulsive Buying • Trichotillomania 	<ul style="list-style-type: none"> • Body Dysmorphic • Sexual Compulsion • Pyromania • Gambling • Problematic gaming

11

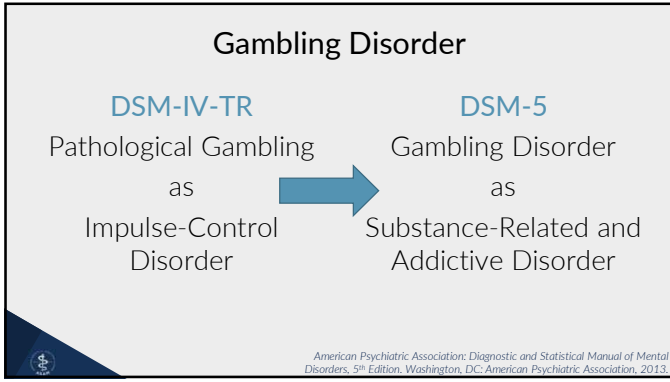
Gambling Disorder

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Substance-Related and Addictive Disorder

Alcohol	Caffeine	Cannabis
Hallucinogen	Inhalant	Opioid
Sedative	Stimulant	Tobacco
Gambling Disorder		

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Clinical Presentation for GD

- **Five DSM-5 Addiction Criteria**
Plus
 - "Chases" one's losses
 - Lies to conceal the extent of their gambling
 - Relies on others for money
 - Gambles when feeling distressed (Specifiers: episodic or persistent)

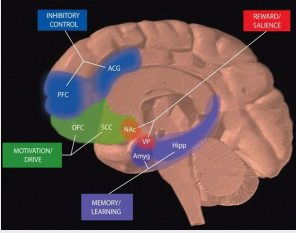
- **Phases**
 - Winning Phase
 - Loss Phase
 - Desperation Phase
 - Hopelessness Phase

Blanco C, Cohen O, Luján JJ, et al: Pathological gambling and substance use disorders, in Substance Dependence and Co-Occurring Psychiatric Disorders: Best Practices for Diagnosis and Treatment. Edited by Nunes EV, Selzer J, Levaonis P. Davies CA, New York, Civic Research Institute, 2010

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Neurobiology of GD

- Gambling affects:
 - DA
 - NE
 - Cortisol
 - 5HT
- Neurobiological similarities with substance use disorders



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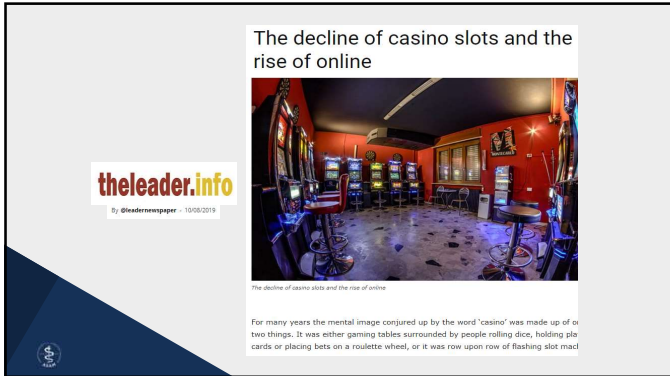
Epidemiology

- **US Gambling Statistics:**
 - \$73 billion/year casino gaming revenue
 - 82% of US residents gamble
 - 1% - 2% meet criteria for PG
- **Problematic Gamblers:**
 - \$40,000 average individual debt
 - 25 hours/week average time spent



www.americangaming.org; Dickson-Gillespie L, Rugle L, Rosenthal R, Fong T: Preventing the incidence and harm of gambling problems. J Prim Prev 29:37-55, 2008

18



19




20



21

Screening Tools

- The Lie/Bet Test
 - Have you ever felt the need to bet more and more money?
 - Have you ever had to lie to people important to you about how much you gambled?
 - 99% sensitivity, 91% specificity



Johnson EE, Hamer R, Nora RM, et al: The lie/bet questionnaire for screening pathological gamblers. *Psychological Reports* 80:83-88, 1997

22


Gambling Cognitive Distortions

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The Odds are Never in Your Favor


- "The house always wins"
- House edge is the ratio of the average loss to the initial bet, essentially the average gross profit the casino expects to make from each game
 - Keno - house edge 25-29%
 - Any craps - 11.11%
 - Ultimate Texas Hold 'Em - 2.19%
 - Blackjack (liberal Vegas rules) - 0.28%
- The longer you play, the greater the odds are that the result of your play will match up with the house edge



www.wizardofodds.com/gambling/house-edge

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Interpretative Biases



- Attributing wins to skill, losses to flukes
- Wrongly believing that a series of losses increases the chance of subsequent win
- Near misses ("I was only one number away!")
- The "Sunk-Cost" effect

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B.E. FOR DOGS: **SUNK COST EFFECT** Duke CENTER FOR ADVANCED HUNDOLOGY




Panel 1: A dog thinks, "I THINK I LEFT MY BONE OVER HERE..."
 Panel 2: The dog is shown digging in the ground.
 Panel 3: The dog says, "I DON'T THINK YOUR BONE IS DOWN THERE..."
 Panel 4: The dog says, "BUT I'M SO SLEEPY ALREADY I CAN'T STOP NOW!" and continues digging. The text "LAYER..." is written in the ground.

BERMAN, FOHL, THORPE 2015

26

Superstitious Beliefs

- Believing in:
 - Good luck objects (like animal parts)
 - Behaviors
 - Routines



Gaboury A, Ladouceur R: Erroneous perceptions and gambling. Journal of Social Behaviors and Personality 4:411-420, 1989.

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Selective Memory



- Remembering wins while ignoring losses
- Totaling wins without correcting for amounts lost

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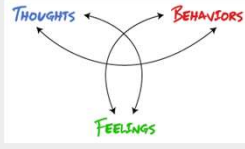
Telescoping

- **Temporal:**
 - Expecting that naturally occurring—that is, probabilistically expected—wins will happen sooner rather than later.

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Treatment


- Behavior therapy, cognitive behavioral therapy, family therapy
- Opioid antagonists, SSRIs
- Mutual-help groups (Gamblers Anonymous)



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Treatment: GD as an Impulsive Disorder

- Opioid Antagonists
 - Naltrexone and Nalmefene
 - Block opioid receptors, decrease dopamine function, and reduce "reward cravings"



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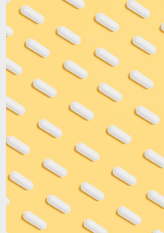
Treatment: GD as an Impulsive Disorder

- Reductions in gambling outcomes and urges to gamble with daily naltrexone
- Results for "as-needed" use of naltrexone more mixed
- Naltrexone 50 mg PO daily seems to be as effective as higher doses though some studies dose up to 250 mg PO daily
- Appears to work best in patients with either a personal or family history of alcohol use disorder

Grant JE, Kim SW, Hollander E, et al: Predicting treatment response to opiate antagonists and placebo in the treatment of pathological gambling. Psychopharmacol. 2003;221:927-938.
Grant JE, Potenza MN: Pathological Gambling: A Clinical Guide to Treatment. Washington, DC, American Psychiatric Publishing, 2009.
Ward S, Smith N, Bowden-Jones H: The use of naltrexone in pathological and problem gambling: A UK case series. J of Behav Addictions. 7(3): 827-833, 2012.

32

Treatment: GD as a Compulsive Disorder



- Selective Serotonin Reuptake Inhibitors
 - Frequently investigated for compulsive disorders (e.g. OCD, hoarding, trichotillomania)
 - Block serotonin reuptake, increase serotonin function, used for treatment of mood and anxiety disorders

Hollander E, Sood E, Pallanti S, et al: Pharmacological treatments of pathological gambling. Journal of Gambling Studies 21:101-110, 2005.

33

Treatment: GD as a Compulsive Disorder

- Fluvoxamine, paroxetine, escitalopram most studied
- Unclear if they help decrease urges but may reduce “self-medication” behavior
- May require higher-than-usual doses
- Work best with co-occurring depression or anxiety

Grant JE, Kim SW. Medication management of pathological gambling. Minn Med. 2006 Sep;89(9):44-8.

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Internet Gaming Disorder

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The Evolution of IGD

DSM-IV-TR	→	DSM-5
Not Found		Conditions for Further Study

American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. Washington, DC: American Psychiatric Association, 2013.

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Proposed Criteria

- Seven DSM-5 Addiction Criteria, plus
 - Has deceived family, therapists or others about the amount of gaming
 - Uses games to escape/relieve negative mood
 - (Excludes Internet gambling, recreational/social Internet use, sexual websites)

American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. Washington, DC: American Psychiatric Association, 2013.

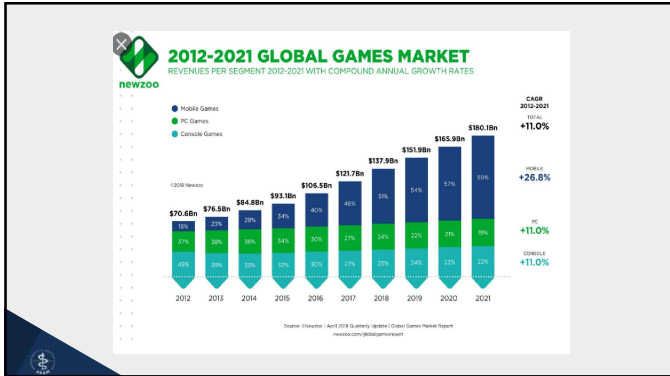
37

ICD-11 Criteria

- A pattern of persistent or recurrent gaming behavior ('digital gaming' or 'video-gaming'), which may be online (i.e., over the internet) or offline, manifested by:
 - 1) impaired control over gaming (e.g., onset, frequency, intensity, duration, termination, context)
 - 2) increasing priority given to gaming to the extent that gaming takes precedence over other life interests and daily activities
 - 3) continuation or escalation of gaming despite the occurrence of negative consequences.
- The behavior pattern is of sufficient severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning.
- Modifiers are "predominantly online" and "predominantly offline."

World Health Organization: International Statistical Classification of Diseases and Related Health Problems, 11th Edition. Retrieved from <https://icd.who.int/>, 2019.

38



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Who's Playing?

- ESA (Entertainment Software Association) 2021 survey
 - 226.6 million Americans play video games
 - 77% of gamers play with others online or in person at least weekly (up from 65% in 2020)
 - 77% play for 3+ hours a week




2021 Essential Facts about the Computer and Video Game Industry. Entertainment Software Association. <https://www.theesa.com/>. Published July 2021. Accessed April 15, 2022.

40

The Average Player

- Is white (73%)
- May be of either gender
 - Gender breakdown: 55% identify as male, 45% identify as female
- Is age 31
 - 80% of players are over 18 years old
 - In 2021, 28% of those who play video games are over the age of 45.



2021 Essential Facts about the Computer and Video Game Industry. Entertainment Software Association. <https://www.theesa.com/>. Published July 2021. Accessed April 15, 2022.

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Clinical Presentation of IGD

- Has more to do with life impact than amount of time played (though this is controversial)
- Often, but not always, occurs in patients with other co-morbidities (especially SUDs and mood disorders)
- Prevalence: Global prevalence appears to be ~2-3% and males 2.5 times as likely to be diagnosed
 - More common in Asian countries esp. China, Taiwan, South Korea. However...




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Context Matters

- South Korea is the most wired country in the world
 - Greatest number of users
 - First country to achieve over 50% broadband penetration per capita
 - Has the fastest, cheapest broadband in the world
 - Tournament gaming is a viable profession
- Unsurprisingly, one study found that up to 50% of Korean teenagers report problematic internet gaming use (Hur 2006)
- Internet gaming addiction is considered a significant public health concern.

Hur MH. Demographic, habitual, and socioeconomic determinants of Internet addiction disorder: an empirical study of Korean teenagers. Cyberpsychol Behav. 2006;9:514-525.


43



44

Problematic Play

- Risk factors include:
 - Personality traits (neuroticism, aggression and hostility, and sensation seeking)
 - Motivations for play (escapism, control, avoiding dissatisfaction)
 - Structural game characteristics (online games, ability to customize virtual game persona, game reinforcement structure).
 - MMORPGs a particular area of interest



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Imaging Studies

- Internet gaming addicts showed lower resting state functional connectivity between VTA and mOFC (Han 2018)
- Several studies show increased activity in the ACC and mOFC in response to gaming cues in subjects with gaming disorder (Han 2010, Ko 2009)
- Altered gray matter volume in patients with gaming disorder

Han, DH, et al. Bupropion sustained release treatment decreases craving for video games and cue-induced brain activity in patients with Internet video game addiction. *Exp Clin Psychopharmacol*. 2010 Aug;18(4):297-304.

Han, DH, et al. Changes in cue-induced, prefrontal cortex activity with video-game play. *Cyberpsychol Behav Soc Netw*. 2010 Dec;13(6):655-61.

Ko, CH, et al. Brain activities associated with gaming urge of online gaming addiction. *J Psychiatr Res*. 2009 Apr;43(7):739-47.

46

Things to ask patients

- Pre-occupation.
 - Do you spend a lot of time thinking about games even when you are not playing, or planning when you can play next?
- Withdrawal.
 - Do you feel restless, irritable, moody, angry, anxious or sad when attempting to cut down or stop gaming, or when you are unable to play.
- Tolerance.
 - Do you feel the need to play for increasing amounts of time, play more exciting games, or use more powerful equipment to get the same amount of excitement you used to get?
- Reduce/stop.
 - Do you feel that you should play less, but are unable to cut back on the amount of time you spend playing games?
- Give up other activities.
 - Do you lose interest in or reduce participation in other recreational activities (hobbies, meetings with friends) due to gaming?

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Things to ask patients

- Continue despite problems.
 - Do you continue to play games even though you are aware of negative consequences, such as not getting enough sleep, being late to school/work, spending too much money, having arguments with others, or neglecting important duties?
- Deceive/cover up.
 - Do you lie to family, friends or others about how much you game, or try to keep your family or friends from knowing how much you game?
- Escape adverse moods.
 - Do you game to escape from or forget about personal problems, or to relieve uncomfortable feelings such as guilt, anxiety, helplessness or depression?
- Risk/lose relationships/opportunities.
 - Do you risk or lose significant relationships, or job, educational or career opportunities because of gaming?

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Treatment

- Therapy modalities consist mainly of CBT, behavior therapy, and 12-Step approaches
- Psychopharmacologic management is off-label and has poor to middling evidence base for efficacy
 - Potential agents mainly selected from the same medications that are researched for SUDs
- Treatment centers initially arose in Asia and then Europe but now exist in North America as well

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Treatment Centers in North America

- ReSTART – a residential treatment center near Seattle
- Foothills at Red Oak Recovery in NC
- Last Door in Vancouver
- CGAA – Computer Gaming Addicts Anonymous

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In Summary

- Behavioral addictions fall within an impulsivity-compulsivity spectrum of illness.
- DSM-5 only recognizes one disorder officially though one other is included as a condition for further study.
- Psychosocial treatments work.
- Medications have fallen short so far.

51

Which of the following behavioral addictions is included in the DSM-5 under "Substance-Related and Addictive Disorders"?


- A. Internet Use Disorder
- B. Gambling Disorder
- C. Internet Gaming Disorder
- D. Hypersexual Disorder



52

Research shows that gambling disorder involves the strongest effect on which of the following neurotransmitters?


- A. Dopamine
- B. GABA
- C. Acetylcholine
- D. Serotonin



53

Which of the following medications has some evidence for the treatment of gambling disorder?

- A. Memantine
- B. Naltrexone
- C. Aripiprazole
- D. Clonidine



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