Psychiatry Beyond the Clinic: Gaming

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No Disclosures

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Gaming Disorder will be an official diagnosis in ICD-11?
Video Games: The Good, The Bad, and The Ugly

- Background
- The Good: Benefits
- The Bad: Displacement
- The Ugly: Gaming Disorder
WHO
ARE
YOU?
Types of Video Games
Rise of the VG Industry

1991 – $12 billion
2001 - $35 billion
2011 - $65 billion
2017 – $116 billion
How Much Do Kids Play?

- **Quadrupled** since ‘00 (Common Sense Media Survey ‘15)

- 61% play VG on a given day average 2 hrs 13 min

- Boys > girls

- Part of >5 ½ hrs per day total screen time

- 1 in 7 boys & 1 in 25 girls play 4 - 10 hrs/day
Do Parents Limit Kids’ Screen Time?

- 94% parents say yes (ESA ‘14)
- 48% report a “constant battle” (APA ‘17)
- 72% youth say no (Kaiser Family Survey ‘10)
- Those with no rules play twice as much
Tablets & Cell Phones
Gaming Trends

- Tablet & iPhone VG sales increased to 50% (NPD Group ‘15)
- Online
- Youtube
- VR
Who Plays Video Games?

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Adults Play, Too

- 74% gamers are adult (ESA, ‘15)
- 74% mothers w kids at home play (ESA, ‘14)
- 43% physicians play VG at work (YouGov, ‘15)
How does VG Play Correlate w Mental Health?
Computer Habits & Mental Health

- Video Games
- TV & Movies
- Computers
- Smartphones

Durkin ‘02, Wack ‘09, Allahverdipour ‘10, Przybyski ‘17, & Twenge ‘17
Health Benefits
VG Displace **Risky** Behaviors

- Sex
- Drug use
- Violence
- Unsafe Driving
Teen Pregnancy

Graph showing trends in teenage pregnancies from 1990 to 2014 for Hispanic, Black, Total, and White populations.
Reported violent crime rate in the United States from 1990 to 2014

Source: FBI

Additional information: United States; 1990 to 2014
Motor Vehicle Traffic Deaths per 100,000 Teens Ages 15 to 19, Selected Years, 1980-2013

Eye-Hand Coordination

VG play improves (Griffith ‘83, Rosenberg ‘05, Li ’16, & Hickman ‘17)
Vision

- Detail resolution (Green ’07)

- Contrast sensitivity (Li ’06, Caplovitz ’09)
Mental Rotation

Gaming improves *(Sims '02, Cherney '14, & Rodan '14)*
Visual Tracking

Improves with gaming (Green ‘03, Trick ‘05, & Ballesteros ’15)
Visual Attention

• Improves with gaming (Green ’03, Tahironglu ’10, Stroud ’15, & Trisolini ’17)
Visual Attention & Dyslexia

• 9 daily sessions of 80 minutes of Rayman Raving Rabids

• Dyslexic youth showed 1 year-equivalent improvement in visual attention & reading (Franceschini ’13)

• No change in those who played a non-action VG
Multitasking

- VG play improves multitasking (Abbott, ‘13, Chiappe ‘13, Cardoso-Leite ‘15, & Steenbergen ‘15)

- Task-switching (Strobach ‘12, Glass ‘13, & Mack ‘16)
VG Grow Your Brain

Assigned Super Mario 30 minutes/day X2 months (*Kuhn ‘14*)

Gray matter growth in areas corresponding to:

- Spatial navigation
- Strategic planning
- Working memory
- Motor performance
VG Displace Healthy Habits

- Socializing IRL
- Exercise
- Academics
- Sleep
Relationships IRL

Not Hanging Out With Friends
Times per week teenagers go out without their parents


2.9 2.7 2.5 2.3 2.1 1.9

- 12th-graders
- 10th-graders
- 8th-graders

2007 - PS3 released
America Is Fatter Than Ever
Obesity prevalence among adults and youths in the U.S.*

- **Adults**
  - 1999-2000: 30.5%
  - 2001-2002: 30%
  - 2003-2004: ~30.5%
  - 2005-2006: ~30%
  - 2007-2008: ~30.5%
  - 2009-2010: ~30%
  - 2011-2012: ~30%
  - 2013-2014: 39.6%
  - 2015-2016: ~39%

- **Youth**
  - 1999-2000: 13.9%
  - 2001-2002: 13.9%
  - 2003-2004: 13.9%
  - 2005-2006: 13.9%
  - 2007-2008: 13.9%
  - 2009-2010: 13.9%
  - 2011-2012: 13.9%
  - 2013-2014: 18.5%
  - 2015-2016: 18.5%
Academics

- Displacement
- Information processing
- Inattention

Diagram showing the relation between videogame weekday screen time and academic performance.
• Insufficient sleep strongly predicts depression, anxiety, & suicidality (*Matamura* '14)

• IGD **triple** sleep deprivation (*Rehbein* ‘10, *Achab* ‘11, & *Lam* ‘14)

• Displacement

• 80% of teens “vamping” (*Englandar* ‘14)

• Arousal
VVG Increase Aggression

- >100 studies demonstrate (Anderson, ‘10, Greitmeyer ‘14, Exelmans ‘15 & Ferguson ‘15)

- **Desensitizes** to violence

- Increases aggressive **thoughts**

- Increases aggressive **behaviors**

- Effect **small**
**VVG Effects Vary by Researcher**

**Significant in vast majority** *(Greitmeyer, 2014)*

**No significant effect** in Ferguson studies
Downward Spiral

- Aggressive youth prefer VVG
- VVG increase aggressive thoughts
- Cycle continues
How Do VVG Increase Aggression?

Media Use

Internal Traits

Aggressive Behavior

Source: Swing '14
Who’s at risk?

• Most players **don’t** become violent

• **Which are at risk?**
  
  • Greater exposure
  
  • Younger
  
  • Aggressive
  
  • Unsympathetic
  
  • **Admire** VVG character
Gaming Addiction
Addiction
Why Are Video Games Habit Forming?
Technology-Assisted Pretend

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Flow: state of being fully immersed in activity, feeling focus & enjoyment
Flow State Depicted Visually

Level of Challenge vs. Current Skill Level

Anxiety vs. Boredom

Zone of Flow
No Stopping Cues
Player continues playing with the new content

Compulsion Loop

Player plays game

Player achieves goals

Player is awarded new content
Psychological Needs

Self determination theory

Autonomy

Competence

Relatedness
Autonomy

Control the course of our lives
Competence

Effective in dealing with environment
Relatedness

Connected with others
Excessive Use Counterproductive (Wu '13)
Designed to Be Addictive

- Behavioral Game Design
- Variable & Fixed Ratio Reinforcement
- Research Labs
Excessive pattern of compulsive behavior leading to impairment & associated symptoms
Gaming Disorder in China & S. Korea

- #1 public health threat
- Laws to limit play
- Hundreds of detox & residential facilities
• **No** official diagnoses

• Researchers survey 1000’s youth using modified substance use disorder criteria
VG Addiction Prevalence

- South Korea 8% (SK Government ’10)
- Taiwan 8% (Ko ’07)
- Australia 8% (Porter ’10)
- Singapore 9% (Gentile ’11)
- U.S. 9% (Gentile ’09)
- China 10% (Peng ’09)
- Germany 12% (Grusser ’07)
- Hong Kong 15% (Wang ’14)
Internet Gaming Disorder

- Condition requiring further study (2013)
- Pattern of excessive play
- Impairment or distress
- Additional symptoms
1. Increasing Time Playing
2. Preoccupation
3. Loss of Interest in Other Hobbies
4. Withdrawal
5. Can’t Cut Down
6. Continue Despite Psychosocial Problem
7. Threatens Job, Relationship or Education
8. Lies
9. Play to Alleviate Negative Mood
IGD Diagnosis

- Substance use disorder requires 2 of 9
- Gambling disorder requires 4 of 9
- IGD requires 5 of 9
- Higher threshold = lower prevalence
IGD Prevalence

- 1% – 5% (Muller ‘14, Lemmens ‘15, Rehbien ‘15, Pontes ‘16, Przybylski ‘17 & Wu ‘18)
- Greater in SE Asia (Saunders ‘17)

Source: Sussman ‘18
ICD 11: Gaming Disorder

A pattern of recurrent VG behavior manifested by:

1. Impaired control

2. Takes precedence over life interests & daily activities

3. Continues despite impairment in functioning
Which Psychiatric Diagnoses Are Comorbid With IGD?
Comorbidity


- **Depression & Anxiety Disorders** (Chele ‘11, Wei ‘12, King ‘13, Lehenbauer-Baum ‘15, Kim ‘16, King ‘16 & Starcevic ‘17)

- **Autism Spectrum** (Mazurek ‘13, Mazurek ‘17 & So ‘17)

- **Disruptive Behavior Disorders** (Desai ‘10, Müller ‘14 & Lehenbauer-Baum ‘15)
Risk Factors
Risk Factors

• Male
• More gaming
• Poor social skills
• Poor emotional regulation
• Impulsivity (Gentile ‘11)
• Novelty seeking & harm avoidant (Kuss ‘14)
• Less protective parenting
• Poor relations w father (Su ‘18)
Which Games Are Most Addictive?

- Computer & console games

- **Fantasy/RPG** games, **shooters**, & **real-time strategy games** (Smythe 07, Kim '10, Elliot '12, & Eichenbaum '15)

- Motivation: **achievement** & **immersion** (Lehenbauer-Baum '15)
Biological Correlates

- Drug addicts - abnormalities in brain structure & function

- VG addicts - similar abnormalities in 29 studies (Weinstein '15)
Dopamine & Addiction

- Recreation drug use causes release spike in striatum & nucleus accumbens

- VG play causes same spike (Koepp '98, Hoeft '08, Weinstein '10)

- Drug addicts - decreased sensitivity of reward systems

- VG addicts - same abnormality (Weinstein '10, Kim '11 & Hou '12)
Morphological Changes

• Drug addicts show **brain matter loss** (e.g. orbitofrontal cortex)

• VG addicts show similar pattern (*Dong ’12, Han ’12, Lin ’12, Hong ’13, Weng ’13, Yuan ’13 & Wang ’15*)
Neuropsychiatric Effects

- Impaired response inhibition
- Cognitive bias
- Executive dysfunction
- VG addicts show identical deficits (Van Holst ‘12, Zhou ‘13, Wang ‘15, & Yao ‘15)
IGD Course

- Addictive play increases from age 6 to 16
- Plateaus through 26 (Ream ‘13)
- 2-year stability 26% - 84% (Gentile ‘11, Van Rooij ‘11, & Scharkow ‘14)
IGD Sequalae

- Depression (Gentile ‘11)
- Anxiety
- Worsened relationship w parents & decreased monitoring (Gentile ‘11 & Su ‘18)
- School failure (Lam ‘10, Achab ‘11 & Gentile ‘11)
Taking a Gaming History?
Talking VG in Clinical Practice

- Facilitates rapport
- Fantasy world
- Evaluate screen habits
Elements of Screen History

• Screen Time
• Content
• Rules
• Supervision
• Conflicts
Screening

• PRIUSS-3 for Problematic Internet Use.
  – Derived from the 18 item Problematic & Risky Internet Use Scale
  – Likert scale: Never=0, Rarely=1, Sometimes=2, Often=3, Very often=4.
  – Social anxiety related to a preference for Internet to the exclusion of real-life relationships
  – Withdrawal when not using
  – Loses motivation to do important activities because of the Internet

• Total of 3 or more = positive

• Sensitivity ~100%

• Specificity ~60%
Red Flag

• “I’m afraid of what my son would do if I took away his games.”

• Ceasing access can trigger unsafe behavior
Treatment

- Family Guidance
- Therapy
- Medication
- Comorbidities
Family Guidance
Don't you think you've been playing videogames a little too much, Michael? Listen son, we noticed you don't play with your cars anymore... and your room's been a mess lately... Your personal hygiene isn't what it used to be, and to be honest, we're worried about you, Mikey. 'Cmon, you've been playing that damn game for 5 hours now without a break!

Uh, Mom, you're in the way....
Parental Monitoring

• **Restrictive** – limit time & content

• **Active** – coplay, discuss & guide
Protective Effects of Parent Monitoring

- Decreasing total screen time improves sleep, school performance & BMI (Tiberio ’14 & Gentile ’14)

- Decreasing media violence exposure improves behavior (Gentile ’14)
Talking With Families About VG Habits

• Parents as role models

• Make time for sleep, socializing, exercise, family, schoolwork & chores

• Tech-free times & areas
AAP Family Media Plan

- ~ 10 minutes
- Screen-free zones
- Screen-free times
- Media choices
- Family play
Mom said
Go play outside
- Net Nanny
- Boomerang Parental Control App
- Wifi shutdown
Parental Controls

• Allowed content

• Screen time by day, total and at what times

• Different rules for each user

• Youtube or Google search
Psychotherapy

- Modeled on substance abuse treatment

- CBT (Young ’11, King ’12, Winkler ’13)

- Family therapy

- Motivational interviewing

- Decrease VG time
Psychotherapy

- Thirty clinical trials showed positive results (*King '17*)
- Inconclusive & flawed
Therapy Techniques

- Overcome denial
- Personal inventory
- Practice the opposite
- Setting goals
- Abstinence
- Peer group
- Family support
Medication For GD

- ADHD Medications
- Antidepressants
- No FDA Approval
ADHD Medications

• 62 children w ADHD methylphenidate X8 weeks - VG play & addiction decreased (Han '09)

• 86 teens w IGD improved methylphenidate = atomoxetine X12 weeks (Park '16)

• IGD improvement correlated w ADHD & impulsivity
Bupropion

- 50 adults w IGD & MDD
- 8-week OL showed benefit *(Han '12)*
- 65 teens w IGD & MDD
- 8-week OL showed benefit
- Bupropion plus group CBT > bupropion alone *(Kim '12)*
Escitalopram vs Bupropion

- 30 adults w IGD & MDD DB randomized 12 weeks (Nam '17)
- Improvement equal
- 119 w IGD 6 week RCT (Song '16)
- Bupropion > escitalopram > waiting list
- Bupropion improved attention & impulsivity
Specialized Treatment Facilities

- **Outpatient**: The Center For Internet & Technology Addiction, East Hartford

- **Inpatient**: Internet Addiction Inpatient Program @ Bradford Regional Medical Center, PA

- **Residential**: reStart, Seattle

- **Wilderness**: VG & Internet Addiction Treatment Program, UT
Conclusions

• Youth spending more time gaming

• VG play healthy in moderation

• Excessive play displaces sleep, socializing, academics & exercise

• 1-4 % develop an pathological habit called Gaming Disorder

• Parental monitoring preventative

• Treatment similar to substance use disorders

• Address comorbidities
QUESTIONS?
COMMENTS?