

THE NEUROSCIENCE OF INTERNET PORNOGRAPHY ADDICTION

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Disclaimer/Disclosures

- Clinician, not an academic or researcher
- ADHD
 - Yes, I've got ADHD. Which means I have the potential to...
 - ...talk fast, jump around, interrupt myself, trail off, etc.
 - Confession: *It I look like I'm reading, I probably am*
- ***Please hold questions until the end.***



“Sex Neutral” presentation

- No stance being taken on the sex (+) vs. sex (-) debate as applied to the topic of internet pornography
- What this presentation is **not**
 - A condemnation or promotion of pornography or pornography use
 - Commenting on sociological, cultural, spiritual/religious, moral, philosophical, psychological, feminist, anthropological, political, etc. perspectives.



“Addiction”

Historical Concept of Addiction

- “A chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences” (NIDA, 2012)

Addictive behaviors are Not a new concept:

- Orford (1985) “Excessive Appetites” – gambling, eating, sex
- Marlatt, Baer, Donovan, & Kivlahan (1988) “Addictive behaviors”
- Multiple overlaps b/t behavioral addictions and chemical addictions: Comorbidity, course, genetic contribution, neurobiology, phenomenology (craving, intoxication, withdrawal), tolerance, and treatment response (Grant, Potenza, Weinstein, & Gorelick, 2010; Leeman & Potenza, 2013) (more & more & more ...)
- About Reward, not Pleasure
- Anticipation



Behavioral Addiction



ASAM The Voice of Addiction Medicine
American Society of Addiction Medicine

- *A primary, chronic disease of brain reward, motivation, memory and related circuitry... This is reflected in an individual pathologically pursuing reward and/or relief by substance use **and other behaviors.** (ASAM, 2011)*



Tolerance and Withdrawal

- **Tolerance** results from a homeostatic adaptation to chronic increased levels of dopamine in the Reward Center (potentially caused by alcohol, gambling, gaming, porn, sex, etc.)
 - Need more to maintain desired state
- **Withdrawal** – incorrectly thought to require external chemical consumption
 - Withdrawal is negative mood state resulting from loss of artificially elevated levels of dopamine due to cessation of chronic activities (chemical consumption or behavioral patterns)



Example Addictive Behaviors

- Lifestyle-related
 - Gambling Disorder, Shopping Addiction, Sex Addiction
- Technology-related
 - Internet-related Addictions
 - Smartphone Addiction
 - *Nomophobia* - (Bangalore, France, New Delhi, Turkey)
 - Nomophobia Questionnaire (NMP-Q)
- Food-related
 - Binge Eating

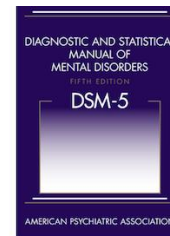


Gambling Disorder

- Now officially an addiction in both the DSM-5 & ICD-11

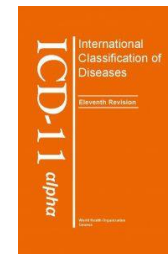
- Substance-Related and Addictive Disorders

- Substance-Related Disorders
 - Drugs, alcohol, nicotine, caffeine
- Non-Substance-Related Disorders
 - [Gambling Disorder](#)



- Disorders due to substance use or addictive behaviors

- Disorders due to substance use
 - Drugs, alcohol, nicotine, caffeine
- Disorders due to addictive behaviors
 - [Gambling Disorder](#)



Internet Addiction

- Officially Proposed for DSM-5
 - Block (2008) 4 key components: *excessive use, withdrawal, tolerance, & adverse consequences*
 - Subtypes: excessive gaming, sexual preoccupations, email/txt msg
 - Added later: Social networking (Yau, Crowley, Mayes, & Potenza, 2012)
- *DSM-5 Outcomes*:
 - *Internet Addiction/ Internet Use Disorder* **not** included
 - *Internet Gaming Disorder* diagnosis **created** in Section III (never proposed)



Terms: “Internet Addiction” ~ “Internet Use Disorder” ~ “IAD”, etc.

- Internet Addiction Disorder (IAD)
- Internet Use Disorder (IUD)
- Compulsive Internet Use (CIU)
- Problematic Internet Use (PIU),
 - General Problematic Internet Use (GPIU) vs. Specific Problematic Internet Use (SPIU)
- Pathological Technology Use (PTU)
 - Includes computer, Internet, television, cellphone, video games, etc.
- Internet Communication Disorder (ICD) (SNS focused)

- **Internet Addiction Test (IAT) (sIAT)**
 - Arabic, Chinese, Finnish, French, German, Greek, Italian, Korean, Malay, Portuguese, Vietnamese



Technology-related Addictions

- **Internet-related Addictions**
 - Internet Addiction
 - GIA (YouTube, Reddit, Amazon, eBay, etc.)
 - Internet Gaming Disorder
 - Internet Pornography Addiction
 - Social Networking (SNS, FB, IG) Addiction
 - Bergen Facebook Addiction Scale (BFAS)
 - Facebook Intrusion Questionnaire (FIQ)
 - Instagram Addiction Scale (IAS)
 - Social Networking Addiction Scale (SNWAS)
- **Smartphone Addiction**
 - Problematic Cellular Phone Use Questionnaire (PCPU-Q)
 - Smartphone Addiction Proneness Scale (SAPS)
 - Smartphone Addiction Scale (SAS)
 - Smartphone Addiction Inventory (SPAI)



Internet Gaming Disorder (IGD)

- #1 of 3 originally proposed subtypes of Internet Addiction
- Listed in Section III “Conditions for further study” in the DSM-5
- Accepted by WHO as “Gaming Disorder” in the ICD-11
- Massive amounts of neuroscience research published in this area
 - MRI
 - fMRI
 - PET
 - SPECT
 - EEG
 - *more?*



Internet Pornography Addiction (IPA)

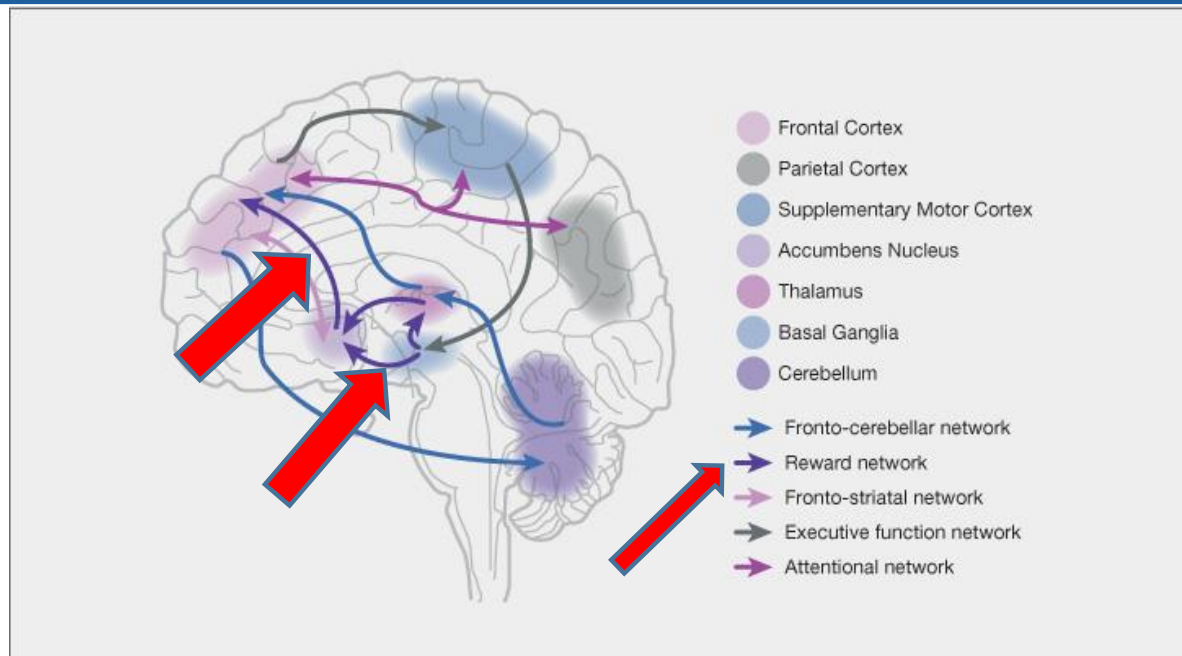
- #2 of 3 original subtypes of Internet Addiction
- “Compulsive Sexual Behavior Disorder” (CSB)
 - Official ICD-11 diagnosis (upcoming release)

Unnecessary controversy and Illogic

- ✓ Gambling **can** develop into an addiction ✓ (official)
- ✓ Internet Gaming **can** develop into an addiction ✓ (official internationally)
- ○ Chronic use of social media **can** develop into an addiction ○
- ○ Chronic use of smartphones **can** develop into an addiction ○
- ○ Chronic use of the internet in general **can** develop into an addiction ○
- ✗ Excessive and chronic time spent on internet pornography **cannot** develop into an addiction. ✗ (Never, ever.)



Addiction Neurobiology



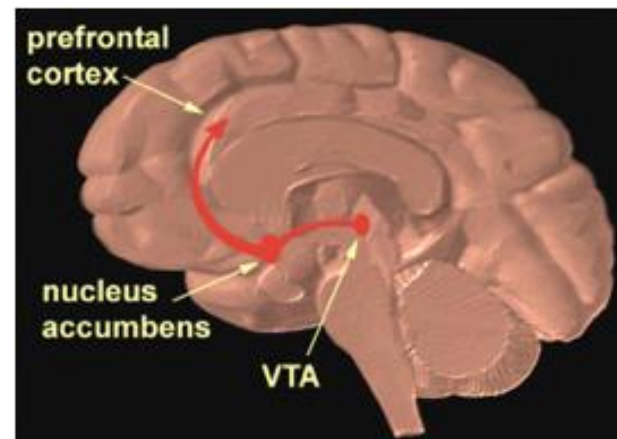
- Purper-Ouakil D, Ramoz N, Lepagnol-Bestel AM, et al. Neurobiology of attention deficit/hyperactivity disorder. *Pediatr Res* 2011; 69: 69R-76R./



Addiction Neurobiology

Mesocorticolimbic Dopamine System/Network:

1. **Mesolimbic pathway:** (horizontal red line) Midbrain, limbic, emotions, etc. Pathway that is most closely associated with impulsivity & motivation.
2. **Mesocortical pathway:** (vertical red line) Downward connection from frontal lobe to midbrain. associated with cognitive functions such as executive functions.



Addiction Neurobiology: NIH 3-Phase model

- **Stage 1: Binge/intoxication**
 - “Sensitization” - “Thrills & excitement”
- **Stage 2: Withdrawal/negative affect**
 - “Desensitization” - “Numbed pleasure response”
- **Stage 3: Preoccupation/anticipation**
 - “Hypofrontality” - “Willpower erodes”

+ **Dysfunctional Stress Circuits**

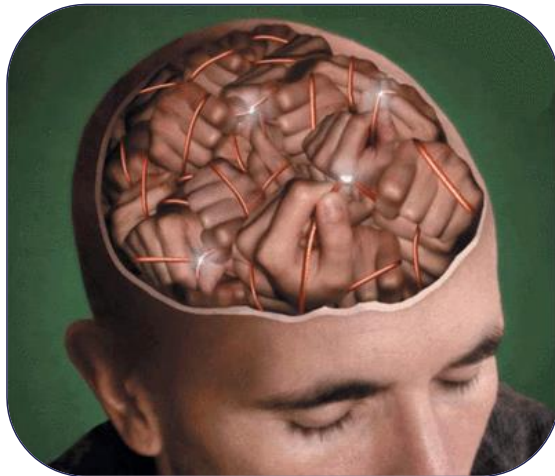
- Can make even minor stress lead to cravings and relapse because they activate powerful sensitized pathways.

“Anti-Reward”
Koob, George F., and Nora D. Volkow. "Neurocircuitry of addiction." *Neuropsychopharmacology* 35.1 (2010): 217.



Neuroplasticity

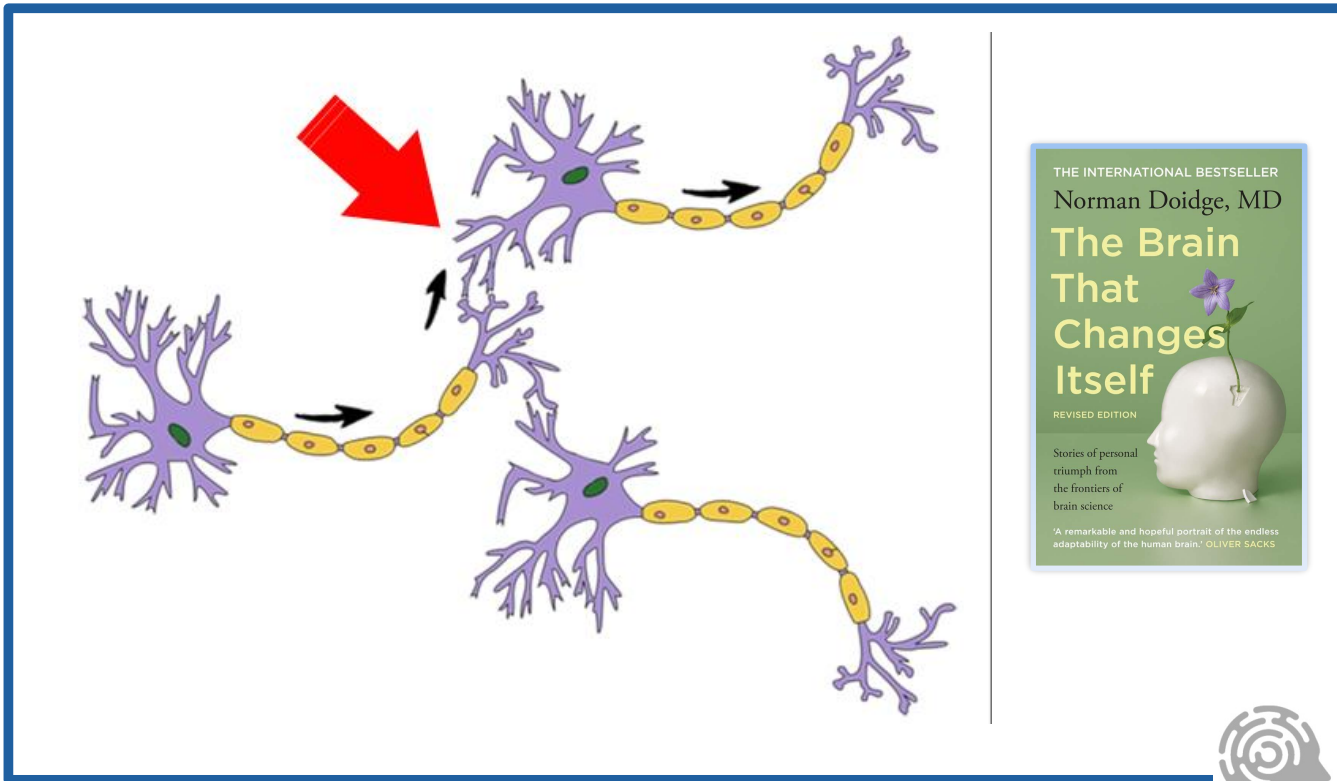
- **Sensitization**: Creating new pathways (learning)
- **Desensitization**: Weakening old pathways
- “Rewiring”



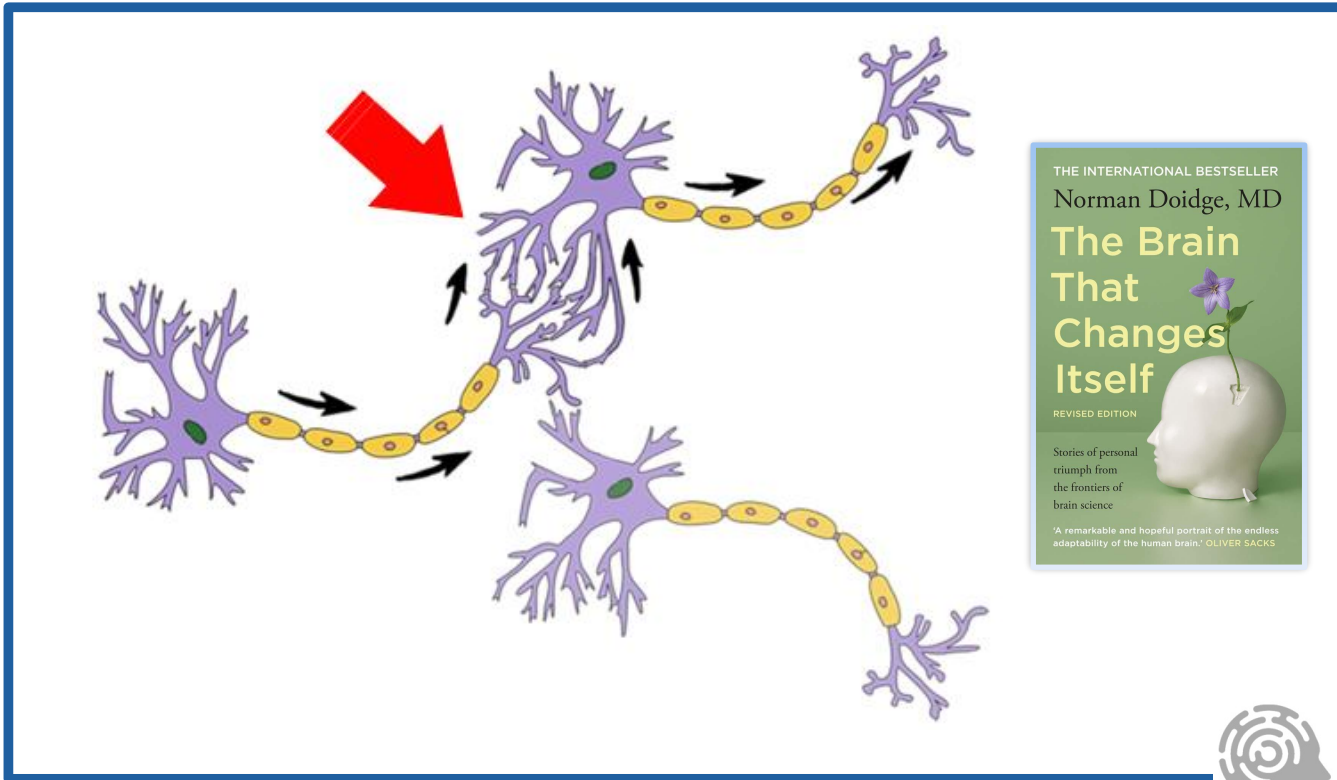
Neuroplasticity: the brain's ability to change and adapt as a result of experience



Nerve cells that fire together...



...wire together

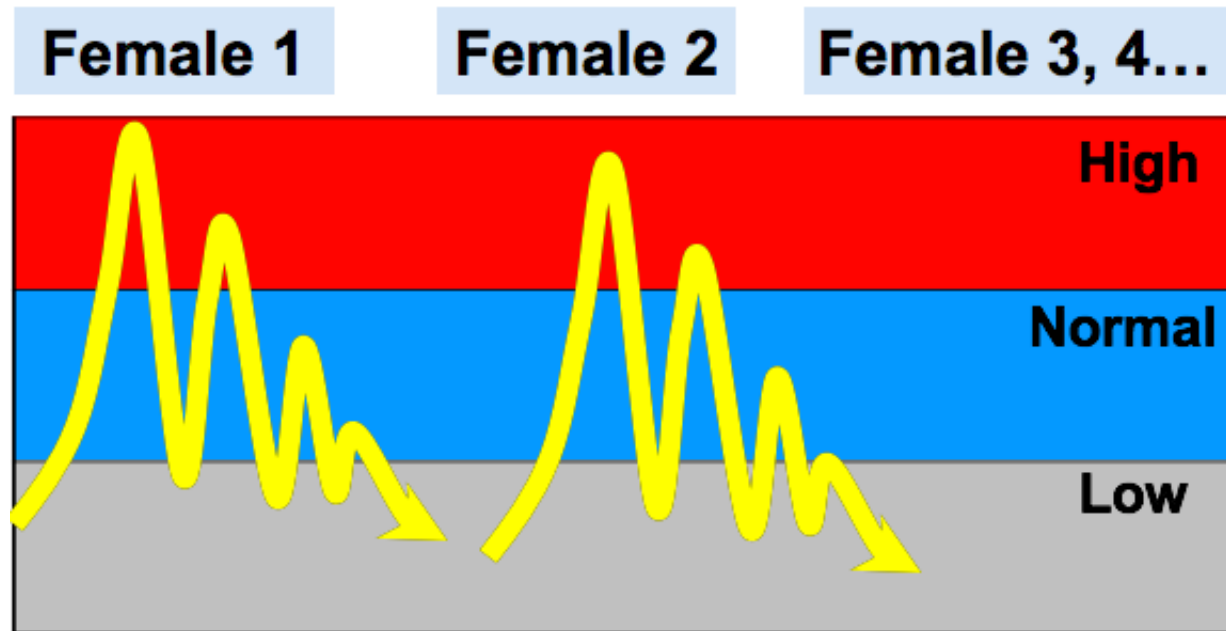


The Coolidge Effect



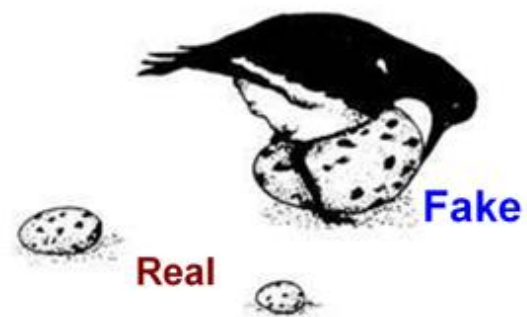
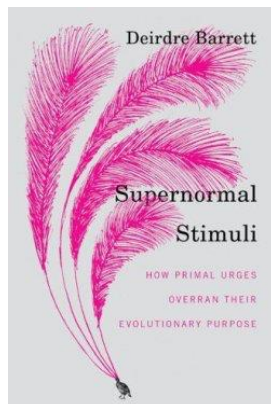
Dopamine surges for a novel sexual partner

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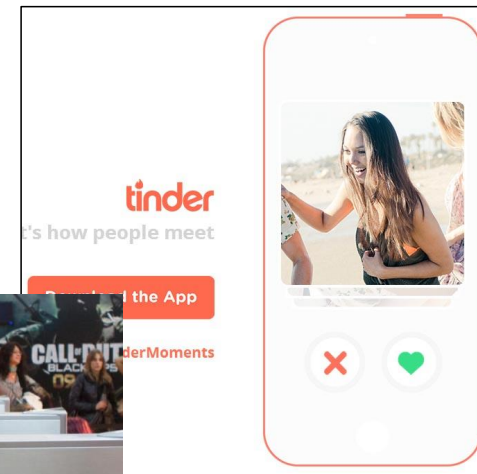
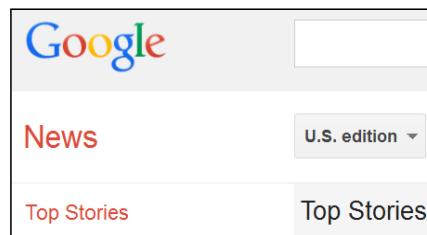


Supernormal Stimulus

- Tinbergen
 - Bird Eggs & Butterfly Wings
- Deirdre Barrett
 - “How Primal Urges Overran Their Evolutionary Purpose”



Information Overload – Classical Conditioning



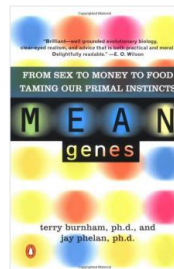
Internet Porn as a Supernormal Stimulus: Evolutionary Mismatch

“All excessive stimulations of the reward circuitry that are not the behaviors for which it originally evolved are problematic.”

- –Jay Phelan, PhD

“Like crack and Krispy Kreme donuts, Internet porn is another manifestation of mismatch.”

- –Jay Phelan, PhD



Research Examples

- 2015 literature review showing 300+ neuroscientific studies supporting the notion of internet pornography addiction.
 - MRI
 - fMRI
 - PET
 - SPECT
 - EEG



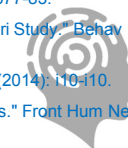
behavioral sciences

Love, T., Laier, C., Brand, M., Hatch, L., & Hajela, R. (2015). Neuroscience of Internet pornography addiction: A review and update. *Behavioral sciences*, 5(3), 388-433.

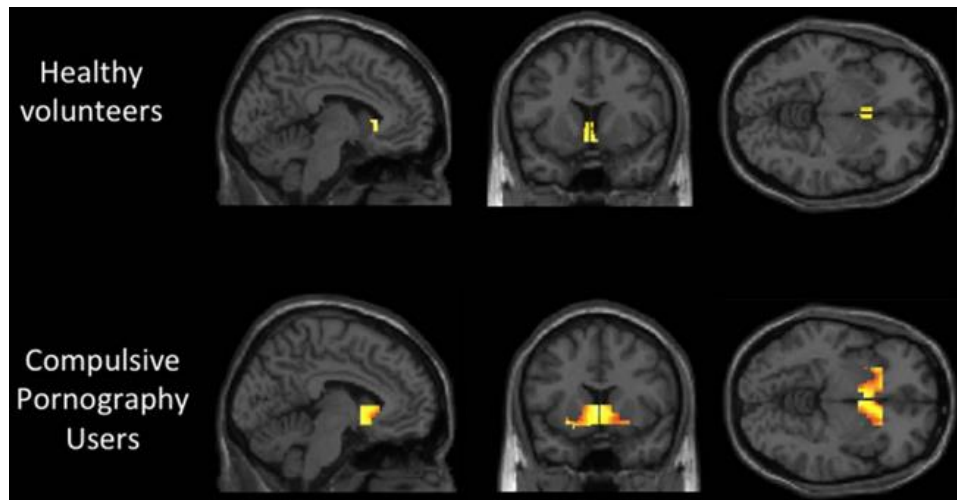


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- Brand, M., K. S. Young, and C. Laier. "Prefrontal Control and Internet Addiction: A Theoretical Model and Review of Neuropsychological and Neuroimaging Findings." *Front Hum Neurosci* 8 (2014): 375.



University of Cambridge study



Voon, Valerie, et al. "Neural correlates of sexual cue reactivity in individuals with and without compulsive sexual behaviours." *PloS one* (2014).



Max-Planck institute study

“Brain Structure and Functional Connectivity Associated With Pornography Consumption: The Brain on Porn” --- **May, 2014: JAMA Psy.**

Lead author Simone Kühn said:

“That could mean that regular consumption of pornography more or less wears out your reward system.”

- *“We assume that subjects with a high porn consumption need increasing stimulation to receive the same amount of reward.”*

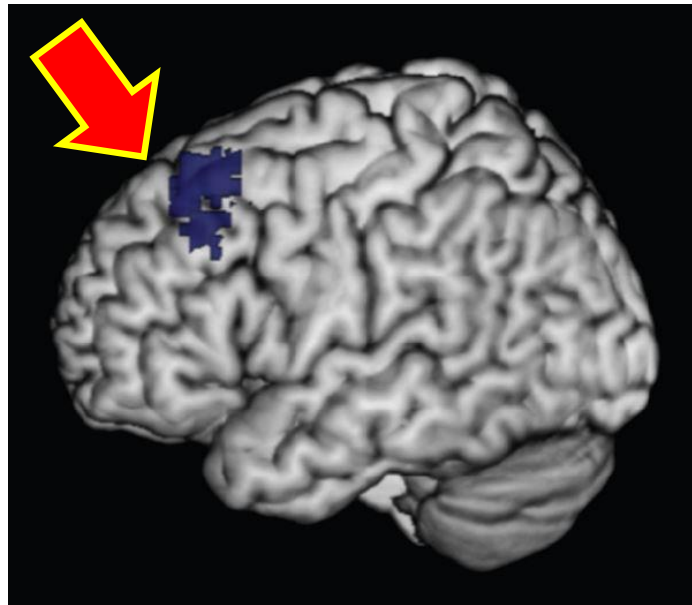
JAMA Psychiatry



Hypofrontality

- Altered frontal lobes - leading to weakened willpower & inability to control use

“The nerve connections between the reward circuit and prefrontal cortex worsened with increased porn watching.”



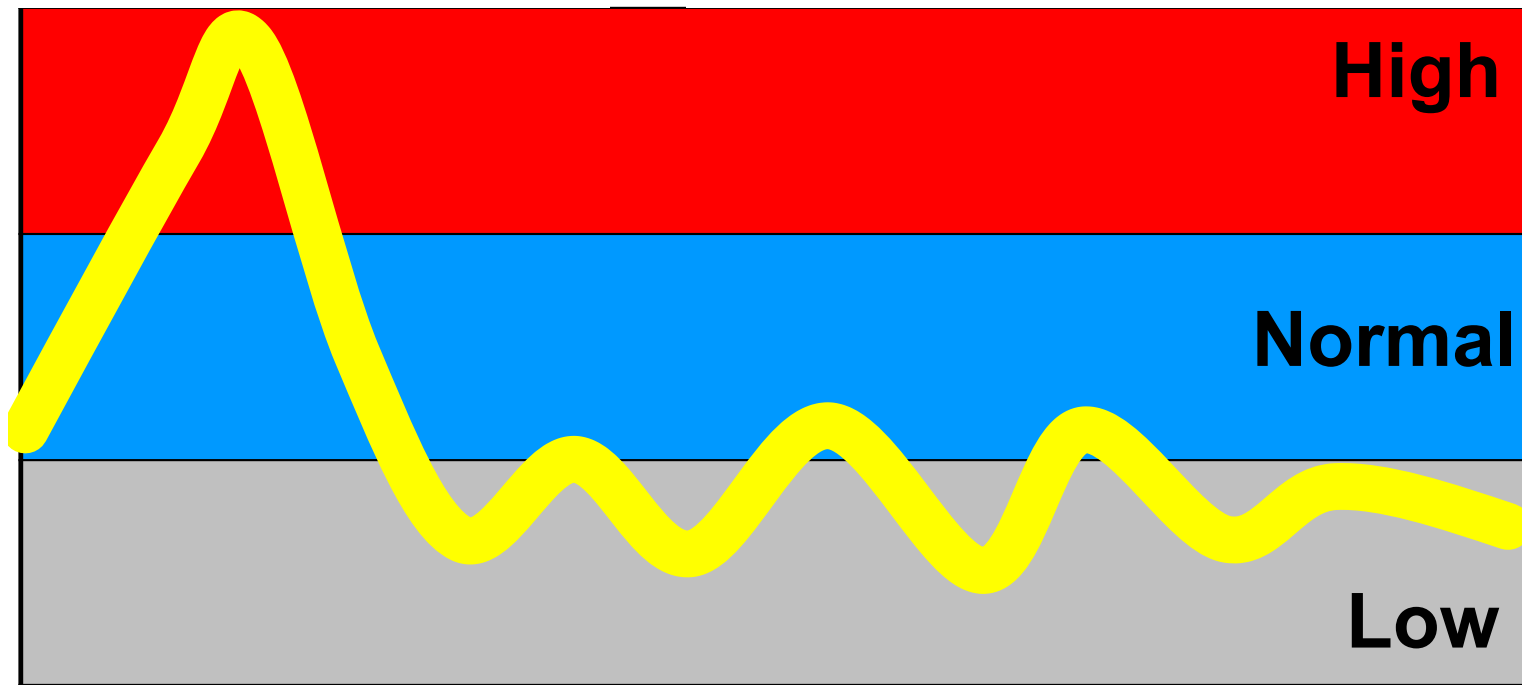
MAX-PLANCK-GESELLSCHAFT



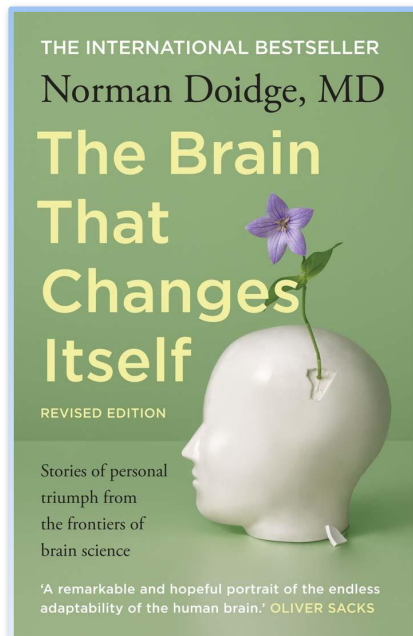
Getting Desensitized

**The
Addiction**

**Everything else in
your life**



Potential Consequence: Altered Sexual Interests



Adolescent and young adult males report progressing to increasingly extreme or ego-dystonic forms of pornography in order to maintain sexual arousal and achieve orgasm.

1. Sexual orientation incongruent pornography
2. Values incongruent pornography (fetishes, violence)
3. Underage or other illegal pornography

- Important clinical considerations:

1. Porn induced sexual tastes NOT necessarily permanent
2. Porn induced sexual tastes NOT necessarily reflect sexual orientation



Video: REWIRED documentary trailer



Porn Induced Erectile Dysfunction (PIED)

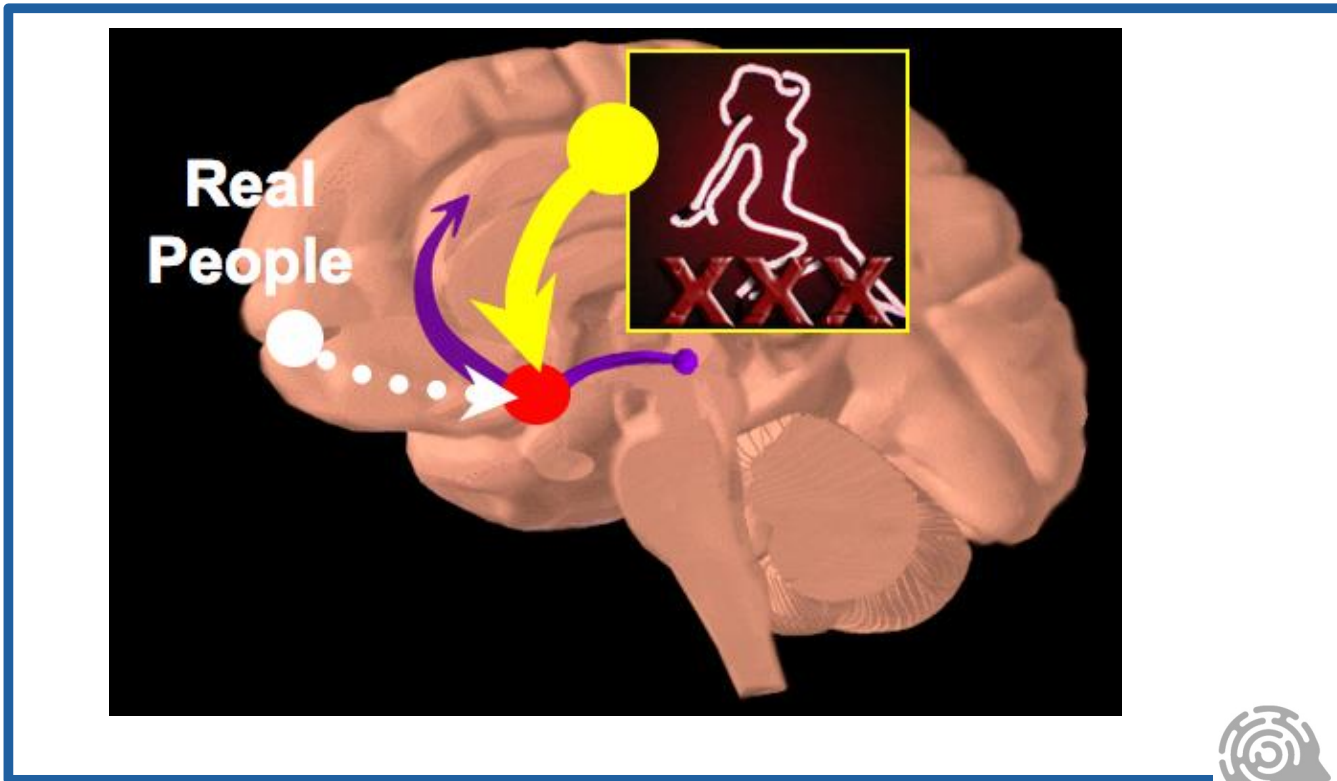
- Another potential problem w/ repeated porn use



Competing sexual pathways

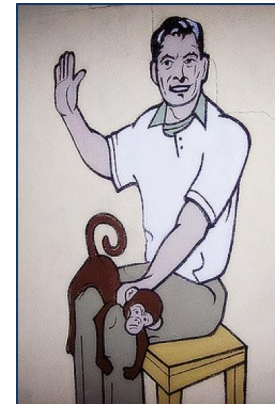


Porn: The preferred pathway



Basic Self-Test for PIED

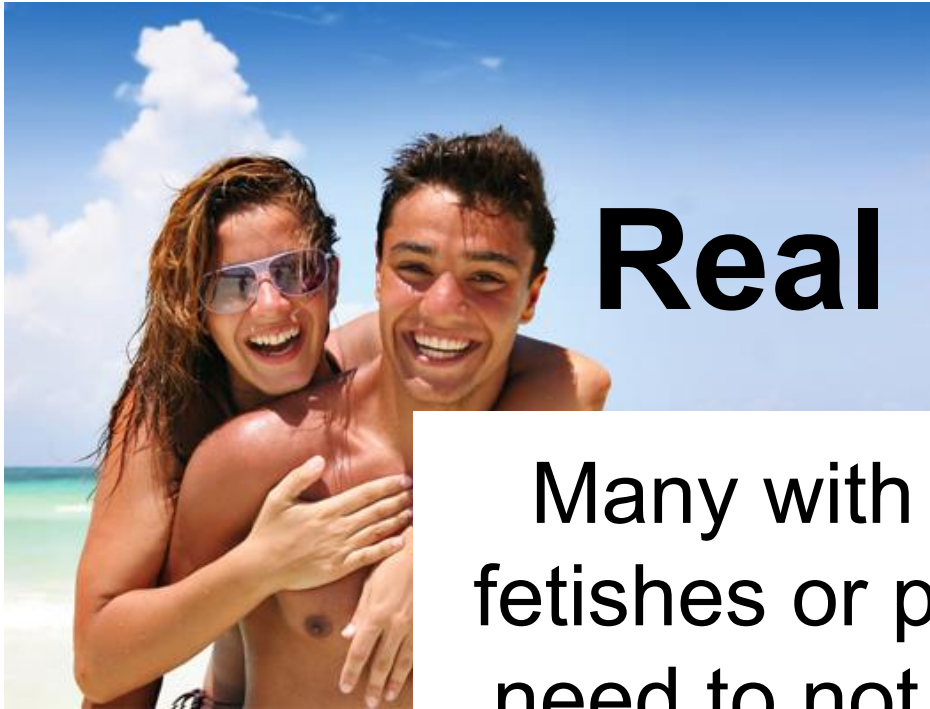
- Step 1: Masturbate to hardcore porn as usual
- Step 2: Attempt to masturbate WITHOUT porn



PIED Recovery Forums

Reboot Nation





Many with porn-induced fetishes or porn-induced ED need to not only stop using porn, they also need to rewire their sexual arousal to real partners.

Porn Addiction Withdrawal Symptoms

- Anxiety
- Restlessness
- Irritability
- Insomnia
- Fatigue
- Poor concentration
- Depression
- Mood swings
- Social isolation
- Headaches
- Severe loss of libido (“the flatline”)



Benefits of quitting may include

- Increases in Energy & Motivation
- Improved Concentration
- Anxiety reduction
- Brain Fog clears
- Start new Hobbies
- Start Dating again
- Go back to School
- Emotional Reconnection
- Newfound Confidence



Video: ASAP Science – Pornography Addiction



FIN

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[Video: Love Child documentary trailer](#)

