Internet Addiction: Epidemiology, Etiology, and Treatment Considerations

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What does this video have to about addiction to technology...?
Lost in Cyberspace...

• Personal/Professional Background

• The Internet & Digital Media Technology, such as the Smartphone is a social-ish activity that is simultaneously socially isolating.

• Can we connect and be disconnected at the same time?
Technology...the knack of so arranging the world that we don’t have to experience it.

-Max Frisco
Myths of Multitasking

1. Multitasking can reduce productivity by approximately 40-percent according to some researchers.

2. Switching from one task to another makes it difficult to tune out distractions and can cause mental blocks that can slow down your progress.

3. It multiplies amount of time that it takes to accomplish any one task.

4. Gen-D kids have false perception of being able to do multiple things at once, but studies have shown that actual comprehension of tasks is reduced by the number of open processing tasks engaged in.
Life has changed: When was the last time you saw one of these?
We currently have no social *Electronic Etiquette*...we don’t really know manage our Smartphone and Internet use: rather it seems to manage us...
Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.

Addiction is characterized by inability to consistently abstain, impairment in behavioral control, craving, diminished recognition of significant problems with one’s behaviors and interpersonal relationships, and a dysfunctional emotional response. Like other chronic diseases, addiction often involves cycles of relapse and remission. Without treatment or engagement in recovery activities, addiction is progressive and can result in disability or premature death.
Major Neuropathways and Brain Centers involved in Addiction.
What makes us Addicted? Our Social Brain: The Neurobiology of Addiction in Psychosocial Context... 90% of people who use mood altering Substances and Behaviors DO NOT get addicted!
There may be an evolutionary/adaptive basis for addictive behavior based on the ancient development of mammalian reward systems in the Mesolimbic system.

The 4 F’s of survival: Feeding, Fighting, Fleeing, and Fornicating are all mid-brain, limbic-based behaviors and all heavily tied to Dopamine pathways. We are wired for pleasure and avoidance of pain.

The neurohormonal pathways from midbrain to frontal cortex are bypassed (shut down) during the high arousal of Hypothalamic-Pituitary-Adrenal Axis and Dopaminergic down-regulation secondary to prolonged dopamine-elevated activities (e.g. intoxicating substances or behaviors and from elevated cortisol from triggers).

There is perhaps an adaptive context to this process in that the bypass of slower processing via frontal cortical executive functions insures survival via rapid stimulus-response limbic-based actions/pleasure responses by shutting down these limbic-frontal cortex connections.

Addiction is more ideally modulated in individuals who have developed secure attachment and social stimulation/supports.

In people with addictions we see the anticipation of potential reward (Elevated Dopamine) evidenced by obsessive thoughts, urges, cravings, and trigger responses, and extinction resistance.
The New Quality Family Time! Sherry Turkle might call this Alone together. Digital Living creates parallel play on a massive cultural scale. Are these people together?
Internet Addiction and Socio-Cultural Factors

• First time is history of modern world where we have a generation raised on digital technology.
• First time ever “broadcast ability” is literally available to anyone with Internet access.
• Digital Technology is a socio-technical form of clothing. Much more personal than a simple communication device. It has become an identity appendage.
• Playing the game is being everywhere but where you actually are in the moment; all electronics seem to move to somewhere other than where actually are.
  (can you really be two places at once!)
• Numbness is good business: Consumerism as modern spirituality
• Connecting vs. Relating
• Being vs. Doing
• Digital=sedentary lifestyle
Anticipatory Dopaminergic Reward
All Addictions, both substance and behavioral, seem to operate in the same manner...
Neuropathways Associated with Addiction

Dopamine Pathways
- Frontal cortex
- Functions:
  - Reward (motivation)
  - Pleasure, euphoria
  - Motor function (fine-tuning)
  - Compulsion
  - Perseveration

Seroetonin Pathways
- Striatum
- Substantia nigra

- Functions:
  - Mood
  - Memory processing
  - Sleep
  - Cognition
Addiction-related brain changes include:

**Desensitization**: (Up-regulation)- More receptors developed- Weakening of circuits related to naturalistic rewards (e.g. food, sex, social/work reward, delayed gratification, etc.):
*Increase or decrease in myelin sheath (white matter) nerve fibers to facilitate the speed of nerve impulses.*

**Sensitization**: (Down-regulation)- Formation of Pavlovian memory circuits related to the addiction reward (Dopamine elevation in Mesolimbic system):
*Increase or decrease in number of dendrites (gray matter): The branch-like fibers are where nerve cells communicate.*

**Hypofrontality**: Weakening of impulse control and prefrontal-inhibitory control circuits:
*Increase or decrease in the number of excitatory or inhibitory synapses: impact executive functioning pathways, information flow, learning and memories. There may be an biologically-adaptive context to this process in that it bypasses slower processing via frontal cortical executive functions; this facilitates pleasurable (adaptogenic) responses via rapid limbic-based behavioral/substance effects by shutting down frontolimbic connections.*

**Altered Stress Response**: CRF, Dysregulation of Amygdala and HPA axis:
*Increase or decrease in neurohormonal regulation and feedback circuits. The neurochemical pathways from midbrain to frontal cortex are partially blocked during arousal of the Hypothalamic-Pituitary-Adrenal Axis and down-regulation secondary to prolonged dopamine-elevated activities (e.g. intoxicating substances or behaviors).*
"Let me guess. Another addicted internet user."
Addiction and Neuroplastic Change

Neuroplastic and neurotrophic mechanisms are at work during brain development, learning, memory formation, as well as in the development of Addictions.

Neuroplasticity works in two directions: it can weaken or delete old connections as well as strengthen or create new connections.

Negotiating these circuits is more ideally modulated in individuals who have secure attachment, stable environment, and social stimulation/supports (not always easy).

Addiction may be, in part, maintained by a Reward Deficiency Syndrome--Normal life seems flat compared to addictive substances and behaviors. With addictions, we see the anticipation of reward (elevated Dopamine) evidenced by obsessive thoughts, urges, cravings, trigger responses and relapse: This is NOT due solely to physiologic dependency and craving--rather addiction is a complex amalgam--a biopsychosocial-spiritual disorder.
Recent Trends in the Neurobiology and Research on Internet Addiction-1

• Dong et al (2012) fMRI used incongruent stroop trials with young Men with IAD showed increased BOLD signal in anterior and posterior cingulate cortices compared with healthy peers. This suggests diminished efficiency of response-inhibition processes in IAD.

• Dong et al (2012) Looked specifically IGA (Internet Gaming Addiction) found that diminished white matter integrity demonstrated with a wide range of other addictive disorders is also present in IGA and the lack of integrity is associated with addiction severity, treatment response and cognitive impairments. Using Diffusion Tensor Imaging (DTI) IGA subjects (n=16) showed higher fractional anisotropy (FA) in the Thalamus and left posterior cingulate cortex (PCC) as compared to controls. Higher FA in the thalamus was associated with greater severity of Internet Addiction. Increase regional FA in individual’s with FA may suggest a pre-existing vulnerability factor for IGA, or may arise...
Recent Trends in the Neurobiology and Research on Internet Addiction-2

• Dong et al (2011) called Internet Addiction the “world’s fastest growing addiction” found in an fMRI study that Internet addicts have increased activation in the orbitofrontal cortex in gain trials (money-like rewards in a game) and decreased anterior cingulate activation in loss trials than normal controls. Study suggests that Internet addicts have enhanced reward sensitivity and deceased loss sensitivity (something we see in other process addictions like gambling).

• Ko, et al. (2011) 3-T fMRI subjects viewed images associated with online games, smoking, and neutral scenes. Found that in both cue induced gaming and smoking urges there was an increased anterior cingulate and parahippocampus gyrus activation. Study suggests that IGA and nicotine dependence share similar mechanisms of cue-induced reactivity over the fronto-limbic network, especially the parahippocampus gyrus
Recent Trends in the Neurobiology and Research on Internet Addiction-3

• In subjects with Internet Addicted (IA) adolescents had lower gray matter density (GMD) changes in the left anterior cingulate cortex, left posterior cingulate cortex, left insula, and left lingual gyrus, when compared to controls using high-resolution T1-weighted MRI using voxel-based morphology. Findings suggest that structural brain changes are present in IA adolescents. The group of impacted structures are all implicated in executive cognitive function (ECF) which govern resolution of conflict, including response inhibition, performance monitoring, implementation of control, and error monitoring. Disruption of these structures could impair an individual’s ability to monitor and inhibit appropriate behavior.

• Kim, et al. (2012) using fMRI found increased activation in the thalamus, bilateral precentral area, bilateral middle frontal area, and areas around the right temporo-parietal junction and that the experience of disembodiment (feeling outside of the physical boundaries of one’s body) is significantly increased in adolescents with IA. Study suggests that IA in adolescents could be unfavorable in their brain development related to identity formation.
Recent Trends in the Neurobiology and Research on Internet Addiction

- Han, et al (2012) compared professional video gamers with patients with on-line game addiction (POGA), and controls using an MRI and voxel-wise comparisons of grey matter. They found the POGA group showed increased impulsiveness and preservative errors, and higher volume in the thalamic grey matter and lower grey matter volume in the inferior temporal gyri, right middle occipital gyrus, and left inferior occipital gyrus. The thalamus is associated with conditioned responses (expectation) and deficits in anterior cingulate function are associated with major depression, ADHD, and impulse control disorders. During on-line game play the higher levels of Dopamine make the thalamus more active which reinforces the behavioral effects of on-line game play and an imbalance of mesolimbic circuits (orbitofrontal gyri, anterior cingulate, ventral striatum, amygdala, and hippocampus) is thought to associated with a distorted reward system.
Kuss and Griffiths (2012) did an exhaustive review of the neurobiological imaging studies on Internet and Gaming addiction. They reviewed 18 studies (some which we have already examined) and found:

1) Compelling evidence for similarities for different types of addiction, notably substance-based and process-based or behavioral addictions such as Internet and Gaming addiction. There were findings of increased glutamatergic and electrical activity on the functional side and evidence of morphometry and water diffusion pointing to changes in brain structure.

2) On a molecular level, Internet Addiction is characterized by an overall reward deficiency that involves decreased dopaminergic activity (down regulation).

3) On a neural circuitry (structural level) Internet and Gaming addiction led to neuroadaptation and structural changes that occur as a consequence of longer elevated activity in brain areas associated with addiction (e.g., limbic structures).
Why is Internet and Smartphone Technology so appealing?

- The shifting of time and space
- Broadcast Intoxication (if not recorded and shared we didn’t really experience it!)
- Mood Altering (Dopaminergic)
- The world’s biggest slot machine (Variable Ratio Reinforcement)
- Efficiency/Easy
- Productivity illusion
- Infotainment (fun)
- Easy access to stimulating content
- Novelty, dynamic, and without boundaries Adventure without risk (virtual excitement)
- Social connection without contact/commitment (less social risk)
Implications of current clinical and Neurobiological research on the treatment of Internet Addiction Disorder

• IA as Part of a “Reward Deficiency Syndrome” caused by a negative down-regulation of dopamine after excessive dopamine release secondary to abnormal neurotransmitter interactions in the mesolimbic system. (Blum, et al (2008).

• Grant et al (2010) look at natural history, phenomenology, tolerance, withdrawal, co-morbidity, overlapping genetic contribution, neurobiological mechanisms and response to treatment strongly suggest that behavioral (process) addiction such as IA resemble substance addictions and that excessive Internet use is indeed an addiction.

• Winkler, et al (2013) found that both pharmacological and psychological treatments were effective in treating IA (time spend online, depression, and anxiety.
Dopaminergic-Serotonergic Neuropathways

Dopamine Pathways
- frontal cortex
- striatum
- hippocampus
- substantia nigra/VTA

Functions
- reward (motivation)
- pleasure, euphoria
- motor function (fine tuning)
- compulsion
- perseveration
- decision making

Serotonin Pathway
- nucleus accumbens
- raphe

Functions
- mood
- memory processing
- sleep
Impaired Frontal-Basal Ganglia Connectivity in Adolescents with Brain activation during response inhibition in the controls and the IA subjects.
Figure 1. Significant between-group differences in functional connectivity between healthy control subjects and those with IGA.

http://journals.plos.org/plosone/article?id-info:doi/10.1371/journal.pone.0059902
Grey matter and Internet Addiction scores

(a) Grey matter volume correlate of the Internet score IAT

(b) Brain region showing functional connectivity of right frontal pole correlated with the Internet score IAT
The current working medical definition is *Pathological Internet Use or Internet Use Disorder*...

**What is an Addiction?**

1. Engaging in intoxicating/pleasurable behaviors that typically alter mood & consciousness.
2. Developing repetitive pattern of excessive use.
3. Negative consequences that impact a major sphere of living
4. The presence of tolerance.
5. Withdrawal-like features.
Cycles of Addiction

Anticipatory Dopamine-release
Reward Expectancy
(mesolimbic activation)

Around and around we go--strengthening of addiction neuropathways

Self-medication of pain/discomfort, e.g. use/abuse of Internet + technology=temporary elevation of Dopamine; Also leads to possible dopaminergic desensitization and down-regulation & other possible neurophysiologic changes.

Increased pain from negative consequences

Shame and Guilt

Negative stimuli (triggers)

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Can you be addicted to the Internet/Smartphone?

The Answer is Yes and Addiction may be, in part, maintained by a Reward Deficiency Syndrome--Normal life seems flat compared to addictive substances and behaviors. With addictions, we see the anticipation of reward (elevated Dopamine) evidenced by obsessive thoughts, urges, cravings, trigger responses and relapse: This is NOT due solely to physiologic dependency and craving--rather addiction is a complex amalgam--a biopsychosocial disorder.
Internet Addiction: What is the Underlying Problem?

I'm addicted to the internet because it's more interesting than people.

Is there a pill you can give to everyone else to make them more interesting?

Doctors never want to treat the underlying problem.
What you see online is not always what you get...
Dot.Comfort: Our latest E-ddiction!
The shorter the time between introducing an intoxicating drug or behavior into our nervous system the more addictive that drug or behavior is...
Key Findings

• **17%** report feeling preoccupied with the Internet.

• *Nearly 6%* meet the criteria for Compulsive use of the Internet. Worldwide studies range between **2 & 12%**.

• Over **11%** of those surveyed report feeling restless or irritable when attempting to decrease or stop their Net use.

• **72%** of those surveyed use the Internet at work and about **33% of the time** spent online is during work hours.

• In another study we found an average of 1-2 hours a day while at work spent doing non-work related activities.

• Nearly **30%** admit to using regularly using the Internet to alter their mood..They use the Net like a Drug to elevate their mood, combat boredom, or reduce stress.
12 factors that contribute to the addictive power of the Internet

- **Accessibility**: The Internet never closes & easily accessible.
- **Intensity & Stimulation**: Content intoxication.
- **Novel and Dynamic**: Always changing and new.
- **Time Distortion**: (Dissociation) We loose track of time & cannot judge our own use.
- **Means of Connection**: Albeit tempered and one step removed.
- **Perceived Anonymity/Fantasy Play**: Be anyone we want!
- **Disinhibition**: We seem to feel free to be more revealing and some describe accelerated intimacy.
- **The Story without an End**: Information is available with no boundaries.
- **Cost**: The Internet provides inexpensive entertainment.
- **Instant Gratification**: The quicker we get reinforced or rewarded the more addictive it becomes…shorter latency=more addictive
- **Interactivity**: We control and guide the whole process.
- **Variable Ratio Reinforcement Schedule**: Dopaminergic enervation fueled by operant and classically conditioned responses (high extinction resistance).
The Internet seems to change who we think we are...
Here are the estimates of what gets crowded out. Each additional minute of time spent online is correlated with 0.27 fewer minutes working; 0.28 fewer minutes spent on other leisure activities, mostly watching television; 0.12 fewer minutes sleeping; and 0.05 fewer minutes socializing offline.
TIME

HALF THE WORLD IS NOT ENOUGH

MARK ZUCKERBERG'S PLAN TO GET EVERY HUMAN ONLINE

by Lev Grossman
Social Media: America's New Pastime...

There are still some aspects of Facebook's Terms of Service that bother me...

You agree to waste precious and valuable time searching for new friends and also boring the daylights out of the friends you currently have with the most mundane details of your sad, sad life...
Nora Volkow, director of the National Institute on Drug Abuse, says she plans to begin research on the topic in the next few months, and will convene a group of scholars in April to discuss it. The possibility that smartphones were contributing to a decline in drug use by teenagers, Dr. Volkow said, was the first question she asked when she saw the agency’s most recent survey results. The survey, “Monitoring the Future,” an annual government-funded report measuring drug use by teenagers, found that past-year use of illicit drugs other than marijuana was at the lowest level in the 40-year history of the project for eighth, 10th and 12th graders.

Dr. Volkow described interactive media as “an alternative reinforcer” to drugs, adding that “teens can get literally high when playing these games.”

Dr. Silvia Martins, a substance abuse expert at Columbia University who has already been exploring how to study the relationship of internet and drug use among teenagers, called the theory “highly plausible.”

“Playing video games, using social media, that fulfills the necessity of sensation seeking, their need to seek novel activity,” Dr. Martins said, but added of the theory: “It still needs to be proved.”
Neurobiological, Physical, and Psychological effects of chronic tech use?

- Shortened attention span
- Impatience and instant gratification
- Distraction issues (driving)
- Multitasking myths
- Sexual Desensitization and pornification of sex
- Physiological and health effects: obesity, sedentary behavior, DVT’s, repetitive motion injuries, eye strain, possible grey & white mater brain changes, dopamine down-regulation/depletion, porn-induced ED, hypertension
- Tech stress syndrome: elevated cortisol levels
- Dopamine down regulation & withdrawal.
- Sleep and circadian rhythm disruption.
- Relationship impact (talk less, less interpersonal skills, real-time living deterioration)
- Decreased academic and work productivity
Modern Technology Adds to Worldwide Obesity Woes: Report
As countries gain information and communication advances, populations pack on pounds, research shows
August 23, 2012
Spending on Tech = More Obesity

Lots of things are making people fat — what we eat, how we eat and a lack of exercise. Now a report tries to tease out the precise effect of technology such as the TVs and computer screens that keep us sitting still instead of moving around.

It comes up with a surprisingly consistent statistic: For every 10 percent rise in what a country spends on information and communications technology, there’s a 1 percent increase in obesity rates.

Technology doesn’t just keep people in their chairs and on sofas, according to the report from the nonprofit Milken Institute. It changes the way people eat, also — adding even more pounds than the lack of exercise alone would.
Teens who spend hours on the internet may risk suffering from high blood pressure and weight gain, according to researchers. Researchers found that teens who spent at least 14 hours a week on the internet had elevated blood pressure and of 134 teens described by researchers as heavy internet users, 26 had elevated blood pressure. This is said to be the first study to link time spent on the internet and high blood pressure.

The findings add to growing research that had shown an association between heavy internet use and other health risks such as addiction, anxiety, depression, obesity and social isolation, researchers said. "Using the internet is part of our daily life but it shouldn't consume us. In our study, teens considered heavy internet users were on the internet an average of 25 hours a week," said Andrea Cassidy-Bushrow, a researcher at Henry Ford's Department of Public Health Sciences, PTI reported.

- See more at: http://www.domain-b.com/technology/Health_Medicine/20151010_internet_users.html#sth_ash.7WbKjYNn.dpuf
My 19 year old daughter just withdrew from Oral Roberts University because she had become depressed and was isolated in her room with her laptop and just quit going to class or doing her homework. She had a full scholarship and was on debate team. She has given all of this up to come home and take a mental break?? She says she is not sleeping, not motivated and does not care about school anymore. She is not taking showers and her room is littered with red bull and snack wrappers.

Mary was an outgoing girl in ninth grade. She fell off a horse and had to have surgery for a herniated disc. During the next four years she had a lot of pain and stayed in bed a lot. She started using the laptop for homework?.. but she fell behind in school. She was always tired but we found her on the laptop and phone late at night until three or four. She could not get up to go to school the next day. She became increasingly depressed and withdrawn. She became more agitated and irritable.
The Different Forms of Excessive Internet use

• Surfing/You Tube (Infotainment)
• Social Media (Facebook, Twitter, Instagram)
• Smartphones
• Texting
• Pornography, Cybersex, webcam use
• Shopping
• Gaming (console, hand-held, smartphone, computer/tablet)
• Online Gambling
Diagnostic Considerations:

• Currently there is no medically agreed upon definition of compulsive Internet use, abuse or addiction. Questions of whether it is a form of compulsion, impulse control disorder or a distinct process addiction are still being considered.

• It is probable that there are numerous sub-types of Internet abuse and compulsive behavior.

• APA’s recent provisional inclusion in DSM-V of Internet Gaming Behavior is a significant start.

• Most mental health and addictions professionals view Internet addiction or online behavior as real and significant treatment issue.

• Scales and Screening Instruments.
Warning signs of Child/Adolescent Digital Technology Use/Abuse

• (-) change in school/work behavior

• (-) change in social/familial involvement (e.g., Isolation and withdrawal—remember all digital /gaming technologies have the potential to isolate users.

• (+) change in time spent online, phone, computer, game device or console game.

Note: There are socially-adaptive, and normative aspects to gaming, texting, tweeting, messaging and social networking sites.
Assessment and Diagnosis of Internet, Digital Media, Gaming, and Smartphone Use

- Not an exact science
- Clinical Interviewing (motivational Interviewing/Enhancement)
- Collateral Interviewing (Family, School, Employer)
- Screening Tests (Adapted Gambling Criteria, etc)
- Behavioral Sequelae
The Differential Diagnosis and Co-Morbidity

• In some cases there may be a pre-existing sexual compulsion/addiction (more typical in older adolescents and adults)

• Numerous studies and antidotal reports have correlated IUD with a variety of psychiatric disorders and conditions.

• Other problems may include: Online Gambling or Sports betting, Compulsive Shopping, and social/interpersonal problems (social anxiety) that should be evaluated. These can be concomitant or resultant.

• Mood disorders, Impulsive and Oppositional Disorders, OCD, ADD/ADHD, Spectrum issues and Substance/alcohol abuse patterns should be assessed. In Gaming addiction I rarely see Etoh/SA issues in adolescent population.

• A standard work-up should include questions about gaming, Internet, and technology use.
### DSM-IV Inclusion Criteria for Pathological Gambling

(maladaptive gambling behavior as indicated by 5 or more of the following)

1) Is preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)

2) Needs to gamble with increasing amounts of money in order to achieve the desired excitement

3) Has repeated unsuccessful efforts to control, cut back, or stop gambling

4) Is restless or irritable when attempting to cut down or stop gambling

5) Gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)

6) After losing money gambling, often returns another day to get even (“chasing” one’s losses)

7) Lies to family members, therapist, or others to conceal the extent of involvement with gambling

8) Has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling

9) Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling

10) Relies on others to provide money to relieve a desperate financial situation caused by gambling

### Virtual Addiction Survey’s Internet Addiction Inclusion Criteria

(maladaptive Internet use as indicated by 5 or more of the following)

1) When not online, do you experience a feeling of preoccupation with the Internet or computers, a tendency to think about or relive past Internet experiences, a need to plan your Internet experience or think of ways to get access to the Internet in the future?

2) Do you experience a need to spend greater amounts of time on the Internet to achieve satisfaction similar to previous events?

3) Have you experienced repeated unsuccessful efforts to control, cut back, or stop using the Internet?

4) Do you experience a feeling of restlessness or irritability when attempting to cut back or stop using the Internet?

5) Do you use the Internet as a way to escape from problems or relieve a bad mood, feelings of helplessness, guilt, anxiety, or depression?

6) Spending what you consider an excessive amount of time on the Internet and vowing not to do so the next day, do you find yourself back the next day or soon after?

7) Do you find yourself lying to family members, therapists, or others to conceal the extent of your involvement with the Internet?

8) Do you find yourself committing illegal acts related to Internet use?

9) Do you find yourself jeopardizing or losing a significant relationship, job, educational or career opportunity because of your Internet use?

10) Do you find yourself relying on others to provide you with resources to continue to access the Internet?
Internet Addiction Scale (IAS)

1. Preoccupied with Internet when not online
2. More time needed to achieve satisfaction
3. Repeated efforts to limit or stop going online
4. Restlessness when attempting limit or stop
5. Using Internet to escape problems or moods
6. Excessive time online with repeated vows to stop
7. Lying to others about use of the Internet
8. Illegal acts related to the Internet
9. Jeopardizing significant others and vocation/school
10. Relying on others for access to the Internet
Internet Addiction as a Primary Versus Secondary Disorder

• Depending upon the type of Internet Addiction there may be more or less concomitant and co-morbid issues.

• In Computer, Video, and Internet Gaming addictions there is very high co-morbid presence of ADD/ADHD, as well as LD and Spectrum Disorders.

• We also often see oppositional-defiant, impulse control an explosive disorders along with various mood disorders.

• Anxiety appears to almost always be present in addictions, and Internet addiction seems to be no exception, and therefore needs to be treated.

• Like in all addictions, there are negative sequelae from the addiction and the addiction is often started or maintained as a self-medication method of numbing and managing negative emotions.
Current Proposed DSM-V Criteria for Internet Gaming Disorder

1. Preoccupation with Internet games.
2. Withdrawal symptoms when game device or access is removed.
3. Tolerance as noted by requiring increasing amounts time on the Internet or game [or increasing simulation levels].
4. Unsuccessful attempts to cut back, limit, or control use of the Internet or gaming.
5. Loss of Interest in previously hobbies, interests, academic or vocational functioning.
6. Continued use and abuse of Internet (gaming) despite awareness of psychosocial problems resulting from excessive use.
7. Lies and deceives others about Internet us patterns and behaviors.
8. Use of Internet games to escape or relieve negative mood.
9. Has jeopardized or lost a significant relationship, job, educational, or career opportunity secondary to use or abuse of the Internet or Internet gaming.
ADD/ADHD and IUD

• My clinical and anecdotal findings demonstrate a near perfect correlation between IAD of the Video/Computer Gaming sub-type and ADD/ADHD.

• Cao, et al (2007) Looked at IAD as Impulse Control Disorder versus a Behavioral/Process Addiction and found + correlation between measured and self-reported impulsivity and severity of IAD.

• Dong, et al (2010, 2011) found less efficient inhibitory processes in the IAD group; suggested by longer peak latency & higher amplitude on a go/no go task; this suggests support of reduced inhibitory processing in gamers which is similar to the neurobehavioral presentation of impulsivity found in ADD/ADHD.

• It is interesting to note that a chief hallmark of IAD is disinhibition.
Impatience meets habitual mouse use...
Etiology

The etiology and clinical course of IUD is not standardized although the DSM-V along with several recent studies have begun to identify several key and consistent factors that appear to reflect consistent signs and symptoms.
Why is he jumping up and down?

More serious question: Can we really virtually experience reality...real intimacy, connection, ourselves & others...our very humanity or are we experiencing something new, something different; a new state of being.
There are numerous models for the etiology of IUD:

1. The cognitive-behavioral model (Davis, RA 2001),
2. The anonymity, convenience, and escape model (Young, KS, Griffin-Shelley E., Cooper, A, O'Mara J., & Buchanan, J., 2000).
3. The access, affordability, and anonymity-an early models espoused by Cooper, A., Putnam, DE, Planchon, & LA, Boies, SC (1999),
4. The Phases model of pathological Internet use (Grohl, 1999),
5. The more comprehensive models of pathological Internet and digital media use discussed by Winkler & Dorsing (2011) where sociocultural acceptance, demographic access factors, genetic predisposition, abnormalities in neurochemical processes. psychological predispositions, including personality characteristics.
6. Greenfield (2010) offers a detailed model that encompasses neurobiological and neurochemical factors: including dopaminergic innervation, depletion, and down-regulation; social (virtual rehearsal of social competence) and accessibility factors, and reinforcement/reward circuit activation secondary to a variable ratio schedule.
Genetics and Epigenetics

• Lee et al (2009) compared healthy controls to adolescents with IUD and found genetic polymorphisms of the serotonin transporter gene. Excessive Internet users had higher frequencies of the long-arm allele (SS-5HTTLPR).

• The study suggests that IUD patients may have similar genetic and personality characteristics to depressed patients but the question remains as to whether increased in BDI and harm avoidance scores found in this study are a result of excessive Internet use as opposed to a cause of such use.

• I question ADD/ADHD as a possible epigenetic factor.
We are genetically and neurobiologically predisposed to socially connect and communicate

• The question is whether virtual communications are as healthy as real-time relationships.

• I believe all communication technologies are attempts to connect to others more efficiently, but perhaps with a cost of less depth and quality.

• Does the Internet affect our ability to judge and obtain social cues?

• There is growing evidence that excessive or repetitive use of the Internet can alter brain structure and function.
Staying connected at Starbucks during power outage in Connecticut
Epidemiology and Prevalence

• Studies vary from 2% -15% (see references for lists of studies)
• Limited by operational and diagnostic definition of IUD
• Probably exists on a continuum from recreational/social use to compulsive use with features similar to other addictive disorder.
Internet Addiction in China: The United States may not be far behind...
Worldwide Internet Addiction Statistics

7% of Chinese elementary and middle school students suffer from internet addiction. The rate is higher in males (10%) than in females (4%). The rate is higher for rural students (8%) than for city students (5%). Liu et al., 2010

Only 1% of college-level introductory and abnormal psychology books make reference to internet addiction. Mossbarger, 2008

Adolescents who play more than one hour of console or Internet video games may have more or more intense symptoms of ADHD or inattention than those who do not. Chan et al., 2006

15% of MMORPG players meet the criteria for Internet addiction. Less than 1% of the players surveyed indicated that they have sought professional help for Internet addiction. Parson, 2005

• 18% of British students were considered to be pathological internet users, whose excessive use of the internet was causing academic, social, and interpersonal problems. Students addicted to the internet were found to have lower self-esteem than other students. Niemz et al., 2005

• 84% of college counselors "agree" or "strongly agree" that Internet Addiction Disorder is a legitimate disorder. 93% of college counselors have "some, but not sufficient training" or "no training" on diagnosing internet addiction disorder. 94% of college counselors have "no training" or "some, but not sufficient training" on the treatment of internet addiction disorder. Venturini, 2005

Among daily users of the internet, 5% of boys and girls from Finland were classified as being addicted to the internet. Kaltiala-Heino et al., 2004

• Greenfield found approximately 5.9% met criteria for compulsive Internet use (Internet Addiction based on adapted criteria from DSM V pathological gambling (Greenfield, D. N. (1999) Psychological Characteristics of Compulsive Internet Use: A Preliminary Analysis. CyberPsychology and Behavior, 8, Number 5.).)
• In a Chinese study, teens classified as highly addicted to the internet were twice as likely to also display self-injurious behavior. Xie et al., 2010

• 1.5% – 3.5% of German teens show signs of internet addiction or excessive use. Among these adolescents, internet addiction is correlated with higher rates of depression, anxiety, and lower school achievement. Peukert et al., 2010

• The prevalence rate of Internet addiction for studies published in North America and Europe ranges from 1.5% to 8.2%. Weinstein et al., 2010

• In 2005, just 9 - 15 million people in the United States used the internet every day. Every three months the rate of use was increasing by 25%. Wieland et al., 2005

• Internet users in Greece have an internet addiction prevalence rate of 8.2%. Most internet addicts are males who play online games and access internet cafés. Konstantinos et al., 2008

• 10% of South Korean youth are considered to be at high risk for internet addiction. Park et al., 2009

• In addition to demonstrating other criteria, it has been proposed that a diagnosis of internet addiction must include symptoms for at least 3 months and at least 6 hours of non-essential internet use per day. Tao et al., 2010

• 96% of teenagers in China use IM and 10% can be classified as IM addicts. Leund et al., 2009

• 41% of self-selected online gamers play video games to escape and 7% are classified as being at risk of developing a psychological and behavioral dependence on online computer games. Hussain et al., 2009

• 1% of Norwegians are addicted to the internet. An additional 5% are at risk of developing internet addiction. The highest rate of addiction is in the 16-29 year old group (4% addicted, 19% at risk). Bakkan et al., 2008

• 11% of South Korean students are considered to be at risk for internet addiction. Park et al., 2008

• The prevalence of problematic internet use among South African technology workers is 4% (compared to 2% of a control group of non-IT workers). Thatcher et al., 2008
# Internet Addiction Prevalence

<table>
<thead>
<tr>
<th>Supporting research</th>
<th>Prevalence</th>
<th>95% CI</th>
<th>Prevalence time frame</th>
<th>Country</th>
<th>Assessment Instrument</th>
<th>Validated</th>
<th>Sample information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rücker et al⁹⁹</td>
<td>11.7%</td>
<td>(11.4–11.9)</td>
<td>Not specified</td>
<td>Switzerland</td>
<td>IAT</td>
<td>Yes</td>
<td>3,067 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Blinka et al⁰⁰</td>
<td>1.4%</td>
<td>(1.3–1.5)</td>
<td>Not specified</td>
<td>25 European countries ⁵</td>
<td>EIU</td>
<td>No</td>
<td>18,709 nationally representative sample of community-based adolescents</td>
</tr>
<tr>
<td>Evren et al⁰¹</td>
<td>15.96%</td>
<td>(15.7–16.1)</td>
<td>3-month</td>
<td>Turkey</td>
<td>BAPINT-SV</td>
<td>No</td>
<td>4,957 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Ha and Hwang⁰²</td>
<td>2.8%</td>
<td>(2.7–2.8)</td>
<td>Not specified</td>
<td>South Korea</td>
<td>KS scale</td>
<td>Yes</td>
<td>56,086 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Heo et al⁰³</td>
<td>2.8%</td>
<td>(2.7–2.8)</td>
<td>Not specified</td>
<td>South Korea</td>
<td>KS scale</td>
<td>Yes</td>
<td>57,857 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Kaess et al⁰²</td>
<td>4.2%</td>
<td>(4.0–4.3)</td>
<td>Not specified</td>
<td>11 countries ⁶</td>
<td>YDQ</td>
<td>No</td>
<td>11,356 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Király et al⁰²</td>
<td>15.5%</td>
<td>(15.2–15.7)</td>
<td>Not specified</td>
<td>Hungary</td>
<td>PIUQ-6</td>
<td>No</td>
<td>2,073 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Li et al⁰³</td>
<td>11.7%</td>
<td>(11.6–11.7)</td>
<td>Not specified</td>
<td>People’s Republic of China</td>
<td>YDQ</td>
<td>No</td>
<td>24,013 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Lin et al⁰⁹</td>
<td>18.7%</td>
<td>(18.5–18.8)</td>
<td>Not specified</td>
<td>Taiwan</td>
<td>CIAS</td>
<td>Yes</td>
<td>9,510 nationally representative sample of school-based adolescents</td>
</tr>
<tr>
<td>Rumpf et al⁰⁸</td>
<td>1%</td>
<td>(0.8–1.1)</td>
<td>Not specified</td>
<td>Germany</td>
<td>CIUS</td>
<td>Yes</td>
<td>8,132 nationally representative community-based sample</td>
</tr>
<tr>
<td>Titaika et al⁰⁶</td>
<td>1.2%</td>
<td>(1.0–1.3)</td>
<td>Not specified</td>
<td>7 European countries ⁷</td>
<td>IAT</td>
<td>Yes</td>
<td>13,284 random sample of school-based adolescents</td>
</tr>
<tr>
<td>Wartberg et al⁰⁷</td>
<td>3.2%</td>
<td>(2.8–3.5)</td>
<td>Not specified</td>
<td>Germany</td>
<td>CIUS</td>
<td>Yes</td>
<td>1,744 nationally representative sample of school-based adolescents</td>
</tr>
</tbody>
</table>
Three Components to Pre-Treatment

1. Identify where the problem is held within the patient, family, of other system/institution?
2. Determine if you have a “customer” and how you can create alignment for healing process, e.g. “Readiness for Change”.
3. Create motivation, positive expectancy, and congruence to create change, e.g. Motivational Interviewing and Enhancement.
Parents are unprepared to deal with how involved their kids are with the Internet and Digital Technology.

Parents are a key factor in any successful treatment plan for most younger patients.

First time in history where a generation has more knowledge than its predecessors.

Reversal of generational hierarchy and Power/knowledge imbalance in families.
### Readiness for Change

<table>
<thead>
<tr>
<th>State</th>
<th>Instructional strategies</th>
</tr>
</thead>
</table>
| **Precontemplation**  
No intention of taking action in the next 6 months | • Engage the individual with information about need for change  
• Provide personalized information about risks if no change and benefits of change |
| **Contemplation**  
Intends to take action in the next 6 months | • Motivate and encourage the individual to set goals and make specific plans |
| **Preparation**  
Intends to take action in the next month and has taken some steps to change behavior | • Help the individual create and implement specific action plans and set realistic goals |
| **Action**  
Has changed behavior for <6 months | • Provide problem-based (action-oriented) learning experiences  
• Provide social support, feedback |
| **Maintenance**  
Has changed behavior for >6 months | • Continue to provide social support, assist with problem-solving, positively address slips and relapses if necessary  
• Employ reminder systems/performance support tools |

PMID: 1329589.
Readiness for Change (detailed)

**Precontemplation** - Not currently considering change: "Ignorance is bliss"
Validate lack of readiness. Clarify: decision is theirs and encourage re-evaluation of current behavior; Encourage exploration, not action. Explain and personalize the risk.

**Contemplation** - Ambivalent about change: "Sitting on the fence" Not considering change within the next month Validate lack of readiness.
Clarify: decision is theirs. Encourage evaluation of pros and cons of behavior change; Identify and promote new, positive outcome expectations.

**Preparation** - Some experience with change and are trying to change: "Testing the waters" Planning to act within 1 month Identify and assist in problem solving re: obstacles.
Help patient identify social supports. Verify that patient has underlying skills for behavior change; Encourage small initial steps.

**Action** - Practicing new behavior for 3-6 months.
Focus on restructuring cues and social support. Bolster self-efficacy for dealing with obstacles; Combat feelings of loss and reiterate long-term benefits.

**Maintenance** - Continued commitment to sustaining new behavior Post-6 months to 5 years.
Plan for follow-up support. Reinforce internal rewards. Discuss coping with relapse.

**Relapse/Resumption** - of old behaviors: "Fall from grace“.

What is Motivational Interviewing and Motivational Enhancement?

To first be clear........

“Motivational Interviewing is NOT a way of tricking others people into changing; it is a way of activating their own motivation and resources for change.”

Miller & Rollnick, 2013
What is **Motivational Interviewing** and **Enhancement**? And how can it help in facilitating **Harm Reduction** in our patient’s with Addictions.

---

**Motivational interviewing: an example**

Imagine you are about to sit down with a patient who smokes and suffers from chronic conditions such as hypertension or diabetes. How would you approach the conversation?

1. **Express empathy**
   
   “So what I hear you saying is that you are tired of being lectured about smoking. Tell me more about why you feel this way.”

2. **Develop discrepancy**
   
   “What are your goals for the future? How do you see smoking fitting in with your aspirations?”

3. **Avoid arguments**
   
   “The single best thing you can do for your health is to quit smoking, and I’m here to help you when you’re ready.”

4. **Roll along when resistance comes**
   
   “It sounds like you have thought of a lot of possible stumbling blocks to cutting back your smoking. What could be some of the possible solutions?”

5. **Support self-reliance**
   
   “I’m really impressed that you are thinking about cutting back on smoking. I want you to know that I believe you can do it. Let’s plan to meet in a month to see how things are going.”

---

Source: Miller W, Rollnick S. “Motivational Interviewing: Preparing People to Change Addictive Behavior.”
The Tx Plan & Goals of treatment: Abstinence versus Moderated or Mindful use...

• Difficult to achieve abstinence with Internet technology
• Moderated use through Tx & external controls: manage the problematic content
• Modified use via behavioral and neurobiological re-patterning (Identifying & changing the trigger/urge response pattern.
• Desensitize urges/craving utilizing EMDR
• Reestablish dopaminergic balance
• Develop situation-dependent appropriate use.
• Treat social anxiety/skills deficits and create real-time alternate behaviors.
• Relapse prevention strategies
Specific Treatment Interventions

1. Determine level of motivation of patient—who is the “customer” and is buying-in.

2. Structure interventions based on realistic motivation and resources.

3. Always understand the developmental and psychosocial context of the symptom, e.g., Why now? What stresses are going on in child’s/adolescent’s life? Social/peer issues?

4. Family re-education, re-empowering the parents re: boundaries/limit setting and management of family technology (parenting skills), modifying/controlling use/abuse pattern, marital/relationship counseling, medications, reward contingencies, induce incentives to real-time living.

5. Key: Parental involvement is essential for successful outcome.
Pharmacological Treatments

• Alpha and Beta Adrenergic Blockers to Tx social anxiety (Propranolol, Clonidine, Trazodone, Prazosin)
• Mood Stabilizers (Tegretol, Gabapentin)-not well studied
• Anti-Depressants: SSRI’s of limited use with other addictive and impulsive behaviors but + when with OCD features. Bupropion however shows some promise with reduced cravings for Internet gaming. Neuroimaging shows decreased activity in L.OL, L. Dorsilateral prefronatal cortex & L. parahippocampal gyrus.
Pharmacotherapy

• Opioid receptor blockers (Naltrexone); borrowed from success with pathological gambling where impacting the mesolimbic dopaminergic pathway where they inhibit dopamine release in the nucleus accumbens

• Psycho-stimulants for very common for concomitant ADD/ADHD (Concerta, Focalin, Ritalin, Adderall)
Pharmacotherapy

• Antipsychotics: some evidence to suggest efficacy with the OCD and Impulse control component of Internet/Gaming Addiction.

• Medications more typically useful when there are co-morbid or co-occurring disorders and are not primary therapy for Internet Addiction.

• Pharmacotherapy still has few evidence-based treatments, but more exciting work.
Specific Treatment Interventions

1. Determine level of motivation of patient—who is the “customer” and is buying-in.

2. Structure interventions based on realistic motivation and resources.

3. Always understand the developmental and psychosocial context of the symptom, e.g., Why now? What stresses are going on in child’s/adolescent’s life? Social/peer issues?

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5. Key: Parental involvement is essential for successful outcome.
Creating a Digital Diet: Balancing our Use of Internet and Digital Media.

• Set limits for use (remember we dissociate and distort time on-line & Smartphone).
• Use external apps and software and settings to limit, block, or manage your time on Internet, Smartphones, or other digital media.
• Tech-lite days...
• Don’t sleep with phone near bed or under pillow.
• No Digital/screen media 60 minutes before bed!
• Develop alternate real-time living strategies.
• Change habits of use, e.g. only surf, check email, check social media a set # of times per day.
• Place computer whenever possible in public places and no laptops, ipad’s, smart phones, or tablets in bedroom
• More real-time living!
Treatment Pragmatics

• ICD and DSM Coding
• Fees
• Insurance Reimbursement
• Inpatient, Residential, IOP or OP?
• Tech Consultation
• Referral
• US treatment options and resources
In order to reach our Digital Youth we need peer-to-peer communication have to have an impact...
Monitoring, Filtering, and Blocking

• Almost always a necessary component of Tx, especially in detox period and to prevent relapse and sustainable/mindful use.
• Not a “magic solution” but rather means to delay access for enough time for frontal lobe executive functions.
• Needs to performed by someone with a sophisticated computer background (typically not parents)
• This approach helps support “managed or moderated use”
CITA Intensive OP Treatment Model

Background/History
• Assess/diagnose use and specifically review Video Game, Computer, and Internet use patterns.
• Establish an overall analysis of virtual addiction℠ (Video Game, Computer, and Internet) behavior.
• Detailed psychosocial, educational, and medical history.
• Address underlying and concomitant psychological and psychiatric issues that might be contributing to the addiction cycle, e.g. ADD/ADHD.

Evaluation/Assessment of other addictive and compulsive behavior patterns, e.g. substances, alcohol, food, gambling, shopping, pornography, etc.
• Understand established emotional and physical triggers for use and abuse found in the addictive gaming pattern.
• Assessment of guilt and shame repetition patterns in the addiction cycle.
• Address the negative social, educational, and interpersonal consequences of computer and video gaming behavior.

Insight/Therapy
• Develop an understanding of the basic hormonal and neurochemical contributions to addiction and pleasure seeking behavior; learn how the Amygdala in the brain and the neurotransmitter dopamine operate to facilitate this addictive cycle—understand the neurological reward pathways.
• Understand role of stress as a trigger and how elevated levels of the neuro-hormone cortisol can increase addictive behavior.
• Develop an understanding the neurobiology of addiction in order to create changes in the deep patterns of behavior and neural habits through the use of EMDR® technology.
• Re-train the cycle of urges and cravings. Learn how to manage emotional disequilibrium and re-gain homeostasis (balance) without gaming.
• Learn to manage and emotions and to metabolize triggers such as boredom, anxiety, fear, frustrations, ease-of-access, peer pressure, feelings of accomplishment and mastery, anger, family discord, and ADD/ADHD issues.
• Desensitize trigger response patterns using various psychological, physiological, and EMDR® strategies.
• Examine and understand how psychobiological factors (operant conditioning and dopamine) impact video and computer gaming addiction and how to manage/limit, and control the impact of desire and use patterns.
• Learn concepts of people, places, and things and a deeper understanding of unconscious trigger patterns and how to changes those patterns that feed the addictive cycle.
• Use appropriate adjunctive pharmacotherapy for co-morbid or resulting psychiatric symptoms.

Promote/Support
• Identify community resources and supports; include various 12-step and other support options; options for professional follow-up and therapy.
• Develop a relapse prevention plan and develop support strategies and crisis techniques to prevent or address relapse.
• Address and develop plans for impacted social, vocational and marital/family relationships.
• Develop computer/smartphone and other technology blocks/Filtermonitors to help limit access to Video Game, Computer, and Internet use.
• Create a real-time life plan to “Plug back in life”.
• Discuss Gaming abstinence vs. moderated use: pros and cons.
• The use of the Real-Time100 list℠: identity 100 non-tech things they can do and then use these strategies as alternative to trigger responses when urge to game or go online presents itself.
Research on Treatment of IAD

• Psychological vs. Pharmacological treatment compared in a meta-analytic review found psychological treatment more effective than pharmacological treatment. (Winkler et al, 2013).

• CBT was effective when depression and/or anxiety were co-morbid factors.

• Research comparisons are difficult as to date there are only a handful of IA treatment studies and many have co-morbid psychiatric Sx as either a cause or effect of IA.
Dr. Greenfield introduced me to the truth behind video gaming...

“There was a time in my life where I would have considered myself to be the doormat of the social universe. Many events like Christmas parties, family dinners, and nights out with friends so that I could squeeze in a couple more hours on my favorite games. I had passed up trips to the zoo, dinners at nice restaurants, poker nights with the guys, and even when there were things I wanted to do outside gaming – I would sometimes forget. Upon hours and hours of time I had relinquished to someone else’s created world. I realized that I had completely lost time with everything that was and remains important in my life. I had to do something. But that something was not something I could do on my own. Dr. Greenfield introduced me to the truth behind video gaming, and with his program successfully pushed me out of the competitive, manipulative addictive world I was living in. I now see that there’s a bigger picture and that’s not simply a metaphor. The world is in fact much bigger than a 17” screen. The only world that truly provides us with endless possibilities”.
8.5 percent of U.S. youth addicted to video games, study finds
What about Internet Gaming makes it so powerful?

- Gaming is *all pleasure center* and it appears that frontal-lobe reasoning may be diminished. Don’t forget frontal/executive functions are already under-developed in kids under their early 20’s.

- **Short Latency**---The addictive potential of a substance is determined by the speed of absorption into the body or the speed of reinforcement received.

- The Internet, and particularly, gaming operate on a *Novelty & variable ratio reinforcement schedule*, and are therefore highly resistant to extinction.

- **Time Distortion/Dissociation**: No child or adolescent can accurately judge how much time he or she spends in a game and at the addicted level they have little control. They will tell you they will be done in a minute, but that minute never ends.
Gaming: A View from inside a Internet cafe
Gaming too close to reality...Love Child
Why do we Love Computer, Video & Internet Gaming

- Personal Competence (a place to excel and accomplish)
- An neurobiological Slot Machine (variable ratio reinforcement schedule—the rewards are unpredictable in content, strength, and frequency)
- Persona and Shadow (our avatars help us find and express disconnected aspects of our personality—fantasy is an aspect if our inner reality.
- Adventure without risk (virtual excitement)
- Social connection without contact/commitment (away from social anxiety) Socially interactive (networked and Internet based games)
- Fun & Excitement
- Challenge (a way to push one’s limits)
- Multimedia (stimulating content)
- Immediate Gratification (you get results right way!)
- Convenient (play virtually anywhere/anytime!)
- Relatively inexpensive entertainment
- Assessable (computers, Internet, and portable/console games are everywhere)
- Anonymity (your private world)
Physiological Sequelae of Internet Gaming Addiction

- Deceased sleep (very common)
- Decreased exercise (very common)
- Increased sedentary behavior
- Repetitive motion injury
- DVT’s
- Poor nutrition
- Poor hygiene
- Increased physical aggression (when devices removed)
- Increased sedentary behavior and obesity
- Porn-induced ED in adolescents
- Preliminary evidence of white-mater changes and deceased attentional capacity
So what’s the *problem* anyway with high amounts of Gaming?

1. Increased social isolation (from friends/family)
2. Mood changes (Depression)
3. Negative impact in school or work performance
4. Decrease in physical health (lack of physical activity)
5. Desensitization and Glorification of Violence—an increased risk of acting–out deterioration of work ethic and delay of gratification.

- *When we are gaming we are NOT doing other things!!!.*

- *It is the Number one reason why people in the US seek treatment for technology addictions, sex being number two...*
What about Internet Gaming makes it so powerful?

• Gaming is *all pleasure center* and it appears frontal-lobe reasoning may be off-line. Don’t forget frontal/executive functions are already under-developed in kids under their early 20’s

• *Short Latency*---The addictive potential of a substance is determined by the speed of absorption into the body or the speed of reinforcement received.

• The Internet, and particularly, gaming operate on a *Novelty & variable ratio reinforcement schedule*, and are therefore highly resistant to extinction.

• *Time Distortion/Dissociation*: No child or adolescent can accurately judge how much time he or she spends in a game and at the addicted level they have little control. They will tell you they will be done in a minute, but that minute never ends.
Gen-D Children and Adolescents see the world from a perspective of instant access and availability. They have known no other way...

Little ability or need for slower process and delay of gratification...

Generation-D sees the connection between work/effort and outcome differently...
Are we what we do? So what are we doing consuming 2-6 hours a day of non-work/school tech?

When I learned, 'You are what you eat', I realized I was nuts.
Implications of current clinical and Neurobiological research on the treatment of Internet Addiction Disorder

• IA as Part of a “Reward Deficiency Syndrome” caused by a negative down-regulation of dopamine after excessive dopamine release secondary to abnormal neurotransmitter interactions in the mesolimbic system. (Blum, et al (2008).

• Grant et al (2010) look at natural history, phenomenology, tolerance, withdrawal, co-morbidity, overlapping genetic contribution, neurobiological mechanisms and response to treatment strongly suggest that behavioral (process) addiction such as IA resemble substance addictions and that excessive Internet use is indeed an addiction.

• Winkler, et al (2013) found that both pharmacological and psychological treatments were effective in treating IA (time spend online, depression, and anxiety.)
Physiological Sequelae of Internet Gaming Addiction

- Deceased sleep (very common)
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- Increased physical aggression (when devices removed)
- Increased sedentary behavior and obesity
- Porn-induced ED in adolescents
- Preliminary evidence of white-mater changes and deceased attentional capacity
Why do we love our Smartphones?
“He looks so natural.”
For most of these questions, at least one-fourth responded “yes” to them, indicating compulsive behavior as it relates to their phone...

<table>
<thead>
<tr>
<th>Question</th>
<th>% Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you sleep with your cell or smartphone (turned on) under your pillow or next to your bed regularly?</td>
<td>61%</td>
</tr>
<tr>
<td>2. Do you feel ill-at-ease or uncomfortable when you accidentally leave your smartphone in the car or at home, have no service or have a broken phone?</td>
<td>53%</td>
</tr>
<tr>
<td>3. Do you feel reluctant to be without your cell or smartphone, even for a short time?</td>
<td>35%</td>
</tr>
<tr>
<td>4. Do you wish you could be a little less involved with your cell or smartphone?</td>
<td>35%</td>
</tr>
<tr>
<td>5. Do you feel your use of your cell or smartphone decreases your productivity at times?</td>
<td>35%</td>
</tr>
<tr>
<td>6. Do you find yourself mindlessly checking your cell or smartphone many times a day, even when you know there is likely nothing new or important to see?</td>
<td>34%</td>
</tr>
<tr>
<td>7. When your cell or smartphone rings, beeps or buzzes, do you feel an intense urge to check for texts, tweets, emails, updates, etc.?</td>
<td>33%</td>
</tr>
<tr>
<td>8. Do you find yourself spending more time on your cell or smartphone than you realize?</td>
<td>30%</td>
</tr>
<tr>
<td>9. Has the amount of time you spend on your cell or smartphone been increasing?</td>
<td>27%</td>
</tr>
<tr>
<td>10. Do you find yourself spending more time texting, tweeting or emailing as opposed to talking to people in person?</td>
<td>24%</td>
</tr>
<tr>
<td>11. When you eat meals, is your cell or smartphone always part of the table place setting?</td>
<td>23%</td>
</tr>
<tr>
<td>12. Do you find yourself viewing and answering texts, tweets and emails at all hours of the day and night—even when it means interrupting other things you are doing?</td>
<td>21%</td>
</tr>
<tr>
<td>13. Do you seem to lose track of time when on your cell or smartphone?</td>
<td>21%</td>
</tr>
<tr>
<td>14. Do you find yourself mindlessly passing time on a regular basis by staring at your cell or smartphone?</td>
<td>20%</td>
</tr>
<tr>
<td>15. Do you text, email, tweet or surf while driving or doing other similar activities that require your focused attention and concentration?</td>
<td>18%</td>
</tr>
</tbody>
</table>

* Difference is statistically significant

- Overall, 90% of the respondents replied “yes” to at least one of these questions. On average, respondents replied “yes” to 4.7 questions.
- Almost one-fourth (22%) replied “yes” to more than half (8+) of the questions.
- People who admit to being addicted to texting replied, on average, “yes” to 8.7 questions, the most of any group.
- Women appear to be more attached to their phone than men are. They were more likely than men to respond “yes” to 12 of the 15 questions. Specifically, women were significantly* more likely than men to respond “yes” to question numbers 2, 3, 5, 7, 10 and 14. The biggest difference between men and women is on question 10 (31% vs. 20%).
- Minorities also appear to be more attached to their phones than whites. They were more likely to respond “yes” to all 15 questions, and the difference between minorities and whites on the percentage responding “yes” is statistically significant for nine of the 15 questions.
- Overall, those under age 30 are more likely to respond “yes” to these questions than those age 30 or older.
- People with smartphones are more likely than those with traditional cellphones to reply “yes” to all 15 questions.
Are you compulsive about texting & driving?

Survey says... you could be.
This what most people know intellectually--yet 75% of us still use the many of the data and entertainment stream features on our phones...not just texting!
Smartphone use while driving

Are you compulsive about texting & driving?

Survey says... you could be.
CBS Early Show on joint research between AT&T and Dr. David Greenfield of The Center for Internet and Technology Addiction
Summary of Survey Results

TEXTING WHILE DRIVING: BEHAVIOR

Overall, three-fourths (74%) of drivers have texted while driving.

- Drivers are more likely to read a text or glance at their phone than to send a text.
- Drivers are more likely to read and send a text while stopped at a stop light or stop sign.

- The more people drive and the more people text on a daily basis, the more likely they are to text and drive.
- Three out of ten (30%) drivers who admit to texting while driving say they do so because it’s a habit.
- Less than one in ten (9%) drivers who admit to texting while driving say they have been in an accident or have come close to being in an accident due to texting while driving. Among some groups, it’s almost one in five drivers.
- Few (12%) drivers who admit to texting while driving, report they have lied to someone about texting and driving.
  - Among those who admit to being addicted to texting, one-third (34%) have lied about texting and driving. This may be an indication that friends and family have said something to them because they text so frequently and they are concerned.
Our Phones may be Smart but we can be pretty Dumb...

- Text\(^2\) (61%)
- Email\(^2\) (33%)
- Surf the net (28%)
- Facebook\(^3\) (27%)
- Snap a selfie/photo (17%)
- Twitter\(^3\) (14%)
- Instagram\(^3\) (14%)
- Shoot a video (12%)
- Snapchat\(^3\) (11%)
- Video chat (10%)

- Other unsettling findings include:
  - 62% keep their smartphones within easy reach while driving.\(^4\)
  - 30% of people who post to Twitter while driving do it “all the time.”
  - 22% who access social networks while driving cite addiction as a reason.
  - Of those who shoot videos behind the wheel, 27% think they can do it safely while driving!
  - See more at: [http://about.att.com/story/smartphone_use_while_driving_grows_beyond_texting.html#sthash.rqO593em.dpuf](http://about.att.com/story/smartphone_use_while_driving_grows_beyond_texting.html#sthash.rqO593em.dpuf)

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• A car travels approximately 97.5 feet per second at 65 miles per hour.

• The minimum average time it takes to experience the impulse to pick up your phone (which can occur hundreds of times per day) or to respond to a notification trigger and neurologically process it, including the motor behavior of picking it up and putting it down, is 3-6 seconds, or longer if you respond!

• So you can unconsciously travel 300-600 feet - 2 football fields with highly-distracted attention, increasing your accident risk 600-1000 percent.

• Stopping distance on a production vehicle traveling 65 miles an hour is approximately 125-150 feet, and that’s if you are paying attention.

• Every second of delay adds to that distance, exponentially increasing risk.
We are approaching 90+ percent Smartphone penetration...the fastest tech adoption EVER!

U.S. Texting and Driving Statistics-This is what we know. It’s NOT only texting however!

Texting While Driving Causes:

Texting While Driving Is:

Texting While Driving:
It’s not just Texting and driving anymore....

U.S. Texting and Driving Statistics

Texting While Driving Causes:

Texting While Driving Is:

Texting While Driving:
There is near universal agreement that texting while driving is dangerous, yet three-fourths of drivers have texted while driving

- Though the difference between men and women is small, it is statistically significant (97% vs. 99%).
- The difference between whites and minorities is small but is statistically significant (99% vs. 96%).
- The difference between drivers who are familiar with It Can Wait and those who are not aware of the campaign is identical (98%).
- Groups least likely to believe texting while driving is dangerous include:
  - Drivers who admit they are addicted to texting – 93%
  - Blacks – 95%
  - Drivers who admit that they text and drive because it’s a habit – 95%
  - People who text 100+ times per day – 95%

Q.28 Do you believe texting while driving is dangerous?

BASE: All respondents (n=1,004)
Overall, almost three-fourths (74%) of drivers have texted while driving.

- Overall, 74% of drivers have done one or more of these.
- Men are more likely to do all of these, except the ones at a red light, in which case women are more likely to do them. None of the differences are statistically significant.
- 19-24 year olds are the most likely age group to do all of these.
- Rural drivers are, for the most part, significantly* less likely to do all of these compared to drivers in urban and suburban areas.
- Drivers who are familiar with the AT&T It Can Wait campaign are less likely to do all of these, compared to those who are not familiar with the campaign. None of the differences are statistically significant.
- Those with smartphones are significantly* more likely than those with traditional cellphones to do all six of these. It appears that advances in phone technology have made it easier for people to text while driving and thus more likely to do it.
- The more people drive and the more people text on a daily basis, the more likely they are to engage in these six activities.

* Difference is statistically
Drivers who do not text and drive are most concerned about the possible negative consequence of doing so.

- The differences between the various demographic sub-groups are not statistically significant. Additionally, the sample sizes among most of these groups are small.

### UNAIDED Reasons for not texting while driving

**CODED RESPONSES**

- Dangerous/distracting: 61%
- Against the law: 13%
- Can cause an accident: 12%
- I don’t text: 6%
- Doesn’t work/I can’t see my phone/difficult to do: 6%
- Can wait/it’s not important: 4%
- Bad habit/stupid: 3%
- Use Bluetooth/hands free: 2%
- I don’t like to text/annoying: 2%
- The costs if I get into an accident: 1%
- Other: 3%
- Don’t know: 1%

**BASE:** Respondents who do NOT text while driving (n=257)

Multiple responses allowed.

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One-fifth of drivers who do not text still have an urge to look at their phone when an incoming text arrives

- Minority drivers are significantly* more likely than whites to want to look at incoming texts (30% vs. 18%). This figure is largely driven by Hispanic drivers (37%).
- Drivers between 16-18 years of age are significantly* more likely than all other age groups to want to look at incoming texts.
- The more that someone drives, the more likely they are to say they have an urge to look at incoming texts.

### Urge to look at incoming text when driving

- Yes: 21%
- No: 79%

### Respondents who do NOT text while driving (n=257)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Almost every day</th>
<th>Every day</th>
<th>Many times day</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-18</td>
<td>15%</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>19-24</td>
<td>23%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>25-29</td>
<td>14%</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>30-39</td>
<td>17%</td>
<td>20%</td>
<td>19%</td>
</tr>
<tr>
<td>40-49</td>
<td>20%</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>50-65</td>
<td>19%</td>
<td>16%</td>
<td>15%</td>
</tr>
</tbody>
</table>

* Difference is statistically significant.

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Certain demographic groups have a higher incidence of getting into accidents or having near misses due to texting and driving, including men, younger drivers and minorities.

- Drivers who send and read texts while driving are three times more likely than those who do not send/read texts while driving to report being in or coming close to being in an accident (send: 15% vs. 5%/read: 12% vs. 4%).

- Drivers most likely to have been in an accident or come close include:
  - Drivers who admit they are addicted to texting – 17%
  - Drivers who admit that they text and drive because it’s a habit – 15%
  - Drivers who have lied about texting and driving – 15%
  - People who don’t think texting and driving are dangerous – 14%
  - Minorities – 13%
    - Asians – 14%
    - Hispanics – 13%
    - Blacks – 12%
  - Urban drivers – 13%
  - Drivers in their 30s – 12%
  - 25-29 year olds – 12%

- Men are significantly* more likely than women to report that they have been in an accident or come close (10% vs. 6%).

* Difference is statistically significant.

**Base:** Respondents who text while driving (n=747)

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Among some demographic groups, more than one in three (34%) drivers have lied about texting and driving.

- Drivers who send and read texts while driving are at least three times more likely than those who don’t do it, to report lying about texting while driving (send: 21% vs. 7%/read: 18% vs. 4%).
- Drivers most likely to have ever lied about texting and driving include:
  - Drivers who admit they are addicted to texting – 34%
  - People who text more than 100 times per day – 27%
  - Drivers who admit that they text and drive because it’s a habit – 22%
  - Hispanics – 22%
- There is no difference between men and women on lying about texting and driving.
- Drivers familiar with It Can Wait are significantly* more likely to lie about texting and driving than those who are not aware of the campaign (14% vs. 9%).
- Minority drivers are significantly* more likely than whites to lie about texting and driving (19% vs. 10%).
- Drivers in urban areas (16%) are more likely to lie than drivers in suburban (11%) or rural areas (8%).

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Our Phones may be Smart but we can be pretty Dumb...

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  - People who text 100+ times per day – 95%

Q.28 Do you believe texting while driving is dangerous?
BASE: All respondents (n=1,004)
The U.S. is way behind the rest of the world’s awareness of the power of the net...
Love @ Light Speed

“Do you believe in love at first Web site?”
overplugged

“come back to life”
Why is he jumping up and down?

More serious question: Can we really virtually experience reality...real intimacy, connection, ourselves & others...our very humanity or are we experiencing something new, something different; a new state of being.
Features of Internet-Enabled Sexual Behavior

• A combination of highly stimulating content with a stimulating/addictive medium (Internet).

• There is a synergistic process on-line, that creates and perpetuates compulsive sexual behavior.

• Many Net users do not view their on-line sexual behavior as the same as real-time behavior (denial).

• A large number of marital therapy referrals have an Internet and cybersexual component.

• Lawyers are reporting more Internet-related divorce proceedings.
A brief History of Pornography

• Been around forever; most powerful human force there is
• Changes brain chemistry
• Naturally arousing and habit forming
• Follows the changes in technology
• Captures the sexual energy that men want and crave but don’t fully understand
• Follows our overtly-focused emphasis on sex combined with our covertly-focused shame/guilt. The more we push sexuality outward the more we collapse our feelings inward.
• Our culture has a duality imbedded within sexuality that is very shame-bound, and porn simply reflects this overtly
• With Pornography one can obtain the powerful sexual energy desired without the fear or encumbrances of intimacy or relationship.
Porn: Some facts

- Morality vs. reality
- 70,000,000 people view online porn each week
- 2005 mobile phone pornography exceeded 1 billion dollars
- Pornography is a 14+ billion dollar industry
- A large percentage of Pornography use and consumption is by adolescents and young adults
- Filtering software is helpful but not fool proof
- Been around a long time... and has spearheaded most technological improvements, e.g. printing, video DVD, Internet.
- It is addictive or compulsion producing
- It is not likely to disappear
- Is all porn use “bad”; is using/viewing pornography always a problem?
Political Correctness prevents me from showing the associated graphics...

• Pornography still continues to lead as the leading area of Internet abuse and represents the largest area of potential compulsive behavior.

Hardcore Junky

www. Should Really be XXX!
If you can’t find what you want for free they offer you many options to pay!
On the Net, Necessity is not the Mother of Invention...convenience is!

• Even with no money exchanged, one can surf the pornographic Net for hours for FREE...And many people do!
Cybersex: What is it?

• Cybersex as a consensual act of mutual alternate stimulation via typed and visual communication online for the purposes of achieving sexual arousal and/or orgasm.

• Digital Dating: use of the Net for personal connections.
• Electronic Bedroom: Private chat room set up by participants for the purposes of having cybersex.

• CyberAffairs>Real-time affairs
Progression of virtual cyber-sexual relations toward real-time sexual contact

<table>
<thead>
<tr>
<th>ONLINE BEHAVIOR</th>
<th>NON-ADDICTED</th>
<th>ADDICTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLIRTING</td>
<td>20 percent</td>
<td>57 percent</td>
</tr>
<tr>
<td>EXPLICIT SEX TALK</td>
<td>9 percent</td>
<td>38 percent</td>
</tr>
<tr>
<td>MASTURBATION</td>
<td>12 percent</td>
<td>37 percent</td>
</tr>
<tr>
<td>ONLINE AFFAIR</td>
<td>14 percent</td>
<td>42 percent</td>
</tr>
<tr>
<td>PHONE CONTACT</td>
<td>18 percent</td>
<td>50 percent</td>
</tr>
<tr>
<td>REAL-TIME SEX</td>
<td>13 percent</td>
<td>31 percent</td>
</tr>
</tbody>
</table>
The Internet is often used for Secret Sexual Behavior
So does the virtual analog of human communication via texting, email, social media, tweets, etc. actually connect to others? Does it fulfill sociobiologic imperative?

What is really going on here? Why are we so digitally connected, with some of us to a compulsive or addictive level?
There is growing evidence that in essence we have created new states of being in the world…

Complete with new languages, altered interpersonal expectations, and a near non-verbal communicational shorthand…
Can you be addicted to the Internet?

The Answer is Yes
Unwiring & Rewiring Your Brain: Sensitization and Hypofrontality signal by (1) knitting together everything associated with the reward, and (2) forming a neural feedback loop heading back to the reward circuitry.