This is your brain online:
The impact of digital technology on child and adolescent development

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Before we get started...

Technical information vs. Emotional impact
Epidemic, endemic, pandemic
Deliberately one-sided
Type I vs. Type II errors
Swimming against the current
Techno sapiens
(Not) the zombie apocalypse
Paradigm Shift in University Mental Health

Schwartz study 1992-2002
AUCCCD survey

[Bar chart showing changes over time]

- 1992
- 2000
- 2002
- 2010
National Trends

**Increased acuity** of presenting concerns at university counseling centers (during past 15 yrs):
- Prevalence of severe psychological disorders has *tripled*
- Increase in high-risk behaviors such as harm to self and others
- Increase in psychiatric medication
- Increase in hospitalizations

**Increased demand** for services was reported by 93% of university counseling center directors (AUCCD, 2012)
- Staff of UCCs have, on average, not grown in the past 15 years
- MSUCC: increase of 79% in students seen in direct service from 2006-2013
Possible Explanations

Improved availability of mental health treatment for children and adolescents

Changes in parenting (anxiety $\rightarrow$ over-protection)

Socioeconomic stressors
  • Financial stressors
  • Competition for grades, internships, jobs

Collective anxiety (9/11, Virginia Tech, climate change, political divide)

Recognition and reporting of trauma, abuse, assault

De-stigmatizing of mental health; increased help-seeking

Over-use of social media, video games, digital technology
Overview

Images of Screen-time
Child development
Neuroplasticity
Increased media exposure
Sleep
Attention, memory, & learning
Play and downtime
Identity & relationships

[Mood & anxiety]
[Emotional regulation]
Addiction to technology
Distracted parenting
Empathy & narcissism
Implications
Discussion
Suggested reading

Nicholas Carr
- *The shallows: What the internet is doing to our brains*
- *The glass cage: How our computers are changing us*

Sherry Turkle
- *Alone Together: Why we expect more from technology and less from each other*
- *Reclaiming conversation: The power of talk in a digital age*

Manfred Spitzer – *Digitale demenz* (in German and Dutch)

Adam Alter – *Irresistible: The rise of addictive technology and the business of keeping us hooked*
Suggested reading (continued)

William Powers - *Hamlet’s Blackberry: Building a good life in the digital age*

Frances Booth – *The distraction trap: How to focus in a digital world*

Kimberly S. Young – *Caught in the net: How to recognize the signs of internet addiction--and a winning strategy for recovery*

*I need to unplug: A journal for escaping the modern-day scourge of digital distraction and information-overload and cord leashing even though the cacophony of dings and boings and buzzes that herald the arrival of texts and emails and headlines are bombarding my brain with craving-inducing dopamine hits that themselves are indication enough that I should go off-the-grid in order to actually experience people and emotions and breathing and the lost art of messy human handwriting even if it’s only for a few minutes at a time.*

- Who’s There, Inc., Venice, CA
Impact on Physical Health

Vision - myopia

Movement, exercise – balance and core strength

Radiation

Vagus nerve
  ◦ regulates cardiovascular, glucose and immune response
  ◦ ability to read facial expressivity
  ◦ ability to tune in to the frequency of the human voice
  ◦ increased vagal tone $\rightarrow$ increased capacity for relatedness and empathy.
  ◦ Reciprocal influence of relatedness and physical health

Headaches
Digital eye strain

The American Optometric Association has identified a new condition, computer vision syndrome, or digital eye strain, which "describes a group of eye and vision-related problems that result from prolonged computer, tablet, e-reader and cell phone use. Many individuals experience eye discomfort and vision problems when viewing digital screens for extended periods. The level of discomfort appears to increase with the amount of digital screen use."

Near-sightedness

Among children and adolescents, optometrists worldwide have identified a trend involving increased prevalence of near-sightedness - myopia- attributed in large part to the developmental impact of computer vision syndrome. "Sixty years ago, 10–20% of the Chinese population was short-sighted. Today, up to 90% of teenagers and young adults are. In Seoul, a whopping 96.5% of 19-year-old men are short-sighted. Other parts of the world have also seen a dramatic increase in the condition, which now affects around half of young adults in the United States and Europe — double the prevalence of half a century ago. By some estimates, one-third of the world's population — 2.5 billion people — could be affected by short-sightedness by the end of this decade."

http://www.nature.com/news/the-myopia-boom-1.17120
Lack of physical activity

A recent, robust finding in the field of physical therapy is that the core strength of young children is significantly lower than in previous generations; this deficit is attributed to the relative lack of physical activity among a cohort that spends an inordinate amount of time watching television, playing video games, and spending time on social media.
Images of Screen Time

HOW DO WE USUALLY IMAGINE OUR KIDS AND OURSELVES ONLINE?
Screen-time as social time
Screen-time as alone time or as learning
Screen-time as risky
Screen-time as isolation or insulation...or neglect
Screen-time for infants and toddlers
Changes in parenting

Parents are busier
Kids are busier

Competition is higher
  - Changes in testing after No Child Left Behind

Family time is shorter

Play time is more structured

Devices are replacing play and face-to-face communication

World has become scarier – 9/11, shootings, terrorism, climate change, environmental toxins

$$$$→$
Changes in parenting

More protective
More anxious
More distracted
Less trusting of others
  ◦ Play dates vs. playing outside

Achievement-oriented
More frequent communication
Less effective, engaged communication
Child Development

A BRIEF OVERVIEW OF HOW OUR BRAINS (USED TO) GROW
Cognitive development

Proceeds along relatively predictable stages

Environmental inputs shape the breadth and depth, but development will occur in the absence of intentional input.
Emotional development

More multifaceted and complex than cognitive development

Non-linear (i.e. ages and stages are not as predictable)

Will not develop without the appropriate environmental inputs
  ◦ Emotional development in humans cannot occur without input from other humans
What are the components of Emotion Regulation?

Eisenberg, Spinrad & Eggum, 2010

- Identification of emotions
- Acceptance of emotional experiences both pleasant and unpleasant
- Management of distress and modulation of excitement/arousal to maintain emotional balance
- Adaptive adjustment of behavior to facilitate social interaction
- Prioritization among competing goals to achieve those that are important to the individual
- Capacity to sustain motivation

Foundation for well-being, academic achievement, social relationships, and positive adjustment throughout the life span
The special case of teens

**Adolescent Brain Development**

- During puberty, the brain stops automatically adding new connections, and starts pruning away the neurons and synapses that aren’t being used (Use them or lose them!)
- The frontal lobes are still forming during this time, still becoming more efficient at conducting signals.
- The adolescent brain is at its peak of learning ability but not fully able to inhibit impulses (good accelerator, bad brakes).

“Young man, go to your room and stay until your frontal lobes finish forming.”
The special case of teens

Cognitive skills needed for successful emotion regulation:

- Working Memory
- Inhibitory Control
- Abstract Thought
- Decision Making
- Perspective Taking

*All of these are at peak development during adolescence.*
Judgment last to develop

The area of the brain that controls “executive functions” — including weighing long-term consequences and controlling impulses — is among the last to fully mature. Brain development from childhood to adulthood:

5-year-old brain  Preteen brain  Teen brain  20-year-old brain

*Dorsal lateral prefrontal cortex (“executive functions”)*

Red/yellow: Parts of brain less fully mature  Blue/purple: Parts of brain more fully mature

Sources: National Institute of Mental Health; Paul Thompson, Ph.D., UCLA Laboratory of Neuro Imaging

Thomas McKay | The Denver Post
# Developmental issues

<table>
<thead>
<tr>
<th>Developmental issues</th>
<th>Impact of over-using digital technology</th>
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<tr>
<td>Sleep critical to brain development</td>
<td>Sleep is disrupted</td>
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<tr>
<td>Low impulse control</td>
<td>Poor choices: risky content, too much time online</td>
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<td>Importance of downtime, reflection, daydreaming</td>
<td>Too fast, too busy $\rightarrow$ no downtime</td>
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<td>Under-developed judgment</td>
<td>Critical thinking not encouraged</td>
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<td>formal operations stage: black-or-white thinking, not critical thinking</td>
<td>no authority</td>
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<td></td>
<td>best information = most popular</td>
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<td>Dependent on peers for identity development (not adults)</td>
<td>Online relationships may lead to lack of support, rejection, bullying</td>
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<td></td>
<td>functions as threat to survival</td>
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<td>Non-conformity almost impossible</td>
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<td>In an uncertain, chaotic world, the internet is a welcome distraction and escape</td>
<td>Escapism $\rightarrow$ isolation, despair,</td>
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<td>(“friction-free”)</td>
<td>underdeveloped sense of identity and belonging</td>
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Neuroplasticity
HOW THE BRAIN IS CONSTANTLY ADAPTING TO OUR ENVIRONMENT
“...the brain is not the unchanging organ that we might imagine. [The brain is] substantially shaped by what we do to it and by the experience of daily life. When I say "shaped", I'm not talking figuratively or metaphorically; I'm talking literally. At a microcellular level, the infinitely complex network of nerve cells that make up the constituent parts of the brain actually change in response to certain experiences and stimuli.”

“...the screen-based, two dimensional world that so many teenagers - and a growing number of adults - choose to inhabit is producing changes in behaviour. **Attention spans are shorter, personal communication skills are reduced and there's a marked reduction in the ability to think abstractly.**”

- Susan Greenfield, Professor of Pharmacology, Oxford University (emphasis added)
Scope of the problem

“This is an issue as important and unprecedented as climate change.”

-Susan Greenfield
Increased Exposure to Media

How much do we actually consume?
How much has our exposure increased?
Swimming in the digital ocean
Advent of social media: 14 yrs.

<table>
<thead>
<tr>
<th>Site</th>
<th>Launch date</th>
<th>Current ranking</th>
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<tbody>
<tr>
<td>LinkedIn</td>
<td>2003</td>
<td>3</td>
</tr>
<tr>
<td>Facebook</td>
<td>2004</td>
<td>1</td>
</tr>
<tr>
<td>YouTube</td>
<td>2005</td>
<td>5</td>
</tr>
<tr>
<td>Reddit</td>
<td>2005</td>
<td>10</td>
</tr>
<tr>
<td>Twitter</td>
<td>2006</td>
<td>2</td>
</tr>
<tr>
<td>Tumblr</td>
<td>2007</td>
<td>8</td>
</tr>
<tr>
<td>Pinterest</td>
<td>2008 (2012)</td>
<td>7</td>
</tr>
<tr>
<td>Instagram</td>
<td>2010</td>
<td>6</td>
</tr>
<tr>
<td>Google+</td>
<td>2011</td>
<td>4</td>
</tr>
<tr>
<td>Snapchat</td>
<td>2012</td>
<td>9</td>
</tr>
</tbody>
</table>
Facebook: over 1.5 billion users

Number of monthly active Facebook users worldwide as of 4th quarter 2015
(in millions)

Source:
Facebook
© Statista 2016

Additional Information:
Worldwide; Facebook; 3rd quarter 2008 to 4th quarter 2015
 Increased media exposure

almost **50%** of American Internet users have online social profiles (2010)

time spent social networking was **up 82%** from previous years (2009)

More than **100 million** people access Facebook with their cell phones (2010)

more Americans now than ever before report using television and the Internet *simultaneously* [i.e. multitasking] (2009)

About **87 percent** of American adults own a cell phone (2012). About **44 percent** of those are smartphones. *(9% increase in smartphone usage in one year.)*
Increased media exposure

29.9% of television-owning households in the United States now contain at least four televisions (2010)

In 2010, television viewing reached an all-time high

the average American is exposed to a 350% increase in total information outside of work than the average amount they experienced only 30 years ago (2010)

“The amount of data humanity will collect while you’re reading [a book] is five times greater than the amount that exists in the entire Library of Congress. Anyone reading it will take in as much information today as Shakespeare took in over a lifetime.”
Prevalence of devices among teens - 2015

88% of US teens have access to a mobile phone.

73% of US teens have a smartphone.
  ◦ 85% of African-American teens
  ◦ 71% of white teens
  ◦ 71% of Hispanic teens

15% of US teens have a basic cellphone.

87% of US teens have or have access to a desktop or laptop computer.

58% of US teens have or have access to a tablet.
Teens online - frequency

24% are online “almost constantly.”

56% go online several times a day.

12% go online once-a-day

6% go online weekly

2% go online less often than once a week.

Source: Pew Research Center’s Teens, Social Media & Technology Report, 2015
Texting among teens

2009: “the average American teen now sends and receives around **1,500** text messages per month

2010: “a Nielson study reported that the average teen sends **over three thousand** text messages a month.”

2012: Newsweek reported that “The average teen processes an astonishing **3,700** texts a month.”

Therefore, from 2009-2012, texting among teens increased by **147%**
Increased media exposure among children and teens

“8- to 18-year-olds spend more time with media than in any other activity besides (maybe) sleeping”

2005: 6 hrs., 30 min. per day
  ◦ 8 hrs, 33 min. of media content (with multitasking)

2010: 7 hours, 30 min. per day, seven days/week
  ◦ **10 hours, 45 minutes** of media content (with multitasking) per day, seven days/week
  ◦ an **increase of almost 2½ hours** of media exposure per day over the past five years
Media exposure among youth of color

A report from Northwestern University reveals that youth of color 8- to 18-years old consume an average of 4.5 more hours of media per day than their white counterparts.

- White: 8-1/2 hours
- Black, Latino and Asian: 13 hours

During the past decade, black youths have doubled their daily media use, and Latino youths have quadrupled theirs, according to Ellen Wartella, co-author of the study.

Source: “Children, Media and Race: Media Use Among White, Black, Hispanic, and Asian American Children”
Texting vs. talking among teens and younger adults

“For many youth, texting is as meaningful as calling.”

“48% of the 18-24 set and 47% of the 25-34 group agreed that ‘texting is just as meaningful to me as an actual conversation on the phone.’”

° “Only 15% of 55+ respondents shared that sentiment.”
Why does this matter?

Research (1985-present) indicates that 60% of human communication is non-verbal

The non-verbal aspects of communication are largely controlled by the right hemisphere of the brain

- Eye contact
- Intonation
- Prosody
- Body language
Why does this matter?

Non-verbal aspects of communication are essential for mature emotion regulation.

Adolescence is critical phase for development of adaptive emotion regulation.

Adaptive emotion regulation has long-term implications for:
- Future regulatory success (i.e. planning, goal achievement)
- Mental health
The lopsided brain: Right hemisphere atrophy

The right side of the brain supports cognitive function, such as memory, attention, thinking, emotions, and processing of ideas. On the other hand, the left hemisphere of the brain is linked to logic and reasoning.

According to Byun Gi-won, due to overuse of digital devices, the left brain tends to get overworked, while the right brain is hardly utilized. This under utilization of specific regions of the brain over time can cause memory problems, leading to symptoms of digital dementia.
Researchers in South Korea and Germany have identified a significant pattern of right-brain deficits (atrophy) among frequent users.

‘Over-use of smartphones and game devices hampers the balanced development of the brain,’ Byun Gi-won, MD, the Balance Brain Centre in Seoul, South Korea

“The more you train kids with computer games, the more attention deficit you get.” – Manfred Spitzer

“The more time you spend with screen media ... the less your social skills will be.” – Manfred Spitzer
Some changes occur very quickly

In a UCLA study, experienced web users displayed fundamentally different neural structures in the pre-frontal cortex.

Novice users displayed similar changes after only five hours of internet use over the course of one week.

“The naïve subjects had already rewired their brains.”
Behavioral correlates

“Taken together, [studies show] internet addiction is associated with structural and functional changes in brain regions involving emotional processing, executive attention, decision making, and cognitive control.”

- research authors summarizing neuro-imaging findings in internet and gaming addiction (Lin & Zhou et al, 2012)

“As a practitioner, I observe that many of the children I see suffer from sensory overload, lack of restorative sleep, and a hyperaroused nervous system, regardless of diagnosis—what I call electronic screen syndrome. These children are impulsive, moody, and can’t pay attention -- much like the description in the quote above describing damage seen in scans.”

- Victoria Dunckley, M.D., integrative child and adolescent psychiatrist specializing in treating children with complex diagnoses and/or treatment-resistant conditions
Sleep

DOES DIGITAL TECHNOLOGY INTERFERE WITH THE AMOUNT OR THE QUALITY OF OUR SLEEP?
Sleeping (with our phones)
Sleep requirements for healthy functioning

The average 5-year old needs 11 hours/day
The average 9-year old needs 10 hours/day
The average 13-year old needs 9 hours/day
The average adult needs 7-9 hours/day
How does your cell phone affect sleep?

Stress – the 12-hour workday

FOMO
- Staying up later to “unwind”
- Checking during the night

Alert messages
Backlight and melatonin: Rensselaer Polytechnic sleep study

(Image from the Lighting Research Center at RPI)
“...a two-hour exposure to light from self-luminous electronic displays can suppress melatonin by about 22 percent.”

“To produce white light, these electronic devices must emit light at short wavelengths, which makes them potential sources for suppressing or delaying the onset of melatonin in the evening, reducing sleep duration and disrupting sleep. 'This is particularly worrisome in populations such as young adults and adolescents, who already tend to be night owls.'”

“the glow of screens from TVs, computers, phones and tablets could be stopping us sleeping at night. ...devices should not be used for more than an hour, and screens should be dimmed.”
Effect of wireless on sleep

The radio frequency wave energy [884 MHZ] that comes from mobile phones leads to enhanced **insomnia, headaches and concentration difficulties**.

The researchers concluded that **those who were exposed to the radio frequency took longer to fall asleep and did not sleep as well throughout the night**.
Where are our phones when we sleep?

68% next to bed / within reach
13% in a different room
16% in bedroom but out of reach
1% in the car
2% other

Source: 2012 Time/Qualcomm poll
Attention, Memory, & Learning

THE CONSEQUENCES OF DISTRACTION AND MULTITASKING
Attention and concentration

The average American attention span has decreased from 12 seconds (in the year 2000) to 8 seconds (in 2013). This is one second shorter than the attention span of a goldfish.

“Researchers in the new field of interruption science have found that it takes an average of twenty-five minutes to recover from a phone call. Yet such interruptions come every eleven minutes — which means we’re never caught up with our lives.”
Play and Downtime

THE IMPORTANCE OF BOREDOM, DAYDREAMING, IMAGINATION, AND SOCIAL INTERACTION
The importance of downtime

Play is not an option...

For kids it is a *developmental necessity*

What do kids learn from play?

- Independence
- Problem solving
- Social cues
- Bravery
- Empathy
- Fine/gross motor skills
- Improved eyesight
- Abstract reasoning
- Creativity
- Joy, laughter, fun

They learn to love life when it is good, and how to cope with life when it is hard.
Three generations

The importance of downtime

For adults, downtime continues to be a necessity

What do adults get from play?

- Replenished stores of attention and motivation
- Increased productivity and creativity
- Increased performance
- Freedom from time so we can learn from the past and plan for the future
- Identity formation and maintenance
- Increased understanding of human behavior
- Development, maintenance, and refinement of code of ethics
- Increased problem solving...epiphanies/”aha” moments
- Decreased stress/anxiety/depression
- Increased energy/vitality/wellness
The “default mode network”: the value of downtime for reverie and reflection

“...we replay conversations we had earlier that day, rewriting our verbal blunders as a way of learning to avoid them in the future. We craft fictional dialogue to practice standing up to someone who intimidates us or to reap the satisfaction of an imaginary harangue against someone who wronged us. We shuffle through all those neglected mental post-it notes listing half-finished projects and we mull over the aspects of our lives with which we are most dissatisfied, searching for solutions. We sink into scenes from childhood and catapult ourselves into different hypothetical futures. And we subject ourselves to a kind of moral performance review, questioning how we have treated others lately. These moments of introspection are also one way we form a sense of self, "swivel its powers of reflection away from the external world toward itself. ”

--Ferris Jabr in *Scientific American*, 2013
Nature and play

Identity and Relationships

Are we becoming less sure of who we are, and less sure of how we belong?
Face-to-face vs. Back-to-back
Impact of social media and cell phones

Reduced emotional intimacy
  ◦ Sherry Turkle study of cell phones in sight during a conversation

Reduced time in face-to-face conversation

Increased social anxiety

Fragmentation and diffusion of identity

False sense of social connection – “friends” versus actual friends
Linked in, checked out...

http://www.filmsforaction.org/watch/i_forgot_my_phone/#.UmerVF87TMg.facebook
Social media: “Alone together”

He had over 2,000 Facebook friends.
I was expecting a bigger turnout.
Fear of intimacy

“These days, insecure in our relationships and anxious about intimacy, we look to technology for ways to be in relationships and protect ourselves from them at the same time.”

“We bend to the inanimate with new solicitude. We fear the risks and disappointments of relationships with our fellow humans. We expect more from technology and less from each other.”

—Sherry Turkle, Alone Together, p. xii
Identity: escape into virtual reality

“The advertising for Second Life, a virtual world here you get to build an avatar, a house, a family, and a social life, basically says, ‘**Finally, a place to love your body, love your friends, and love your life.**’”

- Sherry Turkle, *Alone Together*
Addiction
IS DIGITAL TECHNOLOGY OUR NEW DRUG?
Addiction

“I clearly am addicted and the dependency is sickening.”

“Media is my drug.”
- Students in an “Unplugged” study at the University of Maryland

“I am unable to focus on anything in a deep and detailed manner. The only thing my mind wants to do...is plug back into that distracted, frenzied blitz of online information.” This despite the fact that “the happiest and most fulfilled times of my life involved a prolonged separation from the internet.”
- College senior writing to Nicholas Carr, author of The Shallows: What the Internet is Doing to Our Brains
“iDisorder”

750 teens and adults were studied

Most respondents check text messages, email or social media “every 15 minutes” or “all the time.”

Exceptions: people over 50
Addiction and neurophysiology

fMRIs of addicted users indicate:

- Our brains are being rewired.
- Heavy web users have fundamentally altered prefrontal cortices.
- The brains of internet addicts look like the brains of drug and alcohol addicts.

Frequent dopamine bursts from digital messages lead to erosion of dopamine receptors over time.
Designed to be addictive

A “race to the bottom of the brain stem.”

- Tristan Harris, former Google employee and founder of Time Well Spent, quoted in The Atlantic

Operant conditioning

- variable (intermittent) rewards
- Bright red as “trigger color”
- Based on B.J. Fogg’s research at Stanford’s Persuasive Technology Lab

LinkedIn’s hub-and-spoke icon “triggered people’s innate craving for social approval”
Designed to be addictive

Snapchat’s “Snapstreak” feature “displays how many days in a row two friends have snapped each other and rewards their loyalty with an emoji”

“Hijacking techniques – the digital version of pumping sugar, salt, and fat into junk food in order to induce bingeing.”

*Hooked: How to Build Habit-Forming Products* by Nir Eyal
NPR interview with Adam Alter

http://www.npr.org/podcasts/381444908/fresh-air

NYU Professor

Steve Jobs – iPad “we don’t let our kids use it”

Waldorf School of the Penninsula – no tech, 75% have parents who work in Silicon Valley

Tristan Harris, “Design Ethicist,” calls for Hippocratic Oath for tech design
NPR interview

Moment – measures how much time you spend on smartphone (ave. 3 hrs/day)
  ◦ 5-8pm no phone

Texting communication is impoverished
  ◦ Face-to-face communication develops in critical phase of development
  ◦ 10-year-olds and 7-year-olds

½ of World of Warcraft users are addicted
  ◦ Different missions are user-tested (time-on-device)
    ◦ When you save something, you spend more time than killing, and versions are refined that result in longer use
NPR interview

World of Warcraft friendships are formed
- “guilds” are soothing
- Want to do this all the time (round-the-clock usage due to global usage is dangerous physiologically)

Extreme addiction case study:
- Straight A student started WoW – better alternative world than the real one
- 45 day binge, played continuously
- Stacks of pizza boxes
- 40 pounds of fat
- Skin pale, hair thin
- Mother rescued him to internet addiction treatment center
Distracted Parenting

WHAT IS THE IMPACT ON CHILD DEVELOPMENT?
Distracted Parenting

Eye contact and development of mirror neurons

“Still face” experiment
- https://www.youtube.com/watch?v=apzXGEbZht0
- https://www.youtube.com/watch?v=6czxW4R9w2g&t=187.056105
Depressed Parenting

Two interactive patterns:
◦ intrusiveness
◦ withdrawal

“Intrusive mothers display a hostile affect, and disrupt the infant’s activity. The infants experience anger, turn away from the mother to limit her intrusiveness and internalize an angry and protective style of coping.”

“Withdrawn mothers are disengaged, unresponsive, affectively flat and do little to support the infant’s activity. The infants are unable to cope or self-regulate this negative state, and develop passivity, withdrawal and self-regulatory behaviours (eg, looking away or sucking on thumb)”
Children of Depressed Mothers

2 to 3 times more likely to develop a mood disorder

at increased risk for impaired functioning across multiple domains:
  ◦ Cognitive
  ◦ Social
  ◦ Academic
  ◦ Poor physical health.

However, many children of depressed mothers develop normally, so the goal is to understand what mediates the impact of depression.
  ◦ Disruptions in family process:
    ◦ parenting problems
    ◦ inter-parental conflict
UC Irvine Study

Used a rat model to study how **good but disrupted attention** from mothers can affect their newborns.

Placed some mothers and their pups in modified cages that did not have sufficient material for nesting or bedding. This was enough to distract the mothers into running around looking for better surroundings and end up giving their babies **interrupted and unreliable attention**.

- Dr. Tallie Baram, professor of pediatrics and anatomy-neurobiology at University of California, Irvine
UC Irvine Study

The rats raised in the modified environments consistently ate less of the sugar solution and spent less of their time playing and chasing their peers than the rats raised in the normal setting.

“We were stunned,” “...what aberrant signals did they get?” –Dr. Baram

“The rats had enough food, were raised in the right temperature, and were normal weight. What’s more, they spent the same amount of time with their mothers as the babies raised in the normal environments.”
UC Irvine Study

“...signs of compromised pleasure sensations...”

“...there may be a critical window in which newborns need to be exposed to certain behaviors from a parent in order for their nervous system to develop properly.

In this case, the lack of consistent, repetitive and reliable attention appeared to affect the animals’ ability to develop proper emotional connections to help them understand pleasure.

“...we need predictability and consistency for the emotional system to develop. Nobody looked at that before.”
UC Irvine Study

“...for people, there might be a similar critical time during which babies need to have a mom and dad’s reliable and consistent attention in order to form proper emotional processes.

“If [a primary caregiver] is distracted by a call or a message alert, and turns to the cell phone instead, then this pattern gets broken and the crucial learning that should occur might not happen.”

“Other studies have shown that such poor development of the pleasure system could contribute to mood disorders such as depression and anxiety.”
Distracted Parenting on the Playground

Study by Ruth Milanaik and Anna Krevskaya

- 50 caregivers and their children, age 18 mo. – 5 yrs.
- 371 2-min. episodes
- Key findings:
  - Caregivers were distracted 74% of the time
  - Cause of distraction – percentages of time distracted:
    - Smartphones: 30%
    - Talking with other adults: 33%
    - Eating, drinking, reading, etc.: 37%
  - "Caregivers in general are doing a fine job supervising their children on the playground. However, increased awareness of limiting electronic distractions and other activities that may interfere with supervision should be considered."
Empathy & Narcissism

Are we losing our capacity to care about others?
Empathy
Emotional development

More multifaceted and complex than cognitive development

Non-linear (i.e. ages and stages are not as predictable)

Will not develop without the appropriate environmental inputs
- Emotional development, including empathy, cannot occur without input from other human beings.
Decreased empathy

...college students' self-reported empathy levels (as measured by the Interpersonal Reactivity Index...have been in steady decline over the past three decades...

A particularly pronounced slump has been observed over the past 10 years. "College kids today are about 40 percent lower in empathy than their counterparts of 20 or 30 years ago," Konrath reports.

"Many people see the current group of college students, sometimes called 'Generation Me,' " Konrath continues, "as one of the most self-centered, narcissistic, competitive, confident, and individualistic in recent history."
Processing speed and empathy

“...higher emotions emerge from neural processes that ‘are inherently slow.’”

Empathy for physical pain is almost instantaneous.

Empathy for emotional suffering “unfolds much more slowly.”

“The more distracted we become, the less able we are to experience the subtlest, most distinctively human forms of empathy, compassion, and other emotions.”

“If things are happening too fast, you may not ever fully experience emotions about other people’s psychological states.”

- USC Brain and Creativity Institute
Atrophy of the insular cortex

“A finding of particular concern was damage to an area known as the *insula*, which is involved in our capacity to develop empathy and compassion for others and our ability to integrate physical signals with emotion. Aside from the obvious link to violent behavior, these skills dictate the depth and quality of personal relationships.”

- Victoria Dunckley, 2014
Narcissism: Are selfies making us selfish?

“according to Jean Twenge, a professor of psychology at San Diego State University, is that [over the past 20 to 30 years], students' self-reported narcissism levels have shot through the roof.”

“On average, people spend 60% of conversations talking about themselves—and this figure jumps to 80% when communicating via social media platforms such as Twitter or Facebook.”

“Social media activates self-related thoughts in the medial prefrontal cortex (MPFC)”

Also activates parts of the mesolimbic dopamine system.

- “These newly implicated areas of the brain are generally associated with reward, and have been linked to the pleasurable feelings and motivational states associated with stimuli such as sex, cocaine, and good food.”

“people may be motivated to talk about themselves more than other topics (no matter how interesting or important these non-self topics may be).”

(from Scientific American, “The neuroscience of everybody’s favorite topic – themselves”)
University of Winnipeg: The “shallowing hypothesis”

“those who texted more than 100 times a day were 30 per cent less likely to feel strongly that leading an ethical, principled life was important to them, compared to those who kept their texting to 50 times a day or less.”

“heavy texting was also associated with higher levels of ethnic prejudice”.

“new information and social media technologies may be displacing and discouraging reflective thought,” said Dr. Paul Trapnell.
Implications

CONNECTING THE DOTS...
Those most affected are more likely to feel:

- restless, agitated, or bored
- lonely, isolated, invisible, ignored (i.e., a lack of social support or caring from others)
- depressed or hopeless
- tense, stressed, overwhelmed
- socially anxious and avoidant
- self-centered or narcissistic
- a lack of empathy or compassion toward others
- a lack respect for rules, limits, and authority
Those affected tend to avoid:

Direct interpersonal contact, including:
- Eye contact
- Phone conversations
- Emotional intimacy
- Conflict (e.g. break-ups via texting)
- Help-seeking

Thoughtful reflection (considering alternative actions, reasons for their own behavior or the behavior of others, pausing to ask “why”)

Putting on the emotional brakes – de-escalate, relax, calm down, self-soothe
Those most affected are more likely to engage in:

- impulsive behavior (online spending, gambling, “Tweeting”)
- reckless or thrill-seeking behavior (speeding, couch-burning)
- impersonal or casual sexual encounters (sexting, Tinder, Grindr, #AfterSex, Lulu, Hot or Not, OkCupid, MSU app for “hook-ups”)
- use of illicit or prescription drugs to alter their mood
- self-injurious behavior such as cutting and burning
- suicidal behavior
- aggressive or homicidal behavior, including online bullying
Implications for resilience

Decreased capacity for:
- impulse control
- emotion regulation and distress tolerance
- Help-seeking and social support
- Imagination, symbolism, metaphor, meaning, dreaming
- Perspective-taking (vs. narcissism, solipsism)
- Self-reflection
- Mature self-concept and relatedness

Note: those who have developed these capacities may paradoxically find themselves feeling socially isolated, without a relatable peer group.
So...now what?

STRATEGIES FOR UNPLUGGING OURSELVES AND OUR CHILDREN
“Put your own mask on first”

Examine your own use of digital technology and social media

Allows for empathy and insight

Modeling is more important than information
Obstacles to unplugging

Peer pressure and fear-of-missing-out (FOMO)
- Belief that social media = social life
- Fear that unplugging is becoming a hermit

Work culture is now largely defined by digital technology
- Instant responses
- Frequent, random interruptions
- “24-hour” workday
- “...some businesses and other organizations have begun asking, and in some cases demanding, that employees not check their office email on weekends.” - (Powers, 2010, p. 102)

Addiction to technology
- Intermittent reinforcement
- Dopamine bursts

Ubiquity – the Internet is (almost) everywhere
Before deciding to find a different balance

Conduct a “fearless and searching moral inventory”
- Reflect on the multiple roles that digital technology plays in your life
- Who, what, when, where, how, and above all why you use it
- Evaluate which areas are required and which ones are negotiable
- For each context, decide whether your use is conscious, deliberate, necessary, and adds value to your life
- Or whether it is habitual, automatic, unnecessary, and either fails to add value or actually detracts from your productivity, relatedness, satisfaction, and enjoyment

Read about the negative impact of digital technology and social media

Seek out social support – don’t attempt to make a change in isolation

Recognize that you are stepping out of the mainstream, creating a counter-culture
Swimming against the current

“We can allow ourselves to be carried along by the technological current, wherever it may be taking us, or we can push against it.”

--Nicholas Carr, *The glass cage: How our computers are changing us*, p. 231
Recommended daily allowance

Birth to two years: zero (or as little as possible)

Three to six years: 20 minutes

Seven to ten years: no more than 30 minutes beyond educational use

Eleven to teens: teaching responsible use
  ◦ Ideally, no social media accounts before age 16
  ◦ Inoculating against bullying, porn, violence
  ◦ Sense of self vs. managing profiles
  ◦ Tool, not the place you live your life
Assessing Internet Usage

THE INTERNET ADDICTION TEST
Internet Addiction Test (IAT)

First validated measure of internet addiction, developed by Kimberly S. Young

Based upon the following five-point Likert scale, select the response that best represents the frequency of the behavior described in the following 20-item questionnaire.

0 = Not Applicable
1 = Rarely
2 = Occasionally
3 = Frequently
4 = Often
5 = Always
IAT - questions

1. ___How often do you find that you stay online longer than you intended?
2. ___How often do you neglect household chores to spend more time online?
3. ___How often do you prefer the excitement of the Internet to intimacy with your partner?
4. ___How often do you form new relationships with fellow online users?
5. ___How often do others in your life complain to you about the amount of time you spend online?
6. ___How often do your grades or school work suffer because of the amount of time you spend online?
7. ___How often do you check your e-mail before something else that you need to do?
8. ___How often does your job performance or productivity suffer because of the Internet?
9. ___How often do you become defensive or secretive when anyone asks you what you do online?
10. ___How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
IAT – questions (continued)

11. ___How often do you find yourself anticipating when you will go online again?
12. ___How often do you fear that life without the Internet would be boring, empty, and joyless?
13. ___How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14. ___How often do you lose sleep due to late-night log-ins?
15. ___How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?
16. ___How often do you find yourself saying “just a few more minutes” when online?
17. ___How often do you try to cut down the amount of time you spend online and fail?
18. ___How often do you try to hide how long you’ve been online?
19. ___How often do you choose to spend more time online over going out with others?
20. ___How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?
IAT - scoring

After all the questions have been answered, add the numbers for each response to obtain a final score. The higher the score, the greater the level of addiction and creation of problems resultant from such Internet usage. The severity impairment index is as follows:

**NONE 0 – 30 points**

**MILD 31- 49 points:** You are an average online user. You may surf the Web a bit too long at times, but you have control over your usage.

**MODERATE 50 -79 points:** You are experiencing occasional or frequent problems because of the Internet. You should consider their full impact on your life.

**SEVERE 80 – 100 points:** Your Internet usage is causing significant problems in your life. You should evaluate the impact of the Internet on your life and address the problems directly caused by your Internet usage.
Intervention Strategies

CLINICAL AND PUBLIC HEALTH
Clinical considerations

Thorough assessment of both trauma and internet usage

- **History:**
  - Onset and chronology of both
  - Complex relationship between the two – circularity of cause and effect
    - Internet may be a source of trauma, a symptom of trauma, an obstacle to recovery, and an attempt at recovery

- **Exploration of internet usage:**
  - As self-medication – distraction/dissociation
  - As attempt at (manageable) connection
    - Alternate online identities – escape from self
    - Online support, including with other survivors
  - As attempt at social withdrawal/isolation
  - As source of trauma – online abuse and bullying
    - Note that survivors are more readily re-victimized online
    - Online behavior is directly related to real-life victimization
Clinical interventions

Assessment itself is an intervention
- Creates insight and awareness of both positive and negative aspects
- Creates possibility for alternative coping strategies
- Reduces chances of re-victimization
- Decreases risk of overuse
- Improves sleep hygiene

Mindfulness
- Yoga
- DBT

CBT-IA©
Digital Detox: Internet Usage as a Public Health Issue

61% admit to being addicted to the internet and their devices

The average American dedicates 30% of leisure time to perusing the web

50% of people prefer to communicate digitally rather than in person

67% of cellphone owners find themselves checking their device even when it’s not ringing or vibrating

One out of ten Americans report depression; heavy internet users are 2.5 times more likely to be depressed

The average employee spends 2 hours a day recovering from distractions

1/3 of people would rather clean their toilets than their inbox

The average employee checks 40 websites a day, switching activities 37 times an hour, changing tasks every two minutes.

http://digitaldetox.org/manifesto/
Digital Detox: Internet Usage as a Public Health Issue

However, only 2% of people can actually multi-task without decline in performance.

60% of people say traditional vacation does not relieve their stress

33% of people admit to hiding from family and friends to check social media

High Social media use can trigger an increase in loneliness, jealousy and fear

95% of people use some type of electronics in the hour leading up to bed.
** Artificial light from screens increase alertness and suppress the hormone melatonin by up to 22% – negatively affecting sleep, performance and mood.

1/3 of the global population has access to the internet

*Unplugging for just one day can give some users mental and physical withdraw symptoms*
Public Health Strategies

School-based interventions

- Reducing use of digital technology (DT) in classroom instruction
- Education in primary, middle, and high schools regarding risks of overuse of DT
- Specific focus on risks of online bullying and other forms of predatory or abusive behavior
- Deliberate programming for alternative forms of social connection
  - Support groups
  - Clubs
  - Events
- Parent education
Public Health Strategies

Legislation regarding use of addictive strategies in design and marketing


- International strategies:
  - Prevalence rates for addiction internationally range from 1-38%
  - France: companies over 50 employees must draft formal policies regarding after-hours DT use
  - Japan: Education Ministry has started “internet fasting campus” that teach “the importance of human relationships”
  - India: 25% of adolescents are addicted or have problematic use; 12% of the total population
    - NIMHANS (mental health and neurosciences) has set up “internet de-addiction centres” in 4 cities
  - South Korea: “I Will” centers for children, adolescents and young adults under age 24
    - Provide “counseling, education, and alternative activities”
  - China: over 300 treatment centers
Replace screen-time with face-to-face time

Texting, posting, even Skype and FaceTime do not replace in-person conversation

Beware the mere presence of the device when talking (e.g., Turkle’s research)

Put the phone away, leave it in the car, turn off alerts

Schedule time to just talk

Seek out more meaningful topics – be deliberately more honest, real, vulnerable, curious

Make eye contact – seek to connect and understand

Listen, empathize, mirror visually and verbally, imagine the other person’s experience

Breathe, notice your physical and emotional reactions to the other person
What to do instead?

Cards, board games (MSU athletics example)
Reading, journaling (not blogging)
Scrapbook, not Instagram
Actually *talk* on the phone (not texting)
Write letters and thank-you cards
Go outside... (movement and exercise)
Meditation/mindfulness/yoga
Daydream, play
Tell stories, teach kids to narrate their day
Art, music
Socializing that is screen-free, face-to-face
Don’t distract from other activities by “checking”
Stop filming every experience
Teaching young people about social media

Discuss consequences of social media

- Cyberbullying – both as bully and victim
  - bullycide
- Loss of emotional connection and support
  - Difference between Friending and being actual friends
- Unreality of social media profiles – false persona
  - Self-esteem based on likes and hits
- Everything on the internet is essentially permanent
  - Consequences for future relationships, jobs
- Teach the value of face-to-face conversation
  - Non-verbal communication
  - Learning to read others’ emotions
  - Learning to regulate and express one’s own emotions
Unplugging – tips and strategies

Webinar – “(Dis)connection: Finding a more balanced use of digital technology and social media”

https://mediaspace.msu.edu/media/t/1_e0kpryw7
What you can do: Suggested strategies for unplugging

Find a small group of like-minded people

Stop using your devices 1-2 hours before sleep
  ◦ Use a dimmer setting on your device (e.g., Twilight app)

Sleep away from your phone

Work/study away from your phone

Turn off your email when studying

Turn off alert messages on your devices

Schedule specific times to check messages

Take breaks – stand up every 30 minutes, stretch, move your body
Parenting

Interrupted/fragmented parenting impacts brain development (UC-Irvine study)

Form a parents coalition – your children will resent you less if their friends also have restrictions

Device as babysitter

Model good behavior

Importance of family conversation

Consider no devices for anyone in the car, at the dinner table, in the bedroom

One screen at a time – no texting while watching TV, etc.

Teach the value of boredom

Talk about the “good old days”

Anticipate being resented https://www.youtube.com/watch?v=5HbYScltf1c
The Internet is “Totalitarian”

“You could cooperate with the system or you could oppose it, but the one thing you could never do, whether you were enjoying a secure and pleasant life or sitting in a prison, was not be in relation to it. The answer to every question large or small was socialism. If you substituted networks for socialism, you got the Internet.”

--Jonathan Franzen, *Purity*

(emphasis added)
Websites and Organizations

http://www.Digitaldetox.org

- “We are more globally connected than ever before, but life in the digital age is far from ideal. The average American spends more than half of their waking life staring at a screen. The negative psychological, social and cultural impact is real. Things need to change.”


http://nationaldayofunplugging.com/ (March 4-5, 2016)

- “Cell-phone sleeping bag”

shinrin-yoku, or forest bathing: The value of nature

Screen-dimming applications


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Discussion

QUESTIONS, COMMENTS, POINTS OF REFLECTION
Too Distressed to Learn?

“A new study at 10 community colleges across the nation reveals that half of the more than 4,000 community college students surveyed are experiencing a current or recent mental health condition. Less than half of these students are receiving any mental health services. Students age 25 and younger are especially likely to have an untreated mental health condition. As mental illness can impair academic success and quality of life, there is a clear need for greater attention to and resources for mental health services and programs on community college campuses.” --Wisconsin HOPE Lab
### Students under pressure

College and university mental health trends by school year among students already receiving services at counseling centers

<table>
<thead>
<tr>
<th>Percentage of students</th>
<th>2010–11</th>
<th>2011–12</th>
<th>2012–13*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended counseling for mental health concerns</td>
<td>45.2%</td>
<td>47.6%</td>
<td>48.7%</td>
</tr>
<tr>
<td>Taken a medication for mental health concerns</td>
<td>31.0%</td>
<td>31.8%</td>
<td>32.9%</td>
</tr>
<tr>
<td>Been hospitalized for mental health concerns</td>
<td>7.0%</td>
<td>7.8%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Purposely injured yourself without suicidal intent (e.g., cutting, hitting, burning, hair pulling, etc.)</td>
<td>21.8%</td>
<td>22.5%</td>
<td>23.2%</td>
</tr>
<tr>
<td>Seriously considered attempting suicide</td>
<td>23.8%</td>
<td>25.5%</td>
<td>30.3%</td>
</tr>
<tr>
<td>Made a suicide attempt</td>
<td>7.9%</td>
<td>8.0%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Considered seriously hurting another person</td>
<td>7.8%</td>
<td>7.9%</td>
<td>11.2%</td>
</tr>
<tr>
<td>Intentionally caused serious injury to another person</td>
<td>2.4%</td>
<td>2.2%</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Source: Center for Collegiate Mental Health

*In 2012–13 the answer format was changed for all items except prior counseling/medication. This change may have partially accounted for some of the increases, but because rates changed differentially, it’s clearly more than that. For a more detailed explanation of changes, see the Center for Collegiate Mental Health 2013 Annual Report.
College and university counseling center presenting concerns

Percentage of students who presented with depression, anxiety or a relationship problem as their main reason for seeking help at a counseling center.

Source: Association for University and College Counseling Center Directors
## Presenting Concerns in Counseling: MSUCC in comparison to National Averages

<table>
<thead>
<tr>
<th>Condition</th>
<th>National</th>
<th>MSUCC</th>
<th>% Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>42</td>
<td>58</td>
<td>+16</td>
</tr>
<tr>
<td>Depression</td>
<td>36</td>
<td>61</td>
<td>+25</td>
</tr>
<tr>
<td>Relationship issues</td>
<td>36</td>
<td>25</td>
<td>-11</td>
</tr>
<tr>
<td>Psychotropic medication</td>
<td>24</td>
<td>28</td>
<td>+4</td>
</tr>
<tr>
<td>Suicidal thoughts</td>
<td>16</td>
<td>36</td>
<td>+20</td>
</tr>
<tr>
<td>Significant prior treatment</td>
<td>14</td>
<td>23</td>
<td>+9</td>
</tr>
<tr>
<td>Alcohol abuse/dependence</td>
<td>10</td>
<td>20</td>
<td>+10</td>
</tr>
<tr>
<td>ADHD</td>
<td>9</td>
<td>8</td>
<td>-1</td>
</tr>
<tr>
<td>Sexual/physical assault</td>
<td>9</td>
<td>17</td>
<td>+8</td>
</tr>
<tr>
<td>Self-injurious behavior</td>
<td>9</td>
<td>15</td>
<td>+6</td>
</tr>
<tr>
<td>Eating disorders</td>
<td>6</td>
<td>11</td>
<td>+5</td>
</tr>
<tr>
<td>Oppression (racism, sexism, homophobia)</td>
<td>6</td>
<td>9</td>
<td>+3</td>
</tr>
</tbody>
</table>

Source: AUCCCD survey, 2012
Possible Explanations

Availability of mental health treatment for children and adolescents

Changes in parenting (anxiety → over-protection)

Socioeconomic stressors
  - Financial stressors
  - Competition for grades, internships, jobs post-graduation

Collective/cultural anxiety (9/11, Virginia Tech)

Recognition and reporting of trauma, including childhood sexual abuse and sexual assault

De-stigmatizing of mental health treatment; increased help-seeking

Over-use of social media, video games, and other digital technology
Three generations

HTTPS://SEARCH.YAHOO.COM/YHS/SEARCH?p=NATURE+VALLEY+THREE+GENERATIONS+VIDEO&ei=UTF-8&HSPART=MOZILLA&HSIMP=YHS-004