Social Media: Impact on the Brain

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Why Is This Important

- Social media is used by hundreds of millions of people with teens and young adults making up its largest demographic.
Why Is This Important

- Facebook, the most popular social media platform in 2015 bragged that 1 in 7 people on the planet are logged on in a single day.
Why Is This Important?

- 7 in 10 Americans use social media today.
- 24% of teens are online “almost constantly”.
- 56% of teens go online “several times” a day.
- 88% of teens have a cellphone.
- 91% of teens use a smartphone to access social media.
- CommonSense Media reported teens are spending one third of their day using online media, including video, music which equals nearly 9 hours a day.
- Tweens, between 8-12 years are using online media 6 hours a day.
Gray Versus White

- Gray matter is made up of nerve cell bodies; is 40% of the brain; consumes 94% of the oxygen and this is where real processing occurs.
- White matter is made up of fibers; it is 60% of the brain and is what allows communication to and from the gray matter areas and between the gray matter and other parts of the body.
Lin, Zhou, Lei et al. have shown through neuro-imaging that internet addiction results in structural and functional changes in brain regions associated with emotional processing, executive functioning, attention, decision-making and cognitive control. The red areas indicate abnormal white matter in internet/social media addicted teens.
White Matter Atrophy

- Research shows a loss in the integrity of white matter. “Spotty” white matter results in the loss of communication within the brain, including to and from various lobes in the same hemisphere and between hemispheres.
- Interrupted connections can slow down signals, short-circuit signals and/or cause them to misfire.
Gray Matter Atrophy

- Multiple studies have shown shrinkage or loss of tissue volume in gray matter, which is where processing occurs. Occurs primarily in the frontal lobe.
- Volume loss is also reported in the striatum which is involved in reward pathways and the suppression of socially unacceptable impulses.
Gray Matter Atrophy

- Especially concerning is the damage to the area of the brain called the insula, which is involved in our capacity to develop empathy and compassion for others and our ability to integrate physical signals of emotion. Impairment in this area can result in violent behavior as well as negatively impact the depth and quality of personal relationships.
Other Structural Changes

- Reduced cortical thickness was found in multiple studies which correlates to impairment when completing cognitive tasks.
- Imaging studies have found less efficient information processing; reduced impulse inhibition; increased sensitivity to rewards; insensitivity to loss and abnormal spontaneous brain activity associated with poor task performance.
Chemical Changes

dopamine  endorphin  oxytocin  serotonin
Function of Dopamine

- Reward/Motivation
- Pleasure & Euphoria
- Motor Functioning
- Memory & Learning
- Attention

- Executive Functioning
- Mood – “Molecule of Happiness”
- Sleep
- Pain Processing
Function of Dopamine

The accumulation of dopamine in the brain makes it continue to create new dopamine receptors. Over time, the brain adapts and dopamine stops having the same effect as it did originally, which causes us to search for more of what we crave.
Function of Dopamine

- Research on video games have shown dopamine is released during both gaming and when on social media platforms, which produces brain changes that are similar to drug cravings.
- Other findings in internet/social media addiction include reduced numbers of dopamine receptors and transporters.
Function of Oxytocin

- Regulates social interactions.
- Impacts sexual reproduction.
- Assists with maternal-infant bonding.
- “Love Hormone”/”Cuddle Chemical”.
- Hormone that underlies trust.
- Antidote to depression.
Paul Zak, a neuroeconomist found:

- 13.2% increase in oxytocin levels after 10 minutes of tweeting.
- Significant drop in stress-related hormones.
- Social media produced a calming, soothing and pleasurable effect that was chemically measurable.
- Makes our brains feel good and have increased trust.
- Increased online vulnerability.
- Increased use of social media.
Cognitive Impact - Attention

- Increases the need for excessive stimulation – lights, noises, rewards etc.
- Encourages multi-tasking which adversely impacts learning.
- Inhibits abstract thinking skills.
- Impairs ability to maintain sustained focused attention.
- Questionable link to a significant increase in ADHD diagnoses.
Cognitive Impact - Sleep
Cognitive Impact - Memory

- “Cognitive offloading” or the tendency to rely on the Internet as a memory aide – Internet is a memory support and memory extender – it’s the external drive.
- When the working memory is experiencing digital overload, it’s like a glass of water overflowing.
- Impacting student’s learning and recall.
Learning essentially relies on being able to place information in context, something the conditioned multitasking brain is increasingly unable to cope with.

Numerous studies have also found that when students multitask while doing schoolwork, they understand and retain less of the information.

Negative impact on grades.
Cognitive Impact – Reading

- Decreased interest in reading books and literature.
- Prefer short, efficient reading materials.
- Impacts reading skills, vocabulary and intellectual development.
- Decreased interest in research.
- Can’t differentiate fact from fiction or fake news – trust social media platforms.
Cognitive Impact - Writing

- Negative impact on vocabulary skills – use of cyberslang.
- Negative impact on formal communication skills.
- Increased formatting and grammatical errors.
- Written communication is done in less than 140 characters.
- Loss of creativity and storytelling.
- Negative impact on research skills.
Cognitive Impact - Writing

Mom! Do you know what that means?

Mom lol means laughing out loud!

Oh my goodness!! I sent that to everyone I thought it meant lots of love. I have to call everyone back oh god
Social Skills Deficits identified include ability to read:
- Body language.
- Facial expressions.
- Vocal reactions and expressions.

Social Skills Learning Disability.
Social Impact

- Significant increase in social anxiety has been reported.
- Increased anxiety associated with engagement in social adaptive skills has also been reported.
Social Impact

- Negative impact on empathy and critical thinking skills:
  - Focus is on self-interests.
  - Communication is disjointed and less focused on others.
  - Lack of eye contact impairs our ability to empathize.
Emotional Impact

- Excessive reliance on emoticons may impair our ability to focus on real life emotions and expressions.
- Impairs our ability to recognize nonverbal emotional reactions of others.
- Encourages a false emotional dependence.
- Encourages a social identity that is not real and superficial.
Emotional Impact

- Constant access to social media is:
- Creating oversensitivity.
- Reducing frustration tolerance.
- Increasing impulsive behavior.
Emotional Impact

- Lowers self-esteem.
- Increase in negative comparisons.
- Increased anxiety.
- Increased depression.
- Increase in psychological disorders and personality disorders.
Multiple brain imaging findings show shocking similarities between substance addiction and social media addiction.

Internet Addiction Disorder (IAD) is a new diagnosis under consideration which manifests as tremors, shivers, nausea and anxiety.
Addictive Behavior

• Those at greatest risk of Social Media addiction include:
  • Extroverts.
  • Women.
  • People unable to get to sleep until late at night.
  • People who are socially insecure or anxious.
Other Risks of Social Media

- Cyber Bullying and Cyber Stalking.
- Increased risk to predators.
- Increased risk of self harm.
- Risk of identity and/or identity theft.
- Over sharing of information.
- Increased exposure to offensive behavior.
- Exposure to inappropriate material.
• Questions???????