Trauma – a Burning Fuel for Electronic Media Addiction

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"The views expressed are those of the author and do not reflect the official policy of the Department of the Army, the Department of Defense or the U.S. Government."

An Addiction Hits Close to Home

Definition of Addiction

In Rome being "addicted" meant that you had just been sentenced to slavery.

If you owed someone money and couldn't repay, a judge would sentence you to work as a slave until you could repay the debt.

Addiction later evolved to describe any bond that was difficult to break.

Adam Slater (2018)
Irresistible

The Plan for Today

- How bad is the electronic media addiction problem? – Current trends
- How does the brain get hooked on electronic media?
- Early attachment
- Trauma – Big T and Little t – ACE literature
- The impact of excessive electronic media on the brain and body
- Polyvagal Theory – psychoneurological understanding
- Solutions

The Vicious Cycle

- As we will see, poor attachment and early trauma impact negatively on brain formation, our autonomic template, and general health, and thus set us up for substance and behavioral addictions.

- These addictions further negatively impact our neurology and general health which creates a negative feedback loop which only accelerates the addiction.

I began pondering: What has been going on with kids in the past 10 years or so?

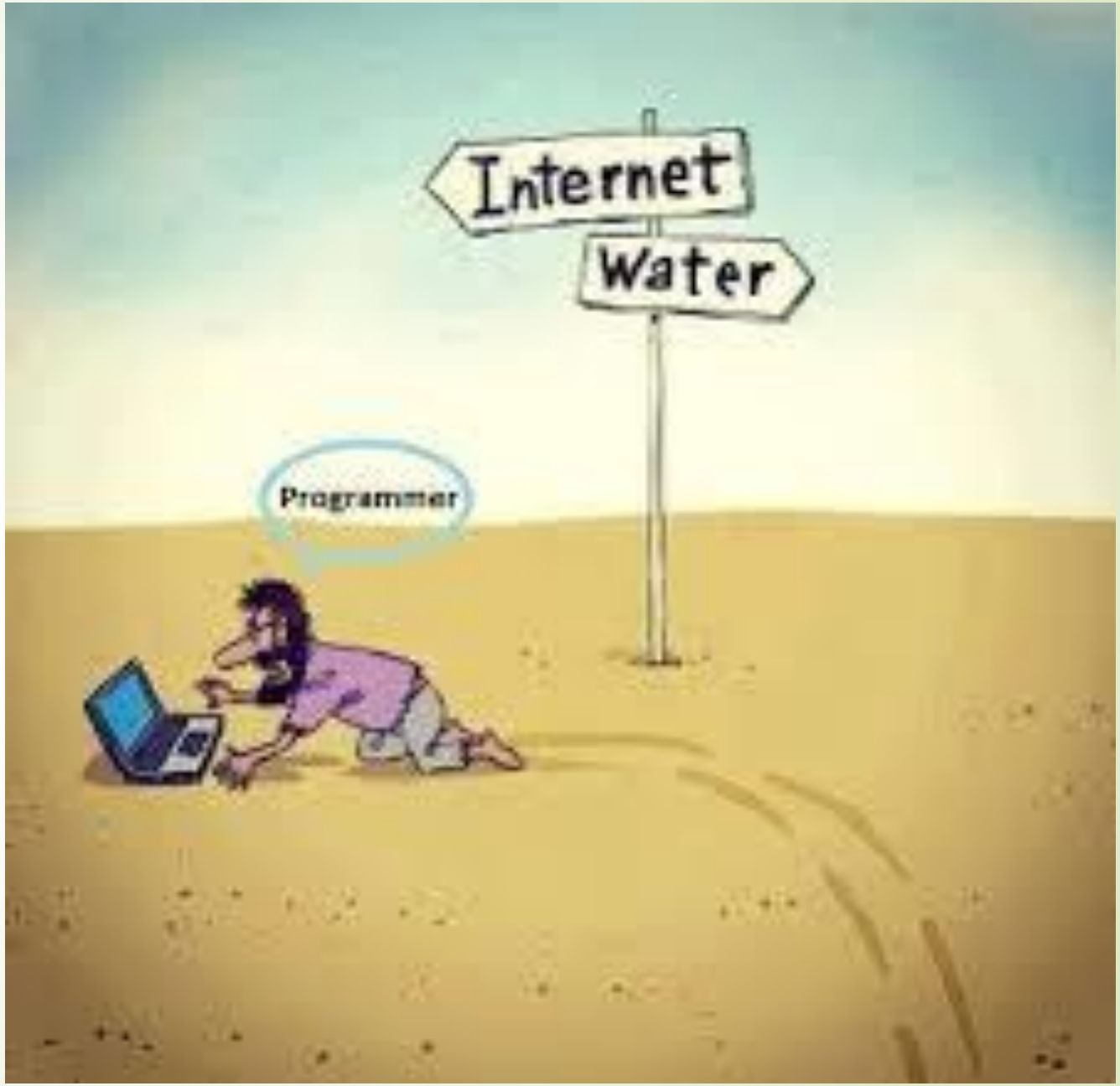
- An alarming increase in aggression
- Increased destruction of property
- Increased negative mood and irritability
- Increased self-harm and suicidality
- Decreased coping skills and resiliency
- Poorer social skills

Disruptive Mood Dysregulation Disorder – Real or a Sign of the Times:

Dunckley 2015 States:

"But what if this '*disorder*' characterized by dysregulation is not some mysterious new plague, but environmentally related? If we ask ourselves, 'What is the biggest change in our children's environment compared to only one generation ago?' the answer is not gluten, pesticides, plastics, or food dye, but the advent of the Internet, cell phones, and wireless communication. Might DMDD really be a by-product of constant bombardment from electronic screen devices, causing the brain to short-circuit? And what if the systematic removal of such screen devices provided much-needed relief, almost immediately?"

Sadly, many these days would go left I think:



Current Trends

In a ten-year span from 1994 to 2003, the diagnosis of bipolar disorder in children increased forty-fold (Moreno et al., 2007).

Childhood psychiatric disorders such as ADHD, autism spectrum disorders, and tic disorders are on the rise (Atladottir et al., 2007).

Between 1980 and 2007, the diagnosis of ADHD has increased by 800 percent (Dunckley, 2012).

Between 2001 and 2005, ADHD medication prescription rose by 40%.

Mental illness is now the number one reason for disability findings for children, representing half of all claims filed in 2012, compared to just 5 to 6 percent of claims twenty years ago (SSI Annual Statistical Report, 2012).

Current Trends - continued

Childhood psychosocial and neurodevelopmental issues have increased in lock step with the insidious growth of electronic screen exposure in daily life. Children 2 to 6 spend 2 to 4 hours per day (Rideout et al., 2004).

According to a long-term study by the Kaiser Family Foundation in 2010, children 8 to 18 spend on average 7½ hours per day on some form of screens – a 20% rise from just 5 years earlier (Rideout et al., 2010).

8-10-year-old children spend nearly 8 hours per day on media and older children spend more than 11 hours (AAP, 2013).

71% of children have a TV or Internet device in their room (AAP, 2013).

Teens receive and send on average 3,705 texts per month or about 6 per hour (Rosen, 2012).

Current Trends – continued

And what about we adults in the room?

Cited in Adam Alder, *Irresistible (2018)*

46 percent of adults say they couldn't bear/fear to be without their smartphones (**Nomophobia**) - some would rather suffer physical injury (Rosenberg and Feder, *Behavioral Addictions*).

In 2008 adults spent on average of 18 minutes on their phones and in 2015 that rose to 2 hours and 48 minutes (Rosenberg and Feder, *Behavioral Addictions*).

Up to 59% of adults say they are dependent on social media, and they report that this reliance makes them unhappy (Rosenberg and Feder, *Behavioral Addictions*).

There were an estimated 280 million smartphone addicts in 2015, which would make the fourth largest country in the world after China, India, and the United States (Rosenberg and Feder, *Behavioral Addictions*).

And Pornography - How  is it?

- **40 million** American people regularly visit porn sites (Webroot, 2019).
- **35%** of all internet downloads are related to pornography (Webroot, 2019).
- **34% of internet users** have experienced unwanted exposure to pornographic content through ads, pop up ads, misdirected links or emails (Webroot, 2019).
- The societal costs of pornography are staggering. The financial cost to business productivity in the U.S. alone is estimated at **$16.9 Billion annually**; but the human toll, particularly among our youth and in our families, is far greater (Weebroot, 2019).
- **One-third** of porn viewers are women (Webroot, 2019).
- Between 2008 and 2011, exposure to porn among boys under the age of 13 jumped from **14% to 49%.** Boys' daily use more than doubled. (Sun et al. 2016)
- In a 2007 University of Alberta study, 429 students ages 13 and 14 from 17 schools across Alberta, Canada were surveyed about how often they accessed sexually explicit media content: **90% of boys** and **70% of girls** reported accessing sexually explicit media on at least one occasion (Betkowski, 2007).

Part Two:

How the Brain Gets Hooked on Media

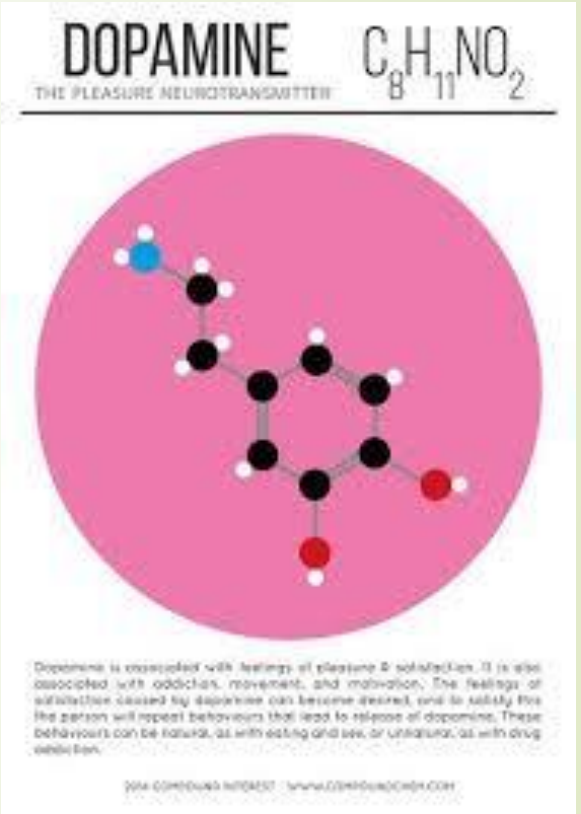
Dopamine - guilty as charged

How the Brain Gets Hooked on Digital Drugs

- As Kardaras(2016) stated in his book*, Glow Kids*, in order to fully understand addiction, we need to understand the brain's reward system and the impact of dopamine on that reward pathway.

- Specifically, how much dopamine is activated by a substance or behavior is correlated directly with the addictive potential of that substance or behavior.

- **Dopamine,** as many of us know, is the "feel-good" neurotransmitter that is the most critical and important part of the addiction process. Dopamine was discovered in 1958 by Arvid Carlsson and Niles-Ake Hillarp at the National Heart Institute of Sweden.



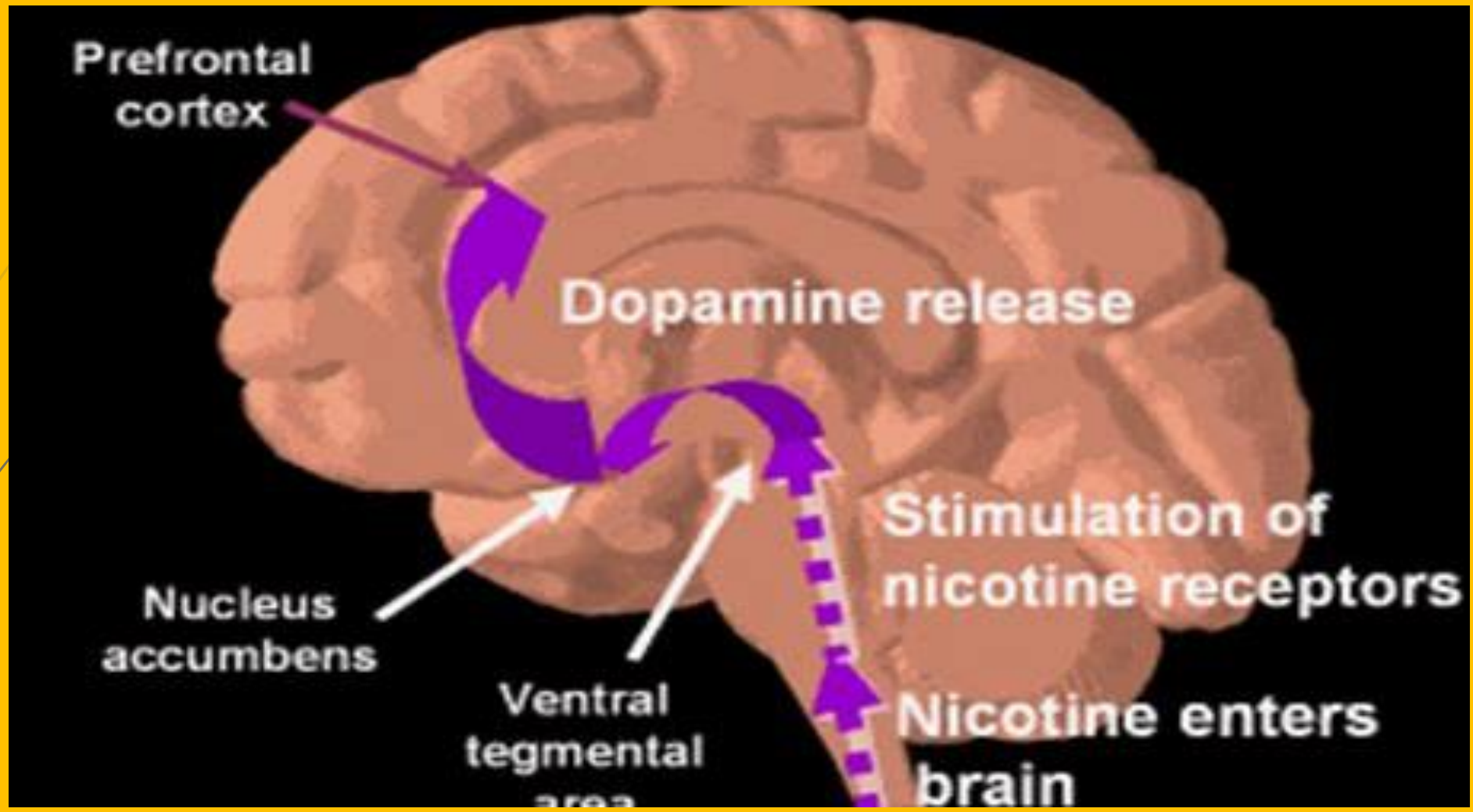
Functions of Dopamine

➨ Dr. Susan Weinschenk (2009) noted that **dopamine** is created in various parts of the brain and is critical in several brain functions to include:

- Thinking
- Moving
- Sleeping
- Mood
- Attention
- Motivation
- Seeking and reward

Inspired to watch because of Dopamine

Dopamine Reward Pathway



The mesolimbic pathway is a collection of dopaminergic (i.e., dopamine-releasing) neurons that project from the ventral tegmental area (VTA) to the ventral striatum, which includes the nucleus accumbens (NAcc) and olfactory tubercle. It is one of the component pathways of the medial forebrain bundle, which is a set of neural pathways that mediate brain stimulation reward.

More on Dopamine

- When an individual performs an action that is satisfying to a need or fulfills a desire, dopamine is released into the nucleus accumbens, a cluster of nerve cells beneath the cerebral hemispheres that are specifically associated with reward and pleasure. This is also known as the brain's "pleasure center."
- Natural dopaminergic activities, such as eating and sex, usually come after effort and delay and serve a survival function.
- These are called the "natural rewards" as contrasted with addictive chemicals/behaviors (which can highjack the same circuity).
- Addictive drugs and behaviors, such as gambling and video gaming, actually offer a short-circuit to this process which only ends up flooding the nucleus accumbens with dopamine and does not serve any biological function.

Dopamine vs Endogenous Opioids

- Although **dopamine** has been referred to as the **"pleasure molecule,"** it is in actuality more about seeking and searching for pleasure, rather than pleasure itself. Dopamine is more involved in drive and motivation to seek.
- The "final reward" or what we experience as feelings of pleasure, Wilson (2014) writes, involve the release of **endogenous opioids**.
- You can think of dopamine as **"wanting"** and opioids as **"liking."**
- As psychologist Dr. Weinschenk explains, "Dopamine causes us to want, desire, seek out and, search; however, the dopamine system is stronger than the opioid system and we hence seek more than we are as satisfied…" (Weinschenk, 2009).
- "Addicts want it more but gradually like it less. Addiction might be thought of as *"wanting gone amok."* (Wilson, 2014).

BOUGHT AND LIKING THE BMW BUT STILL WANTING THE DUCATI DIAVEL

Dopamine and DeltaFosB “Keep doing it!”

- Highly salient activities, in this case addiction, lead to the accumulation of DeltaFosB, a protein that activates the genes involved with addiction. The molecular changes it potentiates are almost identical for both sexual conditioning and chronic drug use. Specifically, DeltaFosB rewires the brain to crave IT whatever IT is.

- In a sense, dopamine is like the foreman on a construction site barking orders and DeltaFosB is the worker on the site. Dopamine is yelling, “This activity is really important, and you should do it again and again.”

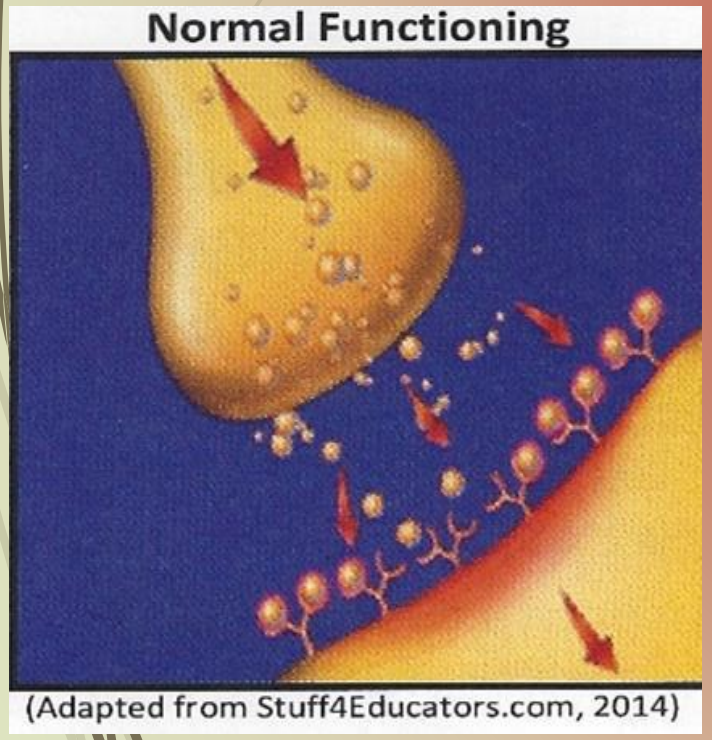
- DeltaFosB is responsible for ensuring that you remember and repeat the activity.

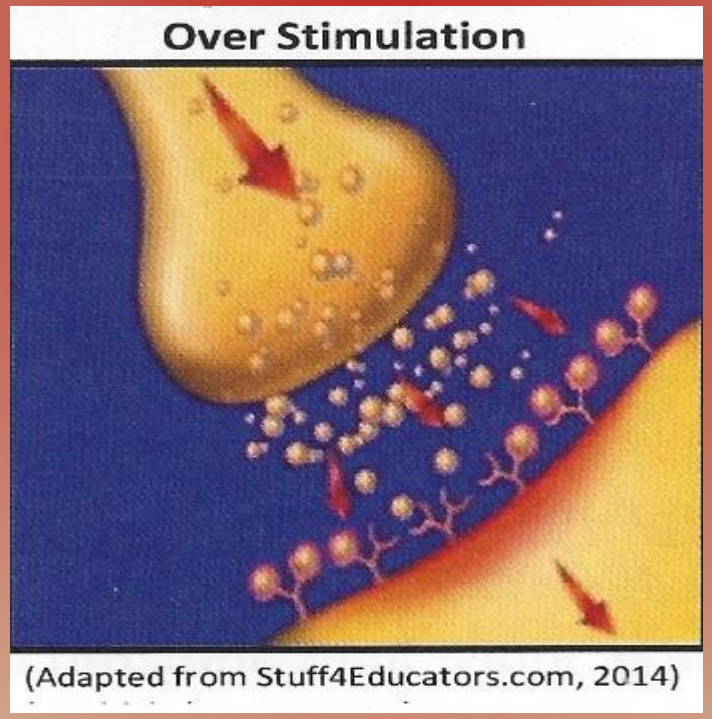
- This repeated process produces what is called sensitization which is based on the principle, “Nerve cells that fire together wire together” as noted by Canadian researcher Donald Hebb in 1949. Repeated activity strengthens cell connections.

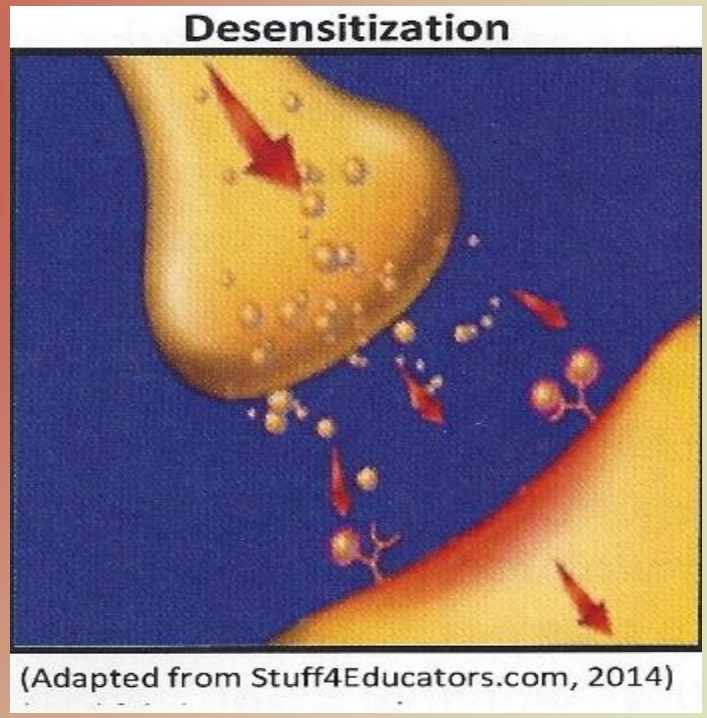
Dopamine and CREB – "Slow it Down, Silver!"

- As the brain recognizes that it needs a rest, it will kick out **CREB** in an effort to slow things down (Wilson, 2014).
- In essence, **DeltaFosB** acts like the gas pedal and **CREB** functions as the brakes.
- CREB specifically inhibits dopamine and endogenous opioids in an effort to take the joy out of the binging/addictive behavior or substance so that you can give it a rest.
- This numbed pleasure response that is induced by CREB is often identified as **desensitization** which leads to **tolerance** - the need of increasingly higher doses to achieve the same effect. Tolerance is a key factor in addiction.

Dopanergic Downregulation at the Synaptic Level







So, we see that chronic overstimulation can lead to two opposite effects:

01

Increased dopamine activity (wanting/seeking it more) –

sensitization via **DeltaFosB**

02

Decreased dopamine and opioid activity (liking it/enjoying it less) – **desensitization** via **CREB**

The Three C's of Addiction

- Wilson (2014) notes that all addictions, regardless of their differences, result in an established set of **"core brain changes"** which, in turn, present as recognized signs, symptoms, and behaviors such as those listed in the **Three C's:**

1. ***Craving and Preoccupation*** with obtaining, engaging in or recovering from the use of the substance or behaviors in question.

2. ***Loss of Control*** in using the substance or of engaging in the behavior and noted by increasing frequency or duration, larger amounts or intensity, and/or increasing the risk and behavior in an effort to obtain the desired effect.

3. ***Negative Consequences*** in physical, social, occupational, financial, or psychological areas.

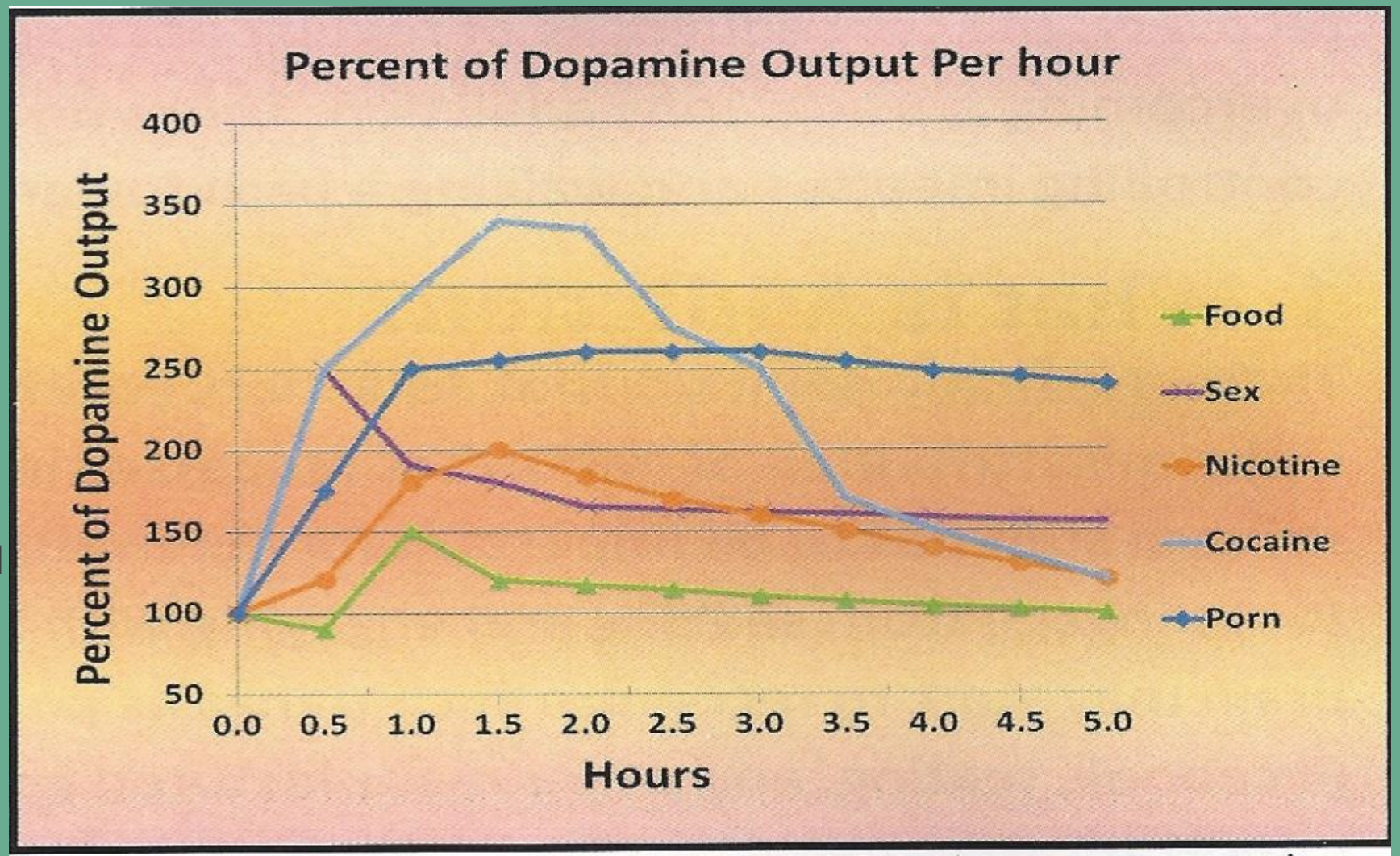
Factoids about Dopamine Increases (Koepp et al.,1998; Guangbheng et al., 2012)

- Chocolate – 50% increase
- Sex – 100% increase
- Snorting cocaine – 350%
- Crystal meth – 1,200%
- Video gaming – 100%

What Cranks Us Up?

Summary of dopamine increases:

- Food – 150% increase
- Nicotine – 200% increase
- Snorting cocaine – 350% increase
- Sexual intimacy – 250% increase
- Pornography – 250% increases and stays elevated for longer – even when compared to cocaine



(Di Chiara & Imperato, 1988; newlifehabits.com, 2010)

Early Attachment

"In particular, it is the experience of loving and being loved that most closely predicts how we react to the hardships of life; human attachments are the ultimate source of resilience.

— Jonah

Early Attachment

- Attachment is a really big deal and has lifelong implications for all of us. Safe and secure attachment are absolutely necessary for developing healthy and secure relationships, emotional health, and the ability to regulate our emotions.
- Two early pioneers in this field, **Dr. John Bowlby** (1969) and **Dr. Mary Ainsworth** (1973) carved the way to our understanding of attachment and child development theory.
- They **defined attachment** as a deep and enduring emotional bond that leads to connections between us across time and space.
- This attachment is not always mutual and can travel in only one direction. For example, a child can attach to a parent, but the parent does not always attach to the child or vice versa (Kain & Terrell, 2018).

In the Words of Johann Hari (2015)

Why is attachment important to addiction?

"Addiction is about **bonding.**

If you can't do it with people, you will do it with a substance.

Now that might be gambling, that might be media, that might be cocaine, that might be cannabis.

You will bond to something because that is our nature.

That's what we want as human beings."

Neurobiology of Attachment
Chambers (2017)

If the **dorsal striatal reward network** is not fully developed during the sensitive attachment period, one cannot develop a preference for familiarity, comfort, and satiety over the rewarding sensation of **novelty brought on by substances of abuse**

Insecure attachment has also been shown to lead to difficulties with other psychiatric illnesses, including depression, anxiety disorders, **substance abuse disorders,** and several medical illnesses (Davies, Macfarlane, McBeth, Morriss, & Dickens, 2009; McWilliams & Bailey, 2010; Puig, Englund, Simpson, & Collins, 2013).

Neurobiology of Attachment

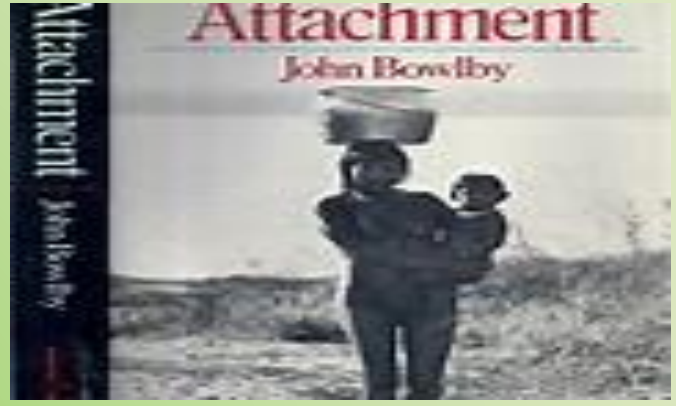
Chambers (2017)

Attachment style has been found to directly impact the recovery of patients hospitalized for the treatment of addictions, where insecure (avoidant) attachment leads to **poor treatment outcomes** (Caspers, Yucuis, Troutman, & Spinks, 2006; Fowler, Groat, & Ulanday, 2013).

Oxytocin and social interaction have been shown to decrease cortisol levels, demonstrating that even at this early stage, physical connection between a mother and her infant has an important effect on brain development and **neuroplasticity** (Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003).

Furthermore, adults with insecure attachment show a **hyper-reactive HPA axis** and **cortisol response to acute stress,** demonstrating that these effects are long lasting (Quirin, Pruessner, & Kuhl, 2008).

Attachment – Dr. John Bowlby



- By way of background on Dr. Bowlby, in an interview with Dr. Milton Stenn , Bowlby shared that his career started off in the medical direction. He noted that he was following in his surgeon father's footsteps. His father was a well-known surgeon in London and Bowlby explained that his father encouraged him to study medicine at Cambridge.
- Bowlby ended up following his father's suggestion but was not terribly interested in anatomy and natural sciences. However, during his time at Trinity College, he became particularly interested in developmental psychology which led him to give up medicine by his third year. When Bowlby left medicine, he accepted a teaching opportunity at a school called Priory Gates for six months where he worked with maladjusted children.
- Bowlby stated that the experience at Priory Gates was extremely important to his career in research as he learned that the problems of today should be understood and dealt with at a developmental level (Kanter, 2007).

Attachment – Dr. Mary Ainsworth

- Bowlby was not the only act in town as he collaborated extensively with Dr. Mary Ainsworth.
- Mary was born in **Glendale Ohio.** When she was 15, she read William McDougall's book, ***Character and the Conduct of Life*****,** which inspired her to pursue psychology.
- While she was teaching at **John Hopkins,** Mary began working on creating a means to measure attachments between mothers and their children.
- It was this that led her to develop her famous **"Strange Situation"** assessment, in which a researcher observes a child's reactions after a mother briefly leaves her child alone in an unfamiliar room.
- The child's reaction after the separation and upon the mother's return, revealed important information about attachment. Based on her observations and research,
- Mary determined that there were **three main styles of attachment:** secure, anxious-avoidant, and anxious-resistant. Since these initial findings, her work has spawned numerous studies into the nature of attachment and the different attachment styles that exist between children and their caregivers (VeryWellMind, 2019)

Four Phases of Attachment

- Rudolph Schaffer and Peggy Emerson (1964) analyzed the number of attachment relationships that infants form in a longitudinal study with 60 infants.
- In their study, infants were observed every four weeks during the first year of life, and then once again at 18 months.
- Schaffer and Emerson determined that four distinct phases of attachment emerged:

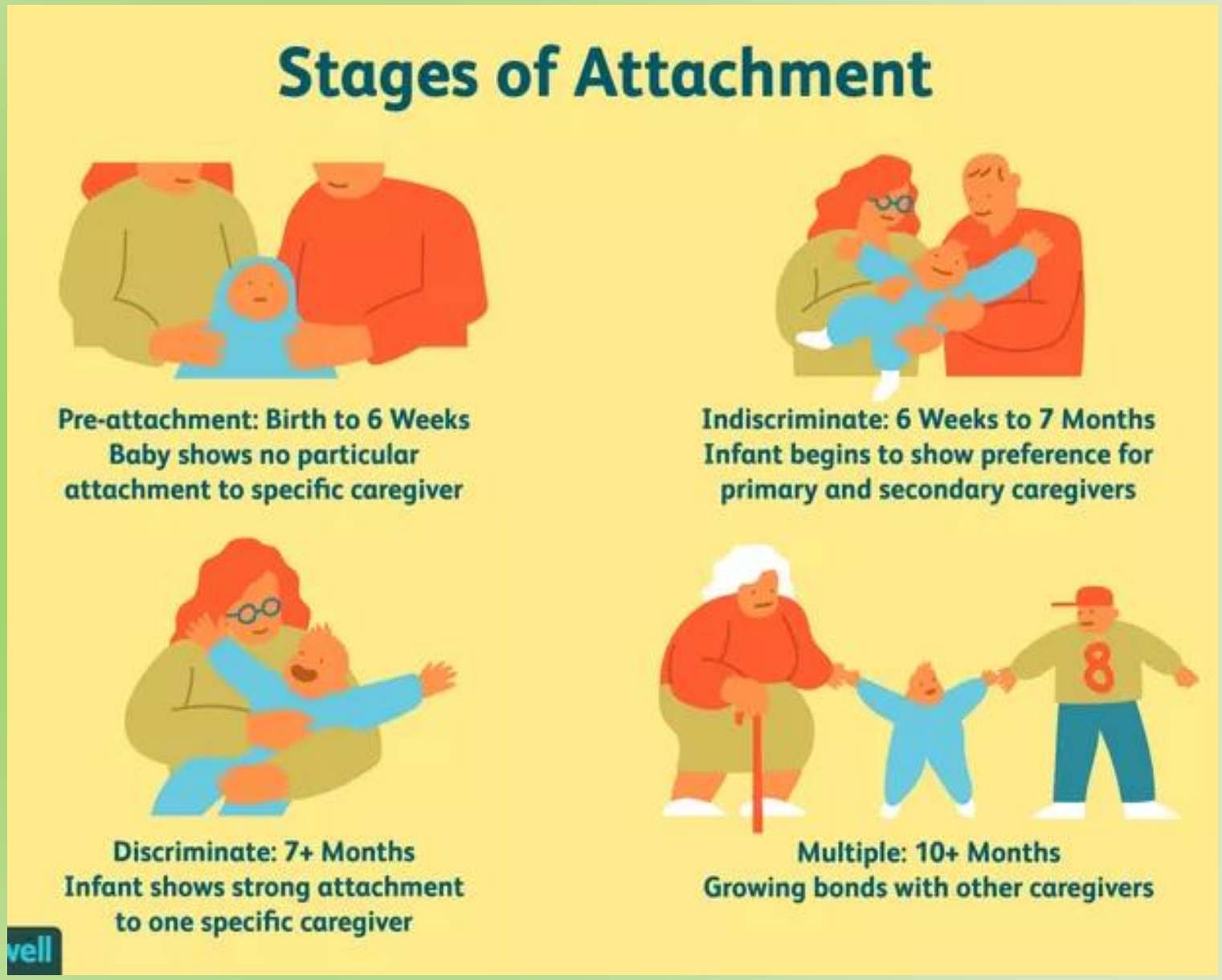


Illustration by JR Bee (VeryWellMind, 2019)

Four Phases of Attachment

Rudolph Schaffer and Peggy Emerson (1964)

- **Pre-attachment stage:** From birth to three months, infants do not show any particular attachment to a specific caregiver. The infant's signals, such as crying and fussing, naturally attract the attention of the caregiver and the baby's positive responses encourage the caregiver to remain close" (Schaffer & Emerson, 1964).
- **Indiscriminate attachment:** From around six weeks of age to seven months, infants begin to show preferences for primary and secondary caregivers. During this phase, infants begin to develop a feeling of trust that the caregiver will respond to their needs. While they will still accept care from other people, they become better at distinguishing between familiar and unfamiliar people as they approach seven months of age. They also respond more positively to the primary caregiver" (Schaffer & Emerson, 1964).
- **Discriminate attachment:** At this point, from about seven to eleven months of age, infants show a strong attachment and preference for one specific individual. They will protest when separated from the primary attachment figure (separation anxiety) and begin to display anxiety around strangers (stranger anxiety)" (Schaffer & Emerson, 1964).
- **Multiple attachments:** After approximately nine months of age, children begin to form strong emotional bonds with other caregivers beyond the primary attachment figure. This often includes the father, older siblings, and grandparents" (Schaffer & Emerson, 1964).

Attachment Styles

As nicely summarized by Lyons-Ruth (1996), the basic the attachment styles culminating from John Bowlby's and Mary Ainsworth's research and the fourth by Drs. Mary Main's and Judith Solomon's (Main & Solomon, 1986) work include:

- Secure
- Avoidant
- Ambivalent
- Disordered

Attachment Styles Explained

- **Secure attachment:** Secure attachment is marked by distress when separated from caregivers and joy when the caregiver returns. Remember, these children feel secure and are able to depend on their adult caregivers. When the adult leaves, the child may be upset but he or she feels assured that the parent or caregiver will return. When frightened, securely attached children will seek comfort from caregivers. These children know their parent or caregiver will provide comfort and reassurance, so they are comfortable seeking them out in times of need" (Lyons-Ruth, 1996).
- **Ambivalent attachment:** Ambivalently attached children usually don't appear too distressed by the separation, and, upon reunion, actively avoid seeking contact with their parent, sometimes turning their attention to play objects on the laboratory floor. This attachment style is considered relatively uncommon, affecting an estimated 7 percent to 15 percent of U.S. children. Ambivalent attachment maybe a result of poor parental availability. These children cannot depend on their mother (or caregiver) to be there when the child is in need" (Lyons-Ruth, 1996).
- **Avoidant attachment:** Children with an avoidant attachment tend to avoid parents or caregivers. When offered a choice, these children will show no preference between a caregiver and a complete stranger. Research has suggested that this attachment style might be a result of abusive or neglectful caregivers. Children who are punished for relying on a caregiver will learn to avoid seeking help in the future" (Lyons-Ruth, 1996).
- **Disorganized attachment:** Children with a disorganized attachment often display a confusing mix of behavior and may seem disoriented, dazed, or confused. Children may both avoid or resist the parent. Some researchers believe that the lack of a clear attachment pattern is likely linked to inconsistent behavior from caregivers. In such cases, parents may serve as both a source of comfort and a source of fear, leading to disorganized behavior" (Lyons-Ruth, 1996).

Attachment Style Percentages

Mary Ainsworth and her colleagues reported in 1978 that studies on the three initial attachment classifications revealed:

- 70 percent of American infants have been classified as secure
- 20 percent as avoidant-insecure
- 10 percent as resistant-insecure (Ainsworth et al., 1978).

Kain and Terrell (2018) warn that there are worrying declines in secure attachment and that in more recent research populations, the percentages of secure attachment have declined by **10 percent** (Andreassen et al., 2007) and this has gotten exponentially worse since 2007 with the advent of the smartphone. Now, we attach to media instead of one another (Hari, 2018, Hansen, 2021).

Attachment Takeaways

- Studies reveal that Interactions during the first three years of life can affect cognitive development and will impact physical, emotional, and mental health of children as they age and develop (Colmer et al., 2011).
- Typically, a parent's emotional response will serve as a template for helping their child learn about emotion. As parents model appropriate emotion regulation through conversations or actions, children learn to control/regulate their emotions.
- On the other hand, insecurely attached children may learn to mask their emotional distress or exaggerate them in order to gain the parent's attention; therefore, making up for a parent who is not consistently responsive (Laible, 2010).
- This type of maladaptive behavior has devastating consequences, resulting in poor social skills, emotional dysregulation, depression, anxiety, peer exclusion, social rejection, and/or low self-esteem (Lewis et al, 2015; Newman, 2017).
- Poor attachment lays a template for future media addiction (Hansen, 2019)
- So, it behooves any of us who are young parents to ensure that we are spending lots and lots of time with our infants and children in healthy, safe, and connected ways, particularly early in life to develop secure attachment so they will be able to have joy, fulfilling relationships, and emotional stability.

Trauma and Adverse Childhood Experiences

Trauma exposure, particularly child maltreatment (e.g., neglect, emotional, physical and sexual abuse), has been established as one of the main determinants of emotional dysregulation and is also a known risk factor for psychiatric disorders, especially depression and PTSD (McLaughlin et al.,2012; McLaughlin et al., 2013).

Moreover, several prior studies have shown that trauma exposure is clearly associated with profound deficits in emotional regulation across the entire lifespan, including during preschool (Langevin, Hebert, Allard-Dansereau; Bernard-Bonnin, 2016), adolescence (Shields & Cicchetti, 1997; Vettese, Dyer, Li, & Wekerle, 2011) and even adulthood (Briere & Rickards, 2007; Thompson, Hannan, & Miron, 2014; Dunn et al., 2018).

Trauma occurs when we are faced with an experience that overwhelms our ability to process incoming information both at the time of that experience and in future situations (Barta, 2018).

Dr. Michael Barta suffered from trauma himself as a child which led him to **addictions** that ultimately landed him in jail and almost destroyed his life. In is book, *TINSA*, he wrote that trauma occurs when our natural defenses are unable to keep us safe from physical, emotional, or mental threats or harm (Barta, 2018).

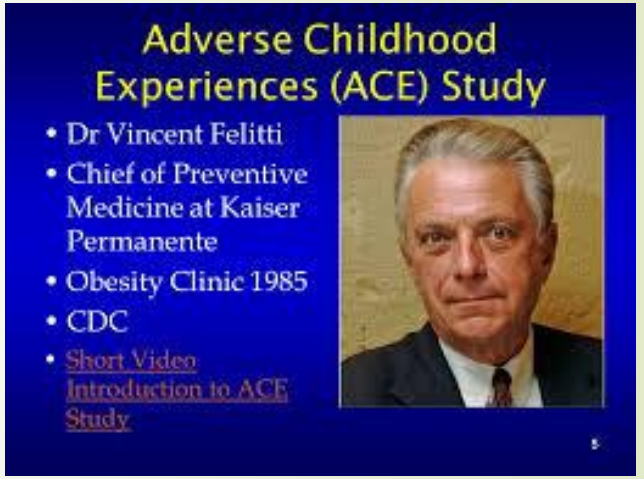
Trauma - Adverse Childhood Experiences

- In the mid-1980's, Dr. Vincent Felitti noticed a puzzling and paradoxical trend in the obesity clinic he was heading.

- Specifically, many of his participants who were having the most success in losing weight were dropping out only to gain the weight back. He interviewed the nearly 300 participants and discovered a surprising pattern: almost all of the dropouts had suffered some form of childhood trauma (Kain & Terrell, 2018).

- This initial study grew into a major public health study with Dr. Felitti teaming up with Dr. Anda at the Centers for Disease Control (CDC) that continues to this day, involving more than 17,000 individuals.

- This research came to be known as the Adverse Childhood Experiences (ACE) Study (Felitti et al., 2014). In this study, people were asked about ten different types of traumatic events that happened to them when they were children to include physical and sexual abuse, family problems, and neglect.



Trauma - **A**dverse **C**hildhood **E**xperiences

The ten reference categories experienced during childhood or adolescence are as below, with their prevalence in parentheses (Felitti and Anda, 2009):

Abuse

- Emotional – recurrent threats, humiliation (11%)
- Physical - beating, not spanking (28%)
- Contact sexual abuse (28% women, 16% men, 22% overall)

Household dysfunction

- Mother treated violently (13%)
- Household member was alcoholic or drug user (27%)
- Household member was imprisoned (6%)
- Household member was chronically depressed, suicidal, mentally ill, or in psychiatric hospital (17%)
- Not raised by both biological parents (23%)

Neglect

- Physical (10%)
- Emotional (15%)

Trauma - Adverse Childhood Experiences

- Somewhat surprising in the Felitti studies was that **emotional abuse** was more likely to cause depression than any other kind of trauma – even sexual abuse.

- This suggests that the kind of treatment children receive from parents is a tremendously powerful predictor of positive outcome and when that trust is broken, devastation surely ensues.

Dr. Michael Barta's Adverse Childhood Experiences

Barta (2018) in his book, *TINSA,* defines ACEs a little differently as summarized below:

- Sexual assault or abuse
- Physical assault or abuse
- Psychological or emotional trauma
- Serious accidents, medical procedures, or illnesses
- Manmade or natural disasters
- Witnessing violence to include domestic abuse
- School violence to include bullying
- Traumatic grief or unwanted separation
- Terrorism or war
- Betrayal by others to include relational trauma

Big T Trauma and Little t Trauma

The experts in the field divide trauma into two categories:

Big T trauma: Traumas that are associated with horrific single events such as natural disasters, terrorism, and war.

Little t trauma: Trauma that are smaller in nature such as bullying, neglect, and betrayal.

ACE Scores and Outcomes

As Dr. Felitti in a 2009 lecture points out, studies reveal many shocking long-term horrible outcomes when we are exposed to ACEs, and this raises exponentially according to how many of them we have been exposed to.

The results indicate that for every category of traumatic experience we have had as a child, we are dramatically more likely to be depressed as an adult.

If we have ACE scores of  , we are:

- 260% more likely to have chronic obstructive pulmonary disease than someone with a score of 0
- 240% more likely to contract hepatitis, 460% more likely to experience depression
- 1,220% more likely to attempt suicide

If we have ACE scores of  , we are:

- Five times more likely to become depressed as an adult

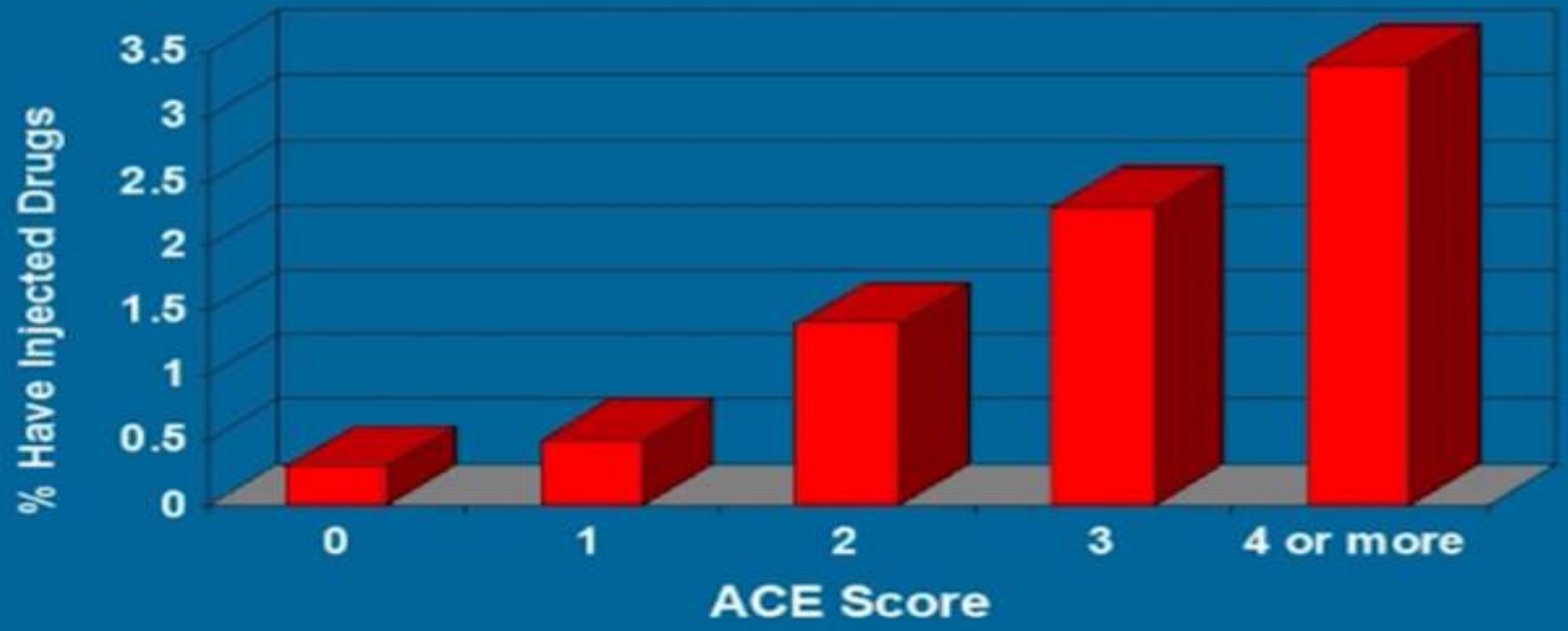
If we have ACE scores of  , we are:

- 3,100 % more likely to attempt suicide as an adult (Felitti et al., 2014; Felitti 2004; Felitti and Anda, 2009; Felitti et al., 1998).

Dr. Felitti offered the following graphs which nicely detail the dramatic impact that ACEs have on our society:

Health risks, Emotional Benefits

ACE Score vs Intravenous Drug Use



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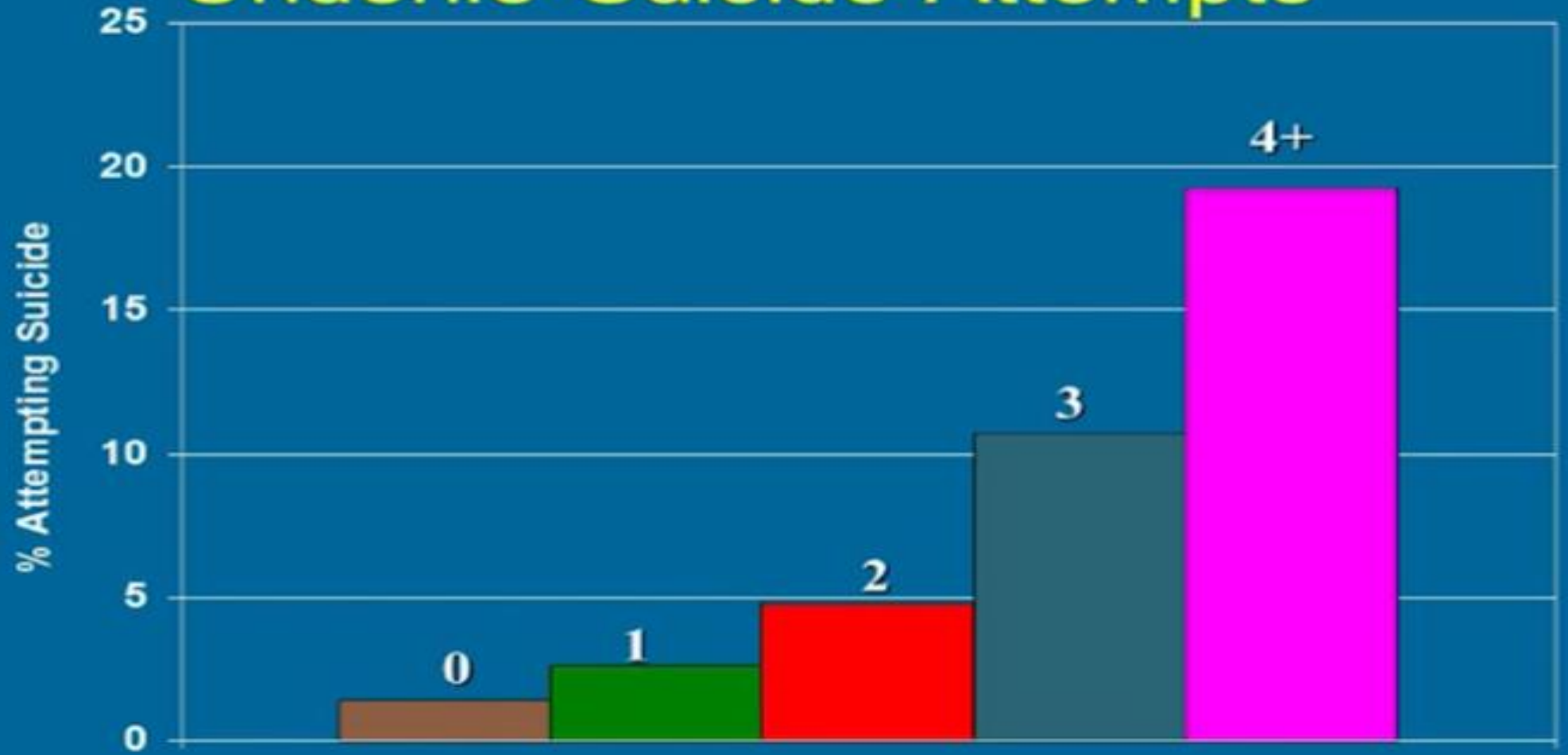
Dr Vincent Felitti (2009) https://www.youtube.com/watch?v=KEFfThbAYnQ (Accessed February 17, 2020)

Death

Childhood Experiences Underlie Suicide Attempts



Dr Vincent Felitti (2009) https://www.youtube.com/watch?v=KEFfThbAYnQ (Accessed February 17, 2020)

ACEs Increase the Likelihood of Heart Disease*

• Emotional abuse	1.7x
• Physical abuse	1.5x
• Sexual abuse	1.4x
• Domestic violence	1.4x
• Mental illness	1.4x
• Substance abuse	1.3x
• Household criminal	1.7x
• Emotional neglect	1.3x
• Physical neglect	1.4x

*After correction for age, race, education, and conventional risk factors like smoking & diabetes.

Circulation, Sept. 2004

Dr Vincent Felitti (2009) https://www.youtube.com/watch?v=KEFfThbAYnQ (Accessed February 17, 2020)

Social malfunction:

ACE Score and Indicators of Impaired Worker Performance

Dr Vincent Felitti (2009) https://www.youtube.com/watch?v=KEFfThbAYnQ (Accessed February 17, 2020)

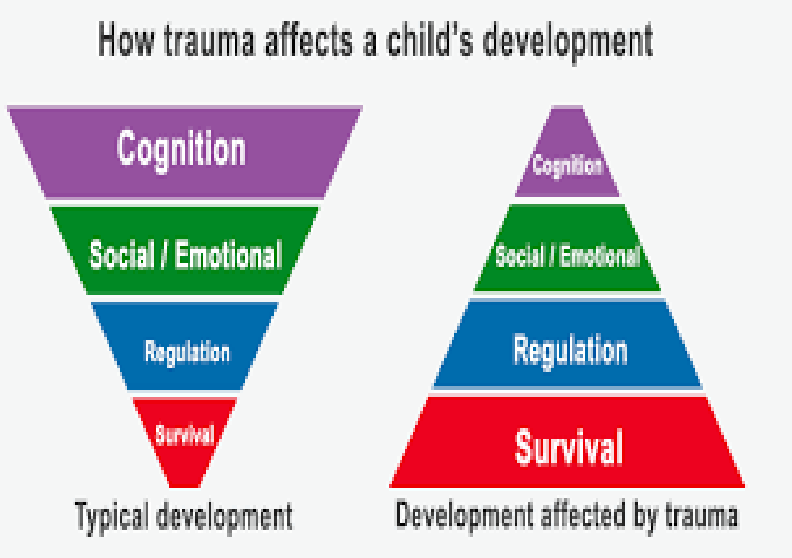
Trauma's Impact on Social Engagement and Emotional Regulation

- My own clinical experience suggests that the most common forms of trauma are due to a lack of attunement or connection with parental or adult figures while growing up.

- As Barta (2015) writes, "These deficiencies are not about bad parenting but about a parent's inability or diminished ability to respond to the child's emotional needs. Most parents are doing the best they can with the tools they have, but whether deliberately or inadvertently, the traumas of our childhood can have tremendous impact on our lives (Barta, 2018, p. 17)

- As trauma expert, Dr. Peter Levine notes in his book, *Healing Trauma*, "Trauma is much about loss of connection – to ourselves, to our bodies, to our families, to others, and to the world around us. This loss of connection is often hard to recognize because it doesn't happen all at once. It can happen slowly over time, and we adapt to these subtle changes sometimes without even noticing them.

- These are the hidden effects of trauma, the ones most of us keep to ourselves...Our choices become limited as we avoid certain, feelings, people, and situations. The result of a gradual constriction of freedom is the loss of vitality and potential for the fulfilment of our dreams" (Levine, 2008, p. 9).

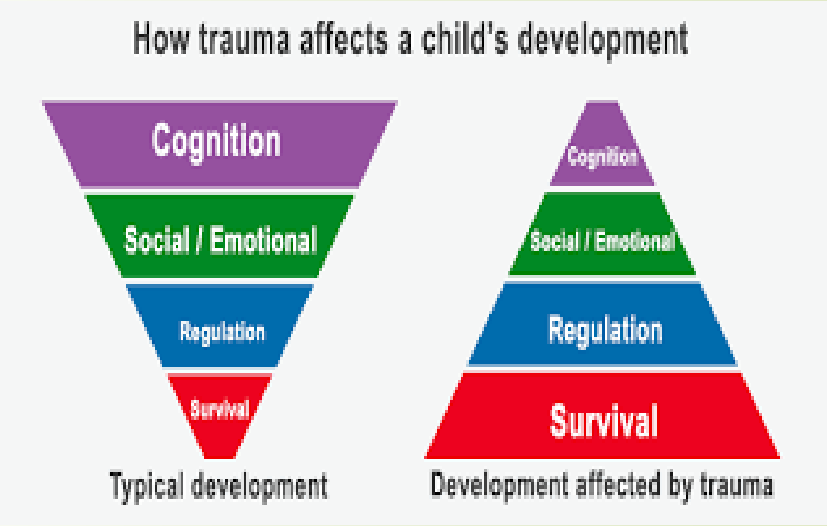


Trauma's Impact on Social Engagement and Emotional Regulation – con't

- Most important to normal development is "social engagement" which is the ability to know, understand, regulate, and express emotions in the present moment. Even though everyone is born with a social engagement system (i.e., a neurological system that promotes human connection), we know that early trauma can disrupt its normal development.

- Anda et al (2018) note, "Early adverse experiences may disrupt the ability to form long-term attachments in adulthood. The unsuccessful search for attachment my lead to sexual relations with multiple partners with resultant promiscuity and other issues related to sexuality."

- As a result of adverse developmental trauma, the ensuing loss of connection with our inner self, our bodies, others, and the world around us, we are predisposed to engage in addictive behaviors to relieve the emotional dysregulation that torments us (Hansen, 2021).



The ACEs Quiz

You might want to take a moment and take the ACE quiz yourself to see where you fall.

For each "yes" answer, add 1. The total number at the end is your cumulative number of ACEs.
Before your 18th birthday:

- Did a parent or other adult in the household often or very often… Swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?
- Did a parent or other adult in the household often or very often… Push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured?
- Did an adult or person at least 5 years older than you ever… Touch or fondle you or have you touch their body in a sexual way? or Attempt or actually have oral, anal, or vaginal intercourse with you?
- Did you often or very often feel that … No one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other?
- Did you often or very often feel that … You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
- Were your parents ever separated or divorced?
- Was your mother or stepmother:
  Often or very often pushed, grabbed, slapped, or had something thrown at her? or Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard? or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
- Did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?
- Was a household member depressed or mentally ill, or did a household member attempt suicide
- Did a household member go to prison?

Total ACE score: _____

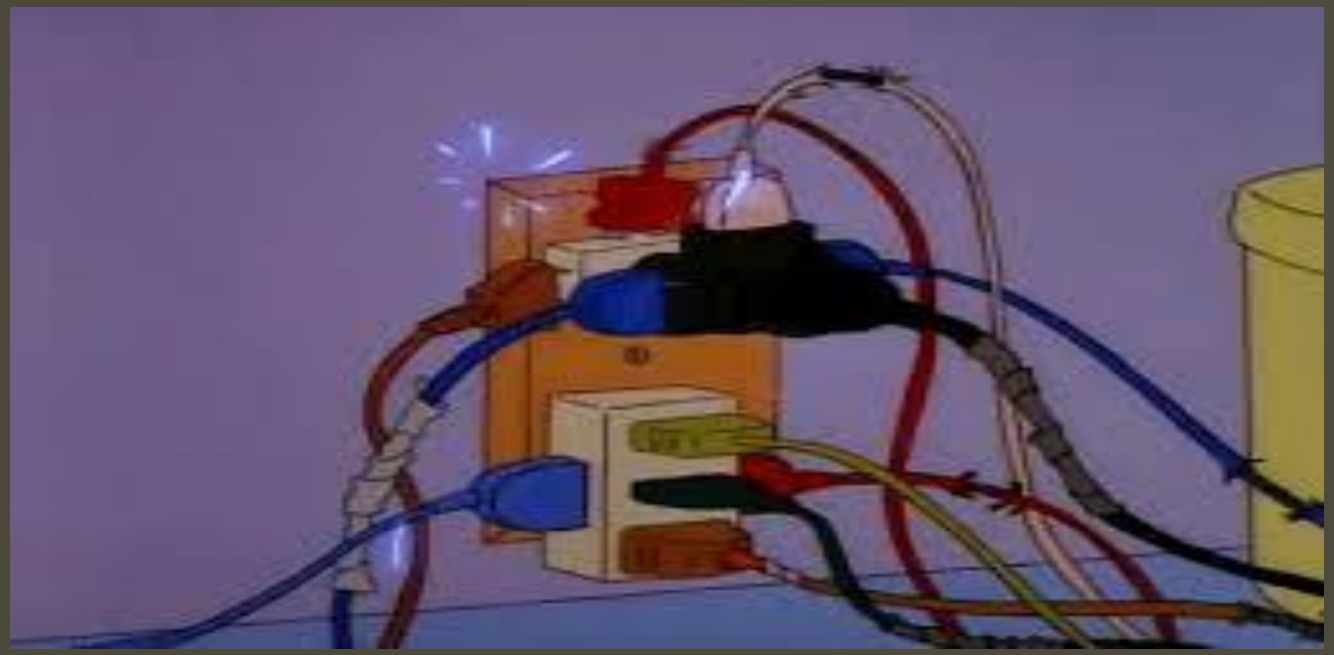
Source: NPR, ACEsTooHigh.com. This ACEs Quiz is a variation on the questions asked in the original ACEs study conducted by CDC researchers. (cited in Shonkoff, 2015).

Part Three:

The impact of Media on Your Child's Brain, Body, and Behavior

"I like to play indoors better,
'cuz that's where all the electrical outlets are."

--Paul, fourth grader in San Diego

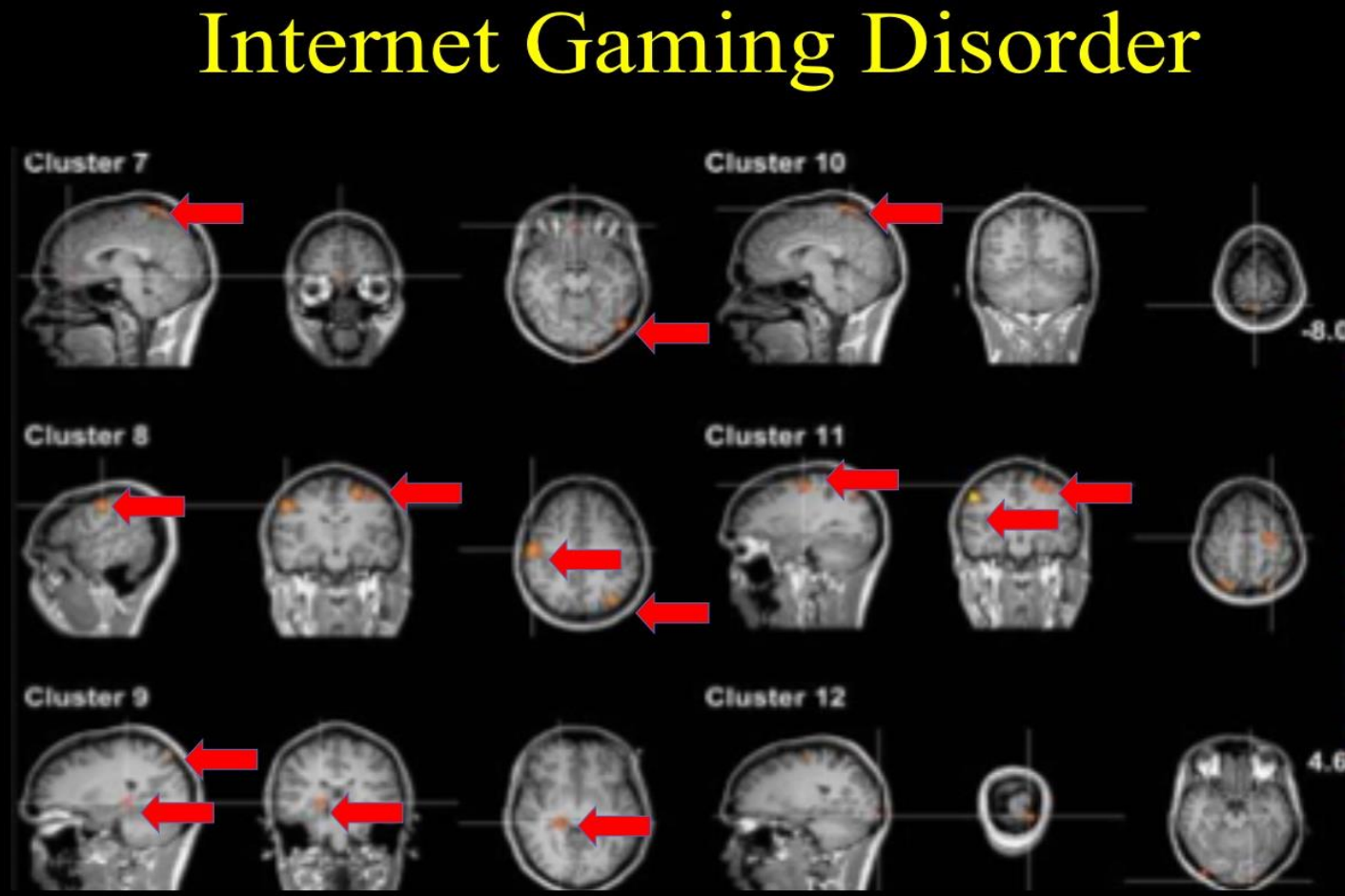


This slide displays areas of brain activity after showing video game addicts triggers consisting of video game footage. The areas of activation occur in similar patterns in brains of people addicted to drugs and gambling.

MRI of "Gaming Brain"

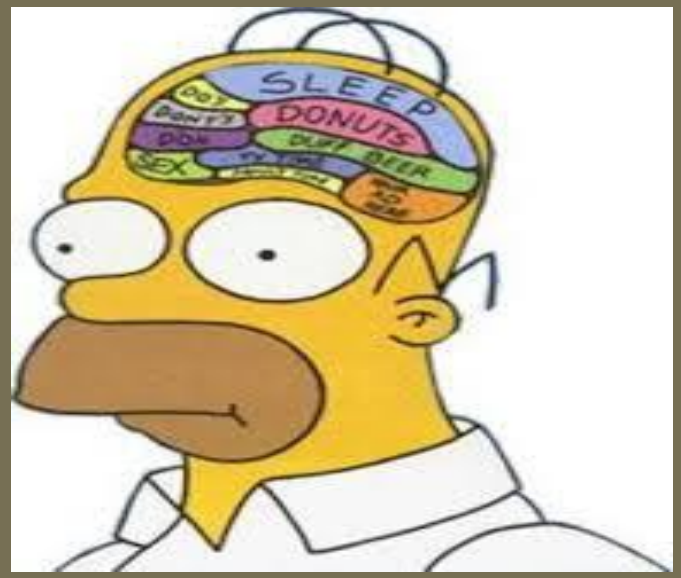
Cerebral Blood Flow Activity of a brain after gaming.

MRI Gaming Addiction.pptx



Brain activity and desire for Internet video game play. Compr Psychiatry. 2011 Jan-Feb;52(1):88-95.

Impact of Excessive Media on the Brain



Excessive Media can hijack the **"orienting response"** which helps us assess a threat before we determine to **fight, flee, or freeze** by creating chemical, electrical, and mechanical shifts that end up raising arousal levels (Dunckley, 2015).

01

Stimulation by excessive media can damage **myelin** in neuropathways, most specifically the **oligodendrocytes**, the brain cells that produce cholesterol for proper myelination. (Kardaras, 2016).

02

When myelin is destroyed by overstimulation during key developmental periods, problems such as our ability to **focus**, **feel empathy**, and/or **discern reality** can all be negatively affected (Kardaras, 2016).

Impact of Excessive Media on the Body

- Excessive media can trigger **Metabolic Syndrome**. Metabolic syndrome is a combination of the following (Dunckley, 2015):
  - High blood pressure
  - Midsection weight gain (spare tire)
  - Abnormal cholesterol levels
  - High fasting blood sugar

- **Metabolic Syndrome** is a serious condition and, if left unchecked, can promote:
  - Diabetes
  - Heart disease
  - Stroke

In the words of my good friend, Dr. Andrew Doan, MD, PhD, and author of *Hooked on Games*:

- "I had pain from my clicking finger all the way up to my forearm. And my cortisol levels were shot - through my hypothalamic-adrenal-pituitary axis (HPA), so I was getting fat because I had all of this cortisol floating around. I didn't exercise, so I was retaining more body fat. And then finally my HPA axis was all dysregulated, so I was more prone to infection - I had pimples all over my face, I had stretch marks beginning. And then, finally, I got an infection in my armpit!

- So, in addition to the carpel tunnel, I had this armpit infection that was streaking down my arm. And on top of that, because my blood pressure was going up because of the gaming adrenaline rush - my blood pressure was high, my cholesterol was high. And because my blood pressure was high, and I was sitting all of the time, I had hemorrhoids the size of walnuts. - I mean, literally! I was a young man - I was pissed off. Why do I have hemorrhoids like some pregnant women do? We're talking about bloody, painful hemorrhoids…So I'm convinced that if people are addicted to this thing, **it's going to ruin their lives**. It almost ruined mine - and it almost ruined my son and almost destroyed his confidence and his opportunities" (Kardaras, 2016).

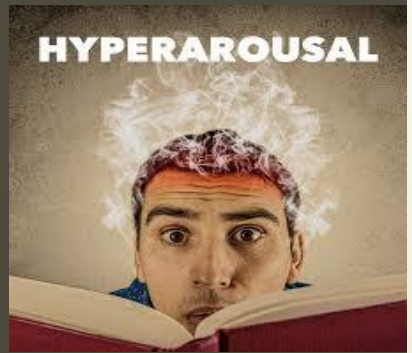
Impact of Excessive Media on Arousal

- Excessive media consumption sends unnatural and overstimulating messages via the eyes, brain, and body to the nervous system which in turn trigger:

  - Fight, freeze, or flee response

  - Electronic Screen Syndrome

  -Poorer ability to manage and handle stress

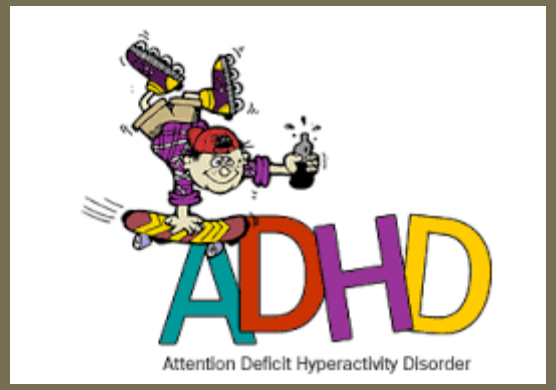


The Impact of Chronic Hyperarousal

- **Blood Flow Shifts**: When a person is under stress, blood flow to the brain is shunted away from the higher regions of the brain, i.e., the cortex, and directed to the more primitive parts of the brain, i.e., the limbic or old brain in an effort to promote survival.

- **Elevated Cortisol**: Chronically elevated cortisol is associated with obesity, diabetes, hormone imbalance, metabolic syndrome, and high blood pressure as previously noted (Pervanidou et al., 2011).

- **Oxidative Stress**: When the cell's natural defenses are overwhelmed due to excessive stress, the antioxidants or scavengers are depleted, and oxidative stress or excessive free radicals develop. Free radicals **cause inflammation, tissue damage, and decreased efficiency.**



Impact of Media on Attention - The ADHD Effect

Prefrontal Cortex directs "executive function" or the ability to get things done which involves:

- Planning
- Organizing
- Revising
- Strategizing
- Attending to details
- Managing time and space
- Inhibition of negative behaviors (putting on the brakes)

Deficits in any one of these areas can have huge impact on the child.

Impact of Media on Attention - The ADHD Effect - continued

Exposure to video games and television in childhood leads to subsequent attention problems (Kardaras, 2016).

When you see something exciting, it is hard to downshift to something less exciting.

The more TV a child watches between the ages of one and three, the more likely the child is to be diagnosed with ADHD by age seven (Kardaras, 2016).

Symptoms of ADHD can be environmentally induced – Microsoft (2015) report: The average attention span has shortened from 12 to 8 seconds in a decade (Turner, 2017).

Impact of Media on Attention - The ADHD Effect - continued

Excessive media can degrade Focused or Voluntary Attention as shown in the **Marshmallow Test** (Mischell, 1972).

Follow-up studies on these kids up until age 40 showed that those children who were able to wait the distance, did better on multiple aspects of life (Palladino, 2015):

Higher Scholastic Aptitude Test (SAT) scores	More successful education	Better success at keeping friends	Greater financial success

Dr. John Ratey, Clinical Professor of Psychiatry at Harvard School of Medicine, coined the term, **Acquired Attention Deficit Disorder.**

Impact of Distracted Parents

Dr. Catherine Steiner noted that many American children first encounter the digital world when they notice their parents are Missing-in-Action.

Penny (7) complains, "I always keep asking her let's play, let's play and she's always texting on her phone."

Distracted parents produce distracted children because parents can't focus to teach their kids the necessary attention patterns for success.

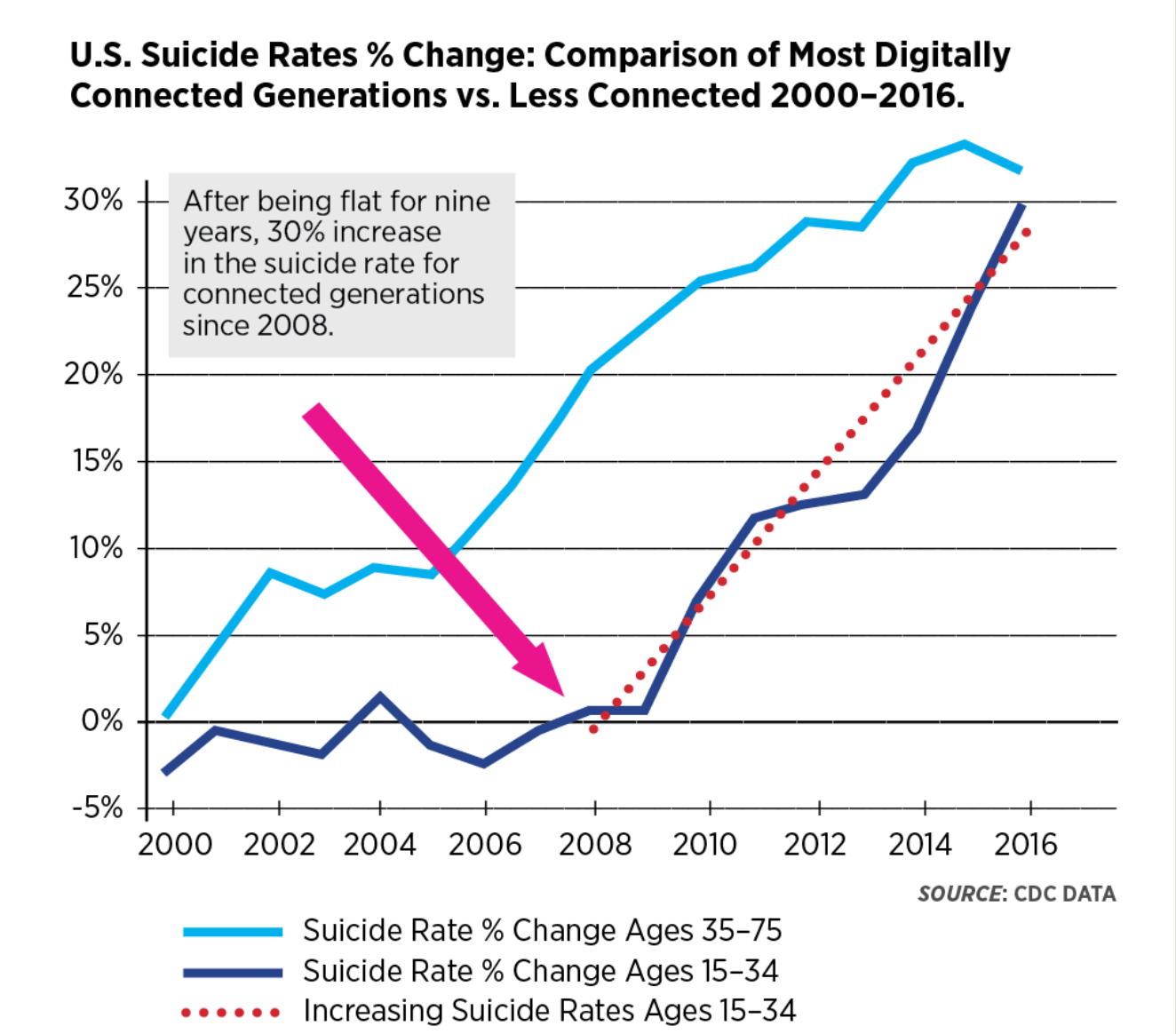
Caregivers who appear distracted or whose eyes wander a lot while their children play appear to negatively impact on infants' burgeoning attention spans (Indiana University, 2016).

The Impact of Media on Depression

- A.N. Turner (2017) eloquently writes of his own struggle with depression secondary to media overconsumption:

*"My relationship with the Internet was not alleviating feelings of loneliness; it was amplifying my loneliness, bringing me to a state of frustrated depression. I felt boxed in, unable to breathe, trapped in an inescapable thought bubble of my own f*ed up, addictive desires. I conditioned myself to need constant stimulation. I couldn't read, talk, study, or play the piano – all things that I love – because it all seemed too slow, too one-note…I was always tired, yet always racing in a mad frenzy. I couldn't focus. I was anxious. I was unable to engage in solitude. My thoughts were a jumble. "*

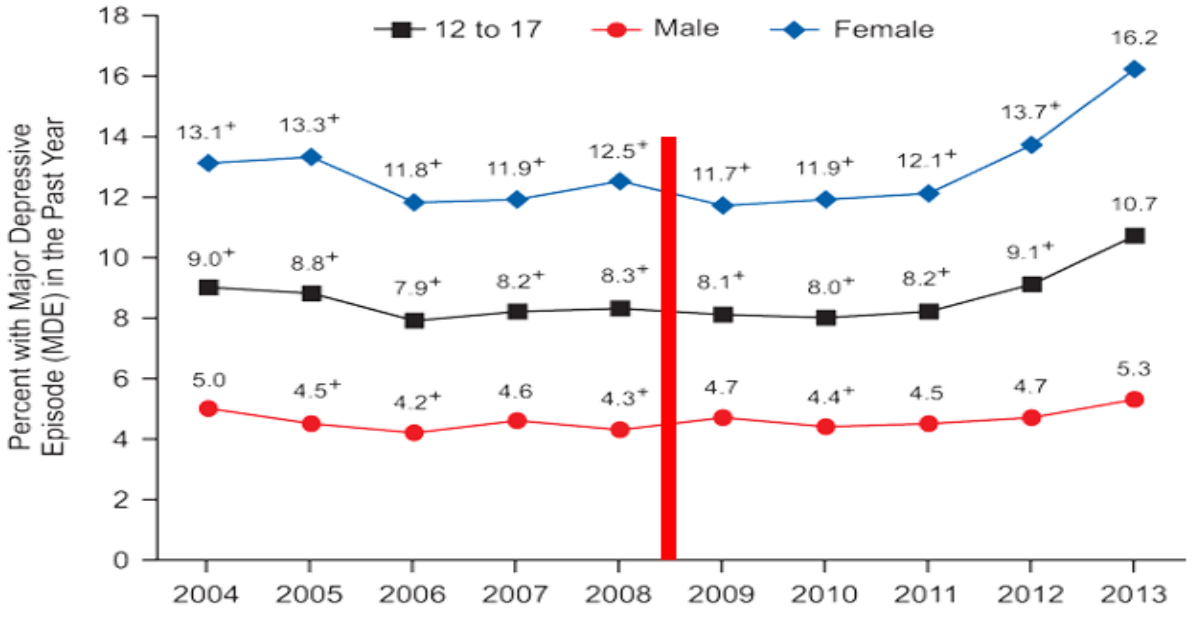
The Impact of Media on Depression – continued:



The Impact of Media on Depression – continued:

Shared with permission – Peter Ryan, CAPT, USN (R)

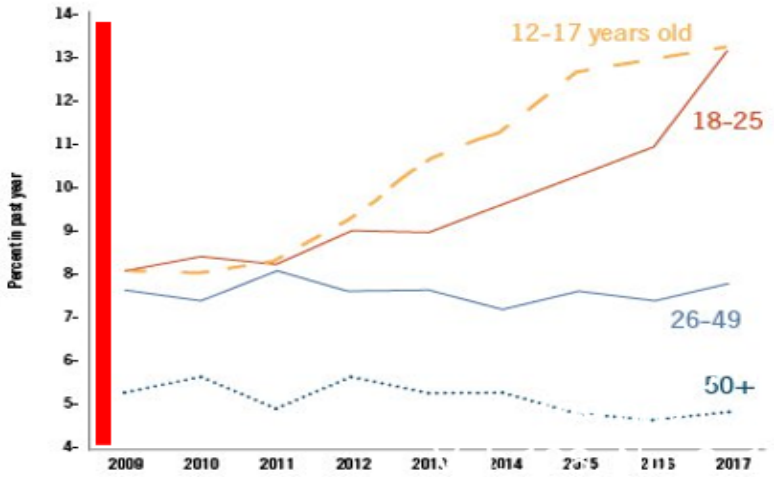
Teen and Young Adult Depression rising since 2008



Substance Abuse and Mental Health Services Administration (SAMHSA),

STUDENT DEPRESSION ON THE RISE

An analysis of a federal survey shows increasing rates of teen and young adult respondents reporting a major depressive episode in the last 12 months. Rates have stayed more consistent among older adults.

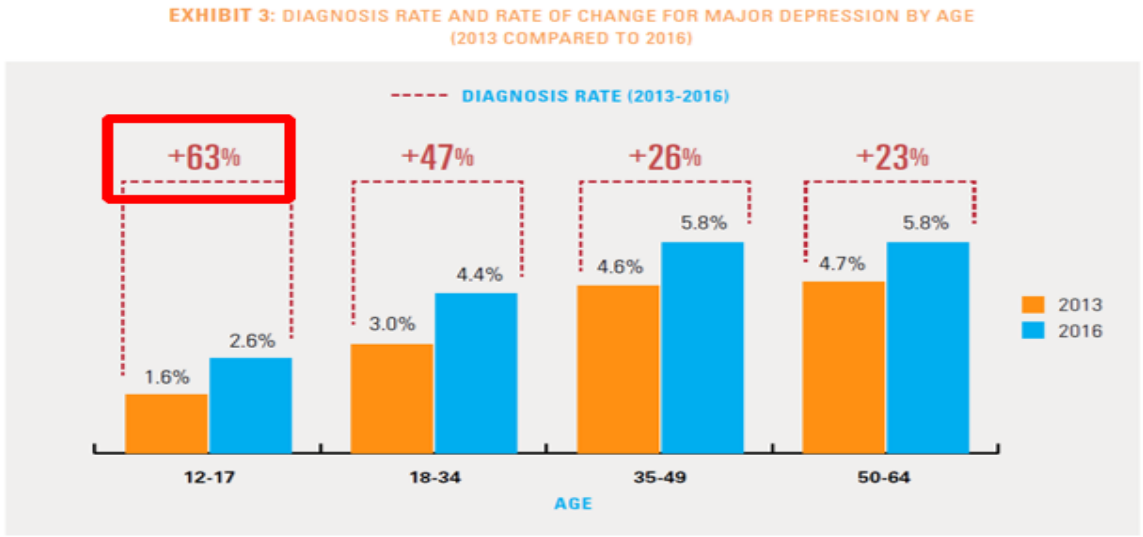


SOURCE: Journal of Abnormal Psychology
2019, Vol. 128, No. 3, 185–199
http://dx.doi.org/10.1037/abn0000410

The Impact of Media on Depression – continued:

Shared with permission – Peter Ryan, CAPT, USN (R)

2018 Blue Cross and Blue Shield Study



Highest depression rate of growth in the youngest and most connected.

The Impact of Media on Depression – continued:

Kardaras (2016) cites the following alarming statistics:

- A 2012 Missouri State University study of 216 students revealed that 30 percent of Internet users showed signs of depression and that the depressed kids were more intense web users.
- A 2014 study looked at 2,293 seventh-graders and found that Internet addiction led to increased depression, hostility, and anxiety.
- A 2014 study conducted in Pakistan with 300 graduate students found a positive correlation between Internet addiction and depression and anxiety.
- A 2006 Korean study involving 1,573 high school students found a correlation between Internet addiction, depression, and thoughts of suicide.
- Recently, the term Facebook Depression has emerged – namely, the more "friends" one has on Facebook, the higher the likelihood of depressive symptoms (Kardaras, 2016).

The Impact of Media on Depression – continued

- Case Western Reserve University School of Medicine study found that **"hypernetworkers"** were prone toward (Pederson, 2015):

  - Higher rates of depression
  - Increase substance abuse
  - Poor sleep
  - Greater reported stress
  - Poor academic performance
  - Higher rates of suicide
  - 69 percent more likely to have sex
  - 60 percent more likely to report four or more sexual partners
  - 84 percent more likely to have used illegal drugs
  - 94 percent more likely to have been in a physical fight

The Impact of Media on Psychosis:

- **Game Transfer Phenomenon:** Gamers transfer elements of the game content, or the interface, into their real lives, usually harmlessly (Griffiths, 2011).

- In 2007 a Chinese boy poured gasoline on another gamer, lit him on fire, and later stated that he had "lost himself in World of Warcraft" believing that he had become a "fire mage." (Kardaras, 2015)

- In December 27, 2004, after playing World of Warcraft for 36 hours straight, a 13 y/o Chinese boy jumped to his death after leaving a note stating that he wanted to join his heroes (Kardaras, 2015).

The Impact of Media on Psychosis - continued:

- Griffiths (2011) notes that video game playing can induce pseudo-hallucinatory-like experiences.
- Two recent single case studies reported rapid onset psychosis after immediate cessation of gaming. Successfully treated with antipsychotics.
- Dunckley (2015) suggests that dopamine dysregulation might be, in part, the underlying mechanism for screen-related psychosis. Medications that increase dopamine such as stimulants are very capable of producing psychosis and, on the other hand, many of the medications used to treat psychosis block dopamine

The Impact of Median on Aggression:

- A meta-analysis of 381 studies on over 130,000 participants conducted by Dr. Greenfield (2015) indicated that violent video games significantly increased aggressive cognition, aggressive behavior, and physical arousal.
- Dr. Craig Anderson from Iowa State University summarized 130 research studies with more than 130,000 participants and, likewise, concluded that exposure to violent video games makes for more aggressive and less caring kids – regardless of age, sex, or culture (Kardaras, 2016).
- Greenfield (2015) noted that gaming is associated with less activity in a region of the brain which is involved in emotionally charged memory; namely, the amygdala.
- Brain imaging research at the Indiana School of Medicine (2011) found a direct relationship between playing violent video games and quantifiable brain changes involving "less activation in certain frontal brain regions."

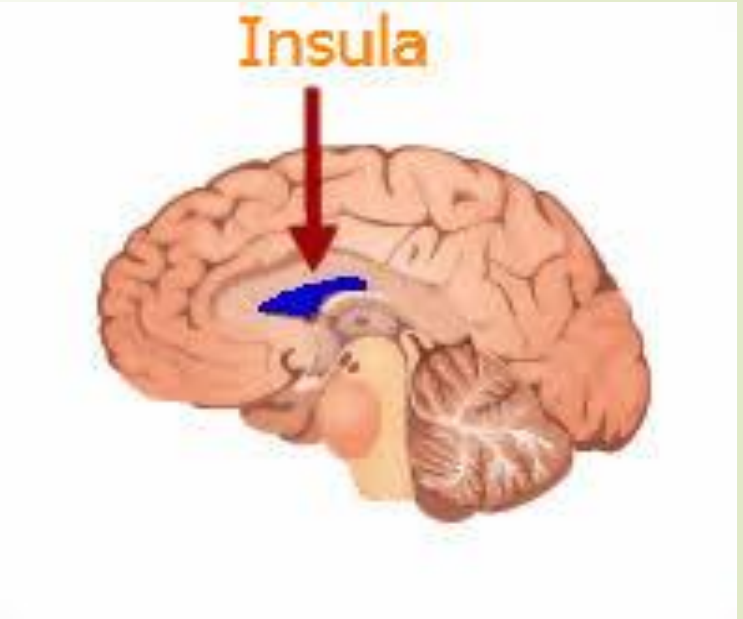
The Impact of Median on Aggression – continued:

- We all remember the tragic Sandy Hook Elementary School mass shooting involving the infamous 20-year-old **Adam Lanza** on December 14, 2012 (Kardaras, 2016):
  - Shot 20 innocent children between the ages of six and seven and six adult staff members
  - 83,000 online kills and 22,000 head shots
  - Was obsessed with "World of Warcraft, Combat Arms, Call of Duty, and Modern Warfare 2
  - "School Shooter" on his hard drive

Impact of Media on Social/Emotional Development:

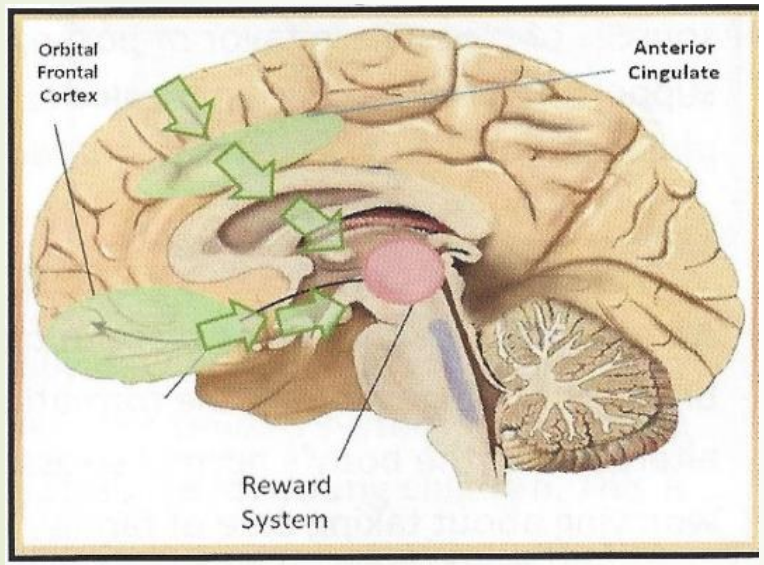
- Brain imaging studies indeed indicate that gaming addiction damages the insula, an area of the brain that has been specifically involved in empathy (Weng, et al., 2012; Suzuki, 2012).

- Dunckley (2015) notes that the more time a child spends behind a screen, the more socially anxious or inept he or she becomes which creates a self-perpetuating spiral in socially anxious children, in particular.

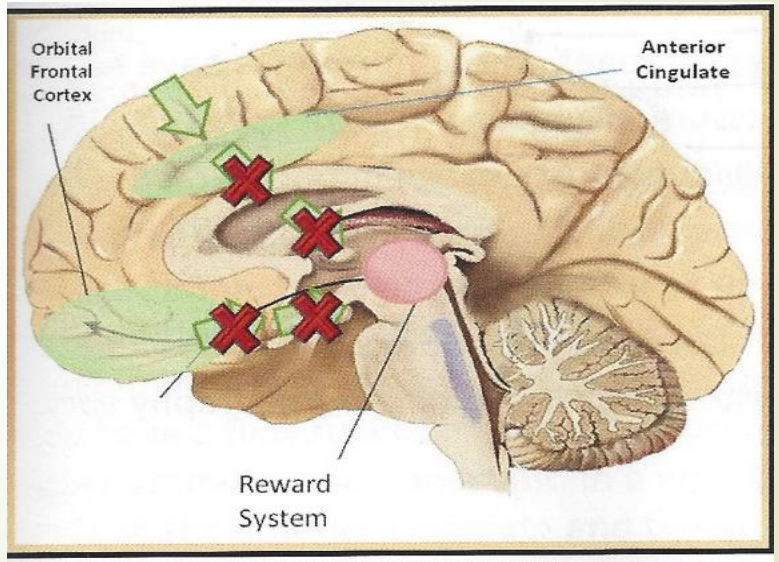


Impact of Media on Social/Emotional Development:

Two areas of the brain, the anterior cingulate and the orbital frontal cortex, serve as a protective mechanism to override the reward system's desire for ever increasing dopamine increase. Sadly, hypofrontality involves the rewiring of our brains so that when an impulse to engage in a dopamine-related behavior activated, the brain ends up shutting down its ability to override the reward system. This is the breeding ground for horrible choices an impacts on social development



(Adapted from Study Blue, 2007)



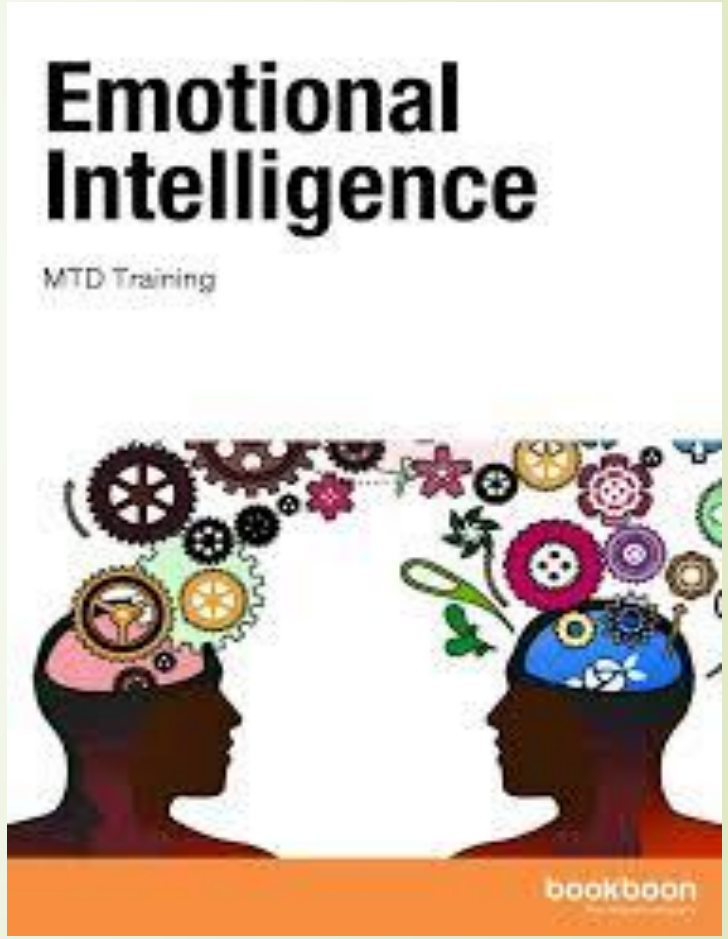
(Adapted from Study Blue, 2007)

Impact of Media on Social/Emotional Development – continued:

Excessive media impairs Emotional Intelligence (EQ) (Kersting, 2016).

Goleman's (2016) "Mixed Model" of Emotional Intelligence:

- **Self-Awareness:** The ability to know your own feelings. This means that you are aware of your emotional triggers and have an ability to deal with them.
- **Self-Management:** This involves the ability to keep your emotions in check when they start to ramp up and become problematic or disruptive.
- **Motivation:** Most people are motivated by external/outside events such as money. Emotionally intelligent people are more internally/intrinsically motivated (i.e., internal peace or a sense of pride for doing the right thing).
- **Empathy:** Empathy involves the ability to appreciate and support the feelings of someone else by responding appropriately to their situation and feelings. This will often lead the person to suspend the needs/feelings of oneself in support of the needs/feelings of another.
- **Social Skills:** This involves, among other things, the ability to deal with others in that you are able to find a common ground with other people. It involves the ability to negotiate, problem-solve, and compromise.



Impact of Media on Social/Emotional Development – continued:

Gray (2015) noted the **following trends in college students** which are, in part, thought to be a function of excessive media (Kersting, 2016):

- Students are **needier** and **less resilient**.
- Students are increasingly **afraid to fail**, and they do not **take risks**. Failure is perceived as catastrophic and totally unacceptable.
- Faculty, especially younger ones, feel **extreme pressure** to give into student wishes in fear of getting low ratings from students.
- Students email faculty about increasingly trivial matters and become demanding about **wanting prompt replies**.

Impact of Media on Social/Emotional Development – continued:

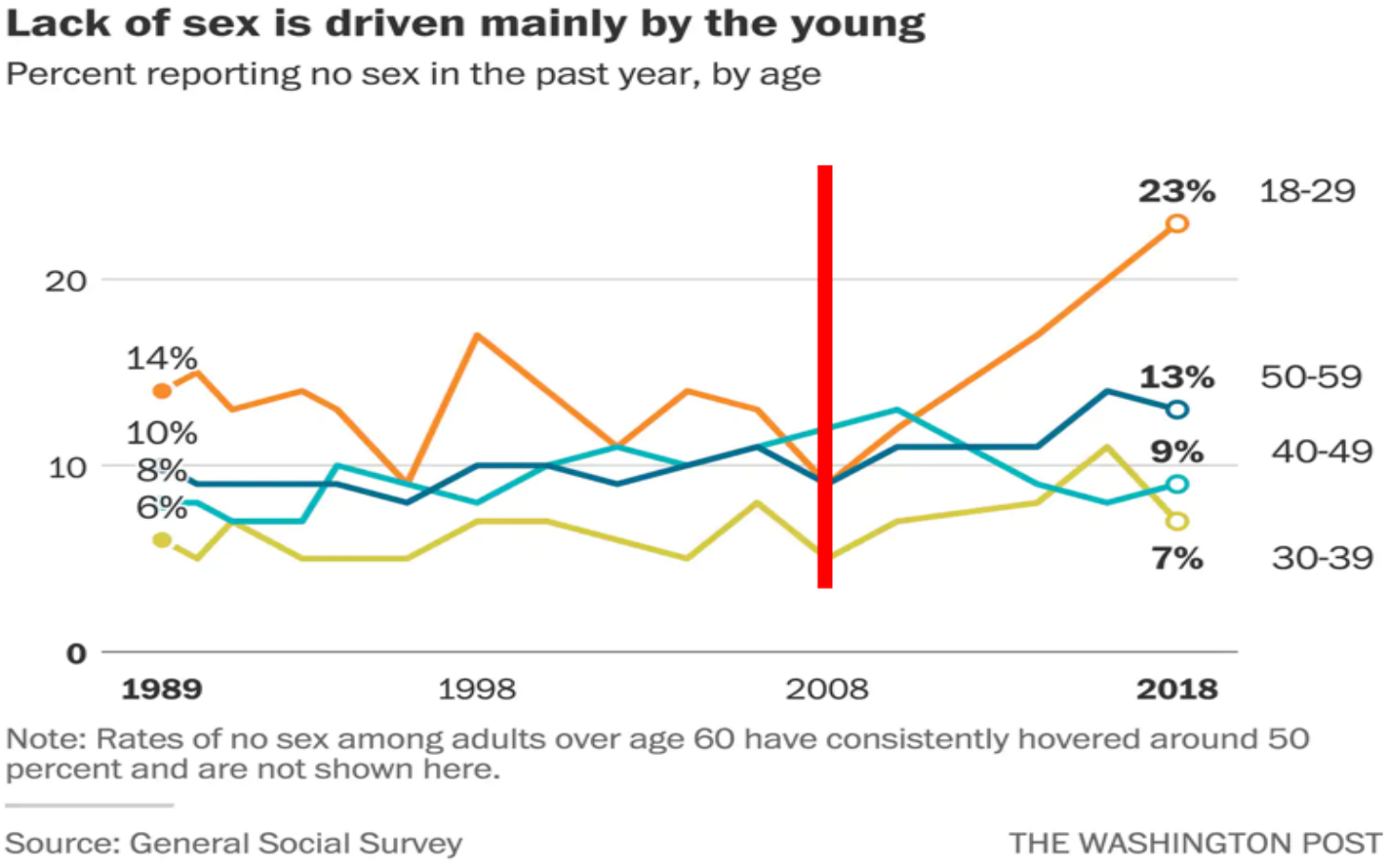
Since 2008, Decreasing Numbers of Young Adults Having Sexual Relations

Source:

https://www.washingtonpost.com/business/

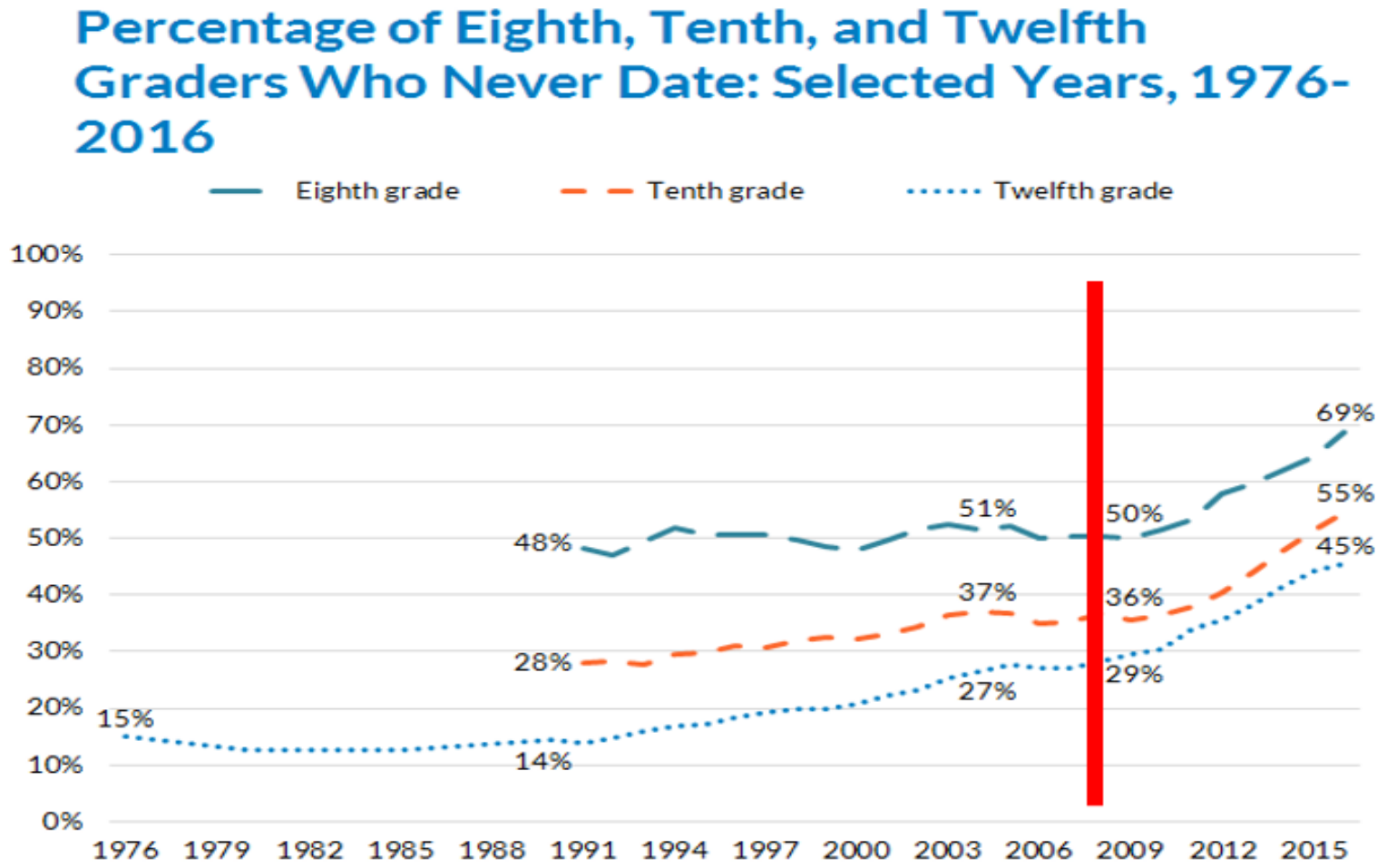
"The share of Americans not having sex has reached a record high"

Mar 29, 2019



Impact of Media on Social/Emotional Development – continued:

Teenage Dating



Source: Child Trends' original analysis of data from Monitoring the Future: A Continuing Study of American Youth, 1976-2016.

childtrends.org

Around 2008, the % of people who never dated goes up precipitously.

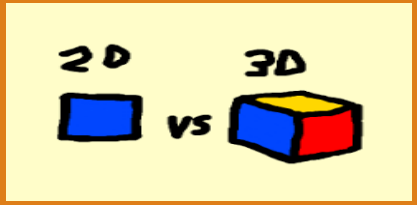
Impact of Media on Social/Emotional Development - continued:

According to Dr. Twenge (2017) in her new book, *iGen: Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy – and Completely Unprepared for Adulthood, conducted* a meta-analysis of 4 studies involving 11 million young Americans and found that they:

- Are more insecure
- Evidence a significant decline in person-to-person interaction
- Are obsessed with safety
- Are insecure about income and their ability to make it in the world
- Tend to extend their childhood
- Are ill-prepared for adulthood
- Are less happy
- Are more tolerant and less rebellious

Impact of Media on Social/Emotional Development - continued:

01



Kersting (2016) points out that EQ is not something that we are born with and can only be learned by observing voices, body posture/language, and/or facial expressions. You must have direct face-to-face 3D interaction or connection with other people as opposed to face-to-screen 2D interaction.

02

Nass (2013) writes that this learning starts at infancy and that it is not an easy thing to acquire. It was much easier for previous generations to build a strong EQ because they had so much more face-to-face interaction.

Before and After

Before

Now

Before and After

Before

Now

Before and After

Before

Now

Before and After

Before

Now

Polyvagal Theory – A New Model

The greatest thing then, in all education, is to make our nervous system our ally as opposed to our enemy

- William James

Definition Please

- **Emotional self-regulation** or **emotion regulation** as defined by Wikipedia "is the ability to respond to the ongoing demands of experience with the range of emotions in a manner that is socially tolerable and sufficiently flexible to permit spontaneous reactions as well as the ability to delay spontaneous reactions as needed.
- Emotion regulation is a complex process that involves initiating, inhibiting, or modulating one's state or behavior in a given situation – for example, the subjective experience (feelings), cognitive responses (thoughts), emotion-related physiological responses (heart rate or hormonal activity), and emotion-related behavior (bodily actions or expressions).
- Functionally, emotion regulation can also refer to processes such as the tendency to focus one's attention on a task and the ability to suppress inappropriate behavior under instruction. Emotion regulation is a highly significant function in human life" (Wikipedia, 2020a).
- As this definition suggests, emotional regulation is a really big deal and involves our thoughts, our bodies, and our feelings

The Marriage of Triune Brain Theory and Polyvagal Theory

The greatest thing then, in all education, is to make our nervous system our ally as opposed to our enemy

- William James

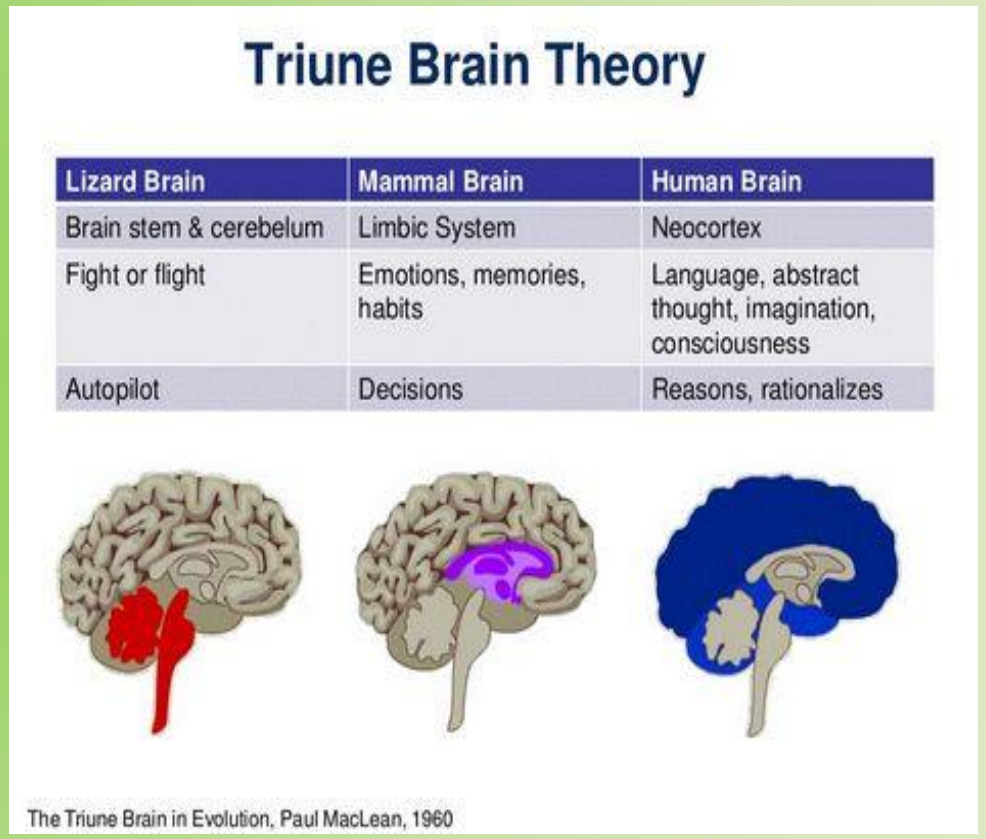
The Marriage of Triune Brain Theory and Polyvagal Theory

- In the last 10 years new and exciting neuroscience has emerged that helps us map out our physical, emotional, and cognitive responses to the world around us and provides us a way through the ensuing tempest within ourselves.
- Dr. Barta (2018) proposes a model that demonstrates how the brain and the nervous system work together to fuel emotional dysregulation. In his model which he calls TINSA (Trauma Induced Sexual Addiction), he pairs some of the greatest minds in neurology and psychology to include:
  - Dr. Stephen Porges' **Polyvagal Theory**
  - Dr. Paul Maclean's **Triune Brain Theory**.

Triune Brain Theory

- MacLean (2009) proposed that there are three distinct formations in our brain which are used in different situations for everyday survival purposes.
- These specific structures developed sequentially on top of each other at different times during the evolution of the brain for the purposes of giving the organism the ability to survive during that period of time.
- Even though the brain became more advanced and adaptive, the older more primitive structures of the brain still play an especially important role in thought, process, and behavior.

(For my Christian friends who might worry about this model contradicting sensitivities about creationism – not to worry. As explained by Dr. Andy Doan, M.D. Ph.D., ophthalmology surgeon and neuroscience researcher, and paraphrased by me, "God is very efficient, and He included in our more developed brain substructures that He already designed for lower life forms/animals. No need to re-do what was already perfect and efficient").



Triune Brain Theory

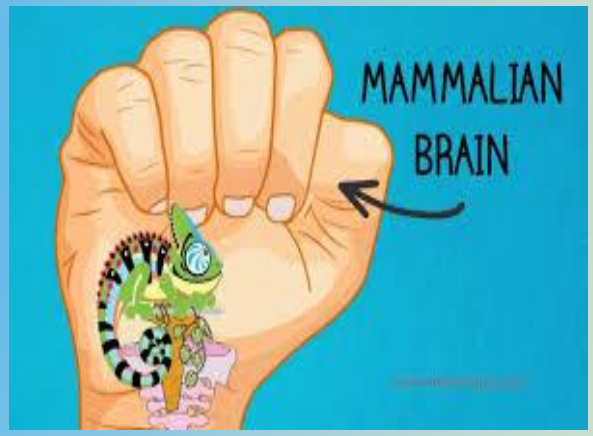
The Reptilian Brain (or Reptilian Complex):

- As the name suggests, this is the most primitive brain and it developed about 500 million years ago in fish and later reptiles.
- Its roles include sensation, instinctual reaction, breathing, temperature regulation. TINSA holds that the reptilian complex promotes certain survival functions as well, most specifically, immobilization or freeze.
- We often see lizards, for example, freeze in the face of danger such as a lunch-starved predator in an instinctive reaction that can be life-saving (sadly for the lizard, it doesn't always work, and he sometimes ends up being a snack anyway).

Triune Brain Theory

The Mammalian Brain (or Limbic System):

- Later, about 150 million years ago, the limbic system first appeared in small animals.
- This system developed as critters were able to move more freely about as they were now equipped with extremities.
- As such, it often became necessary to either fight off or flee from would-be predators. In addition, the capacity to have memory and emotions developed.
- This enabled the animal to control the body's response to danger and to remember that danger as well as the ability to be vigilant and scan the surrounding environment for potential dangers. Like critters, we often revert to this neurological system when we act instinctively.



Triune Brain Theory

The Frontal Lobe (or Neocortex):

- According to Maclean (1990), the frontal lobes came on board only about 2 or 3 million years ago.
- As in the reptilian brain and the limbic system, the purpose of this brain formation is to react to and protect us from danger.
- Unlike our more primitive neighbors, this system reacts **consciously**. Very importantly, there was a need to develop a system that made possible more “civilized” responses to threats and at the same time one that offered the possibility to *connect* to others for safety.
- Therefore, the frontal lobe allows us to access a new way of surviving based on **socialization**. This makes it possible for us to use analysis, logic and decision-making, and this is what specifically separates us from other lower-ordered animals that rely on instincts alone for survival

Triune Brain Theory – To Bring it Home

- To bring it home, on topside we have the cortical brain consisting of the frontal lobe which is the most recently developed portion of the brain, i.e., **the conscious, thinking brain**.
- At the bottom, we have our subcortical, unconscious brain, which is made up of the **reptilian and limbic complexes** and is directed largely by raw instinct and emotions which often results in immediate knee-jerk reactions that happen in a split second.
- Barta (2018) informs us that, in the best of worlds, we try to lead with our **frontal lobe** and remain socially engaged if something threatening confronts us and in order think our way out of it, smile, and/or stay calm.
- But in times of **intense stress** or in situations that remind us of **past trauma**, this survival mechanism is quickly overrun by earlier, more primitive survival strategies of our mammalian/limbic brain and our reptilian brain structures.
- As such, when our **prefrontal cortex** fails us, the **limbic system** takes command and we are then rapidly sent into our fight-or-flight response and if this does not work and we cannot run away or fight our way out of it, the most primitive line of defense is deployed and we simply freeze, become immobilized, or completely collapse. This hijacking process can occur whether the threat is real or merely perceived (Barta, 2018).

Polyvagal Theory

Autonomic Nervous System

Sympathetic

Activated, anxiety, fear, terror, anger

Parasympathetic

Ventral Vagal

Connected, calm, safety

Dorsal Vagal

Shut-down, depressed

Polyvagal Theory

The Autonomic Nervous System

The autonomic nervous system is our **personal surveillance system**.

In an effort to keep us out of danger, it is always on guard; asking the question, “Is this safe?” Its dedicated goal is to protect us by sensing safety and risk.

It achieves this by listening moment by moment to what is happening in and around our bodies and in the connections we have to others (Dana, 2018).

This listening happens far below awareness and far away from our conscious control.

Dr. Porges, understanding that this is not awareness that comes with perception which is conscious, coined the term **neuroception** to describe the way our autonomic nervous system scans for cues of safety, danger, and life threat, without involving the thinking parts of our brain or the unconscious parts of the brain (Porges, 2017).

Dr. Steve Porges

Polyvagal Theory
The Autonomic Nervous System

Briefly stated, our response to threat will move us toward one of **three defensive responses**. Two of which keep us in perpetual defense and one of which moves us toward health and restoration.

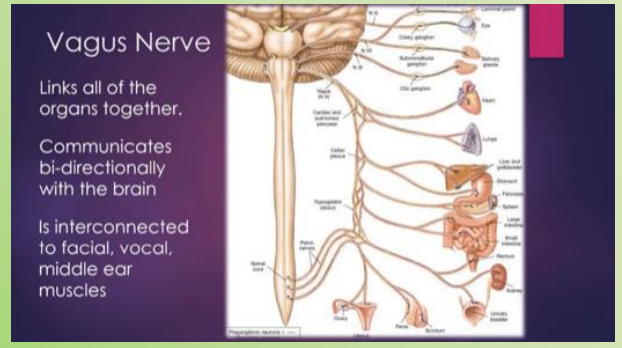
- Sympathetic Division: Prepares the body for stressful or emergency situations – fight or flight. The sympathetic nervous system originates in spinal nerves (nerves that arise from the spinal cord) and is our system of mobilization. The sympathetic nerves are found in the middle of our backs in the thoracic and lumbar regions of the spinal cord. There are two mobilization systems in our sympathetic nervous system.
  - Sympathetic Adrenal Medullary (SAM): The SAM system is activated very quickly, within 100 milliseconds and brings up a burst adrenaline for a fast response to a stressor. SAM activation triggers a short-term and rapid response to a stressor which is followed by a return to regulation (Dana, 2018).
  - Hypothalamic-Pituitary-Adrenal (HPA) Axis: The HPA axis takes over when the quick, adrenaline surge of energy of the SAM does not resolve the distress. The HPA releases cortisol (AKA stress hormone). This release takes longer and is much slower in taking effect, requiring minutes to take effect rather than seconds (Dana, 2018).

Polyvagal Theory
Sympathetic Division

- The sympathetic division increases heart rate and the force of heart contractions and widens (dilates) the airways to make breathing easier.
- It causes the body to release stored energy.
- Muscular strength is increased. This division also causes palms to sweat, pupils to dilate, and hair to stand on end.
- It slows body processes that are less important in emergencies, such as digestion and urination (Merck Manual).
- When we are in this physical state, we can feel emotions such as fear and/or rage and, if extremely activated, absolute terror (Rothschild, 2017).

Polyvagal Theory

Parasympathetic Division



- The parasympathetic division conserves and restores calm/homeostasis. It slows the heart rate and decreases blood pressure. It stimulates the digestive tract to process food and eliminate wastes. Energy from food is processed and used to restore and build tissues (Merck Manual).
- Dr. Porges discovered that the parasympathetic division of the Autonomic Nervous System consists of two branches which lead to two different responses.
- The main nerve in the parasympathetic nervous system is the 10th cranial nerve, aka vagus nerve, which is the largest of the 12 cranial nerves and has huge implications for our well-being and health.
- The name vagus comes from the Latin word *vagary* which means *wanderer,* and this nerve is definitely a vagabond.
- The vagus travels downward from the brainstem to the heart and stomach and then back upward to the face and its connection with other cranial nerves.
- This amazing wandering nerve is a mixed nerve which communicates bidirectionally between the body and the brain. 80% percent of its fibers are sensory (afferent) sending information from the body to the brain, and 20% are motor (efferent), sending action information from the brain to the body (Dana, 2018).

Polyvagal Theory - Parasympathetic Division

The vagus nerve has two very distinct branches**: Dorsal vagal nerve** and the **ventral vagal nerve**.

Dorsal Vagal Nerve: Barta (2018) notes that the most primitive form of defense occurs when the dorsal vagal nerve is activated.

- It is not sophisticated in that it is unmyelinated and slow. When activated, the dorsal vagal nerve promotes. shutdown, freeze, and collapse
- An example of this shutdown is when a gazelle, for example, is being stalked by a lion and when trapped with no possible way to flee, drops down and appears to be deader than a doornail.
- This is not a conscious process but is, rather, a very primitive and unconscious one. When we are in this physical state, we can feel emotions such as sadness, depression, grief, shame and/or disgust (Rothschild, 2017).

Ventral Vagal Nerve: Barta (2018) writes that the second response of our parasympathetic nervous system (the first being freeze and collapse as noted above) is responsible for our ability to engage socially and to handle social relationships.

- According to Barta, the social engagement system is controlled by our ventral vagus nerve which is a very smart myelinated nerve with a rapid response time. As such, it allows us to "know" if we are safe enough so we can calm our defenses through a process of **"neuroception"** which, as noted earlier, is translated as the brain's ability to sense safety.
- This serves not only bonding needs but allows us to shift out of sympathetic arousal and move into parasympathetic calm or to downshift from activation to calm. When we are in this emotional state, we can feel emotions such as calm, pleasure, love, sexual arousal, and "good" grief (Rothschild, 2017).

Marriage of MacLean's Triune Brain Theory with Porges' Polyvagal Theory

Through the marriage of MacLean's Triune Brain Theory with Porges' Polyvagal Theory, we can explain how each part of the triune brain is correlated with the three responses of the autonomic nervous system (Barta, 2018).

Sympathetic

Limbic System (Mammalian Brain)

Developed 150 million years ago

Fight or Flight

Unconscious

Social Engagement (Parasympathetic – Ventral Vagal)

Frontal Lobe (Neocortex)

Developed 2 to 3 million years ago

Ventral Vagal

Present/Safe/Aware

Conscious

Parasympathetic (Dorsal Vagal)

Reptilian Brain (Reptilian Complex)

Developed 500 million years ago

Freeze

Unconscious

Polyvagal Theory – The Stream

When we enter into an autonomic state, the information about that state travels up the automatic pathways to the brain where a **story is drafted** to make sense of the embodied experience/sensations.

In other words, the physiological state produced by the autonomic nervous system creates a **psychological story.**

Dana (2020) describes this as a metaphor of a **stream** where we can imagine the flow of experience. At the river's source is neuroception and at the river's mouth is the story. In between **lie perception, autonomic state, feelings, and behavior.** We are accustomed to entering in the river downstream with feeling and behavior, our story being at the fore.

However, **neuroception** takes place at the furthest point upstream. We need to make our way back to the starting point, leaving behind the story, behavior, and feelings in order to identify the state and **bring perception or awareness** to neuroception (Dana, 2020).

This has implications for treatment which can be found in other papers on my website and in Hansen, 2019).

Polyvagal Theory – Autopilot or the Choice of Connection?

- So, our neurosystem, left on autopilot will, when we are faced with stress and threat, move us to either:

  (a) **Sympathetic fight or flight** which equates to extreme anxiety, anger, rage, and or terror or to

  (b) **Dorsal vagal shutdown** which leads to slowing down, withdrawal, and possibly even depression. If these modes of coping become excessive, we are at risk for potentially using maladaptive strategies such as addictions to quell the pain of negative physical symptoms, associated negative emotions, and/or complete withdrawal and possibly self-destructive behavior.

- The best response is to activate our **social engagement system of the ventral vagal pathway** of the parasympathetic branch. In this state, our heart rate is regulated, our breath is full, we take in the faces of friends, and we can tune in to conversations and tune out distracting noises.

The chart below adapted by Dr. Rothschild nicely demonstrates the shifting in body sensations, physiological symptoms, and emotions as we move between autonomic states (Rothschild, 2017).

AUTONOMIC NERVOUS SYSTEM: PRECISION REGULATION
** WHAT TO LOOK FOR **

"Normal" Life

Threat to Life

		LETHARGIC Parasympathetic I (PNS I)	CALM Parasympathetic II (PNS II) *Ventral Vagus*	ACTIVE/ALERT Sympathetic I (SNS I)	FLIGHT/FIGHT Sympathetic II (SNS II)	HYPER FREEZE Sympathetic III (SNS III)	HYPO FREEZE Parasympathetic III (PNS III) *Dorsal Vagus* Collapse
PRIMARY STATE		**Apathy, Depression**	**Safe, Clear Thinking, Social Engagement**	**Alert, Ready to Act**	**React to Danger**	**Await Opportunity to Escape**	**Prepare for Death**
AROUSAL		**Too Low**	**Low**	**Moderate**	**High**	**Extreme Overload**	**Excessive Overwhelm Induces Hypoarousal**
MUSCLES		Slack	Relaxed/toned	Toned	Tense	Rigid (deer in the headlights)	Flaccid
RESPIRATION		Shallow	Easy, often into belly	Increasing rate	Fast, often in upper chest	Hyperventilation	Hypo-ventilation
HEART RATE		Slow	Resting	Quicker or more forceful	Quick and/or forceful	Tachycardia (very fast)	Bradycardia (*very* slow)
BLOOD PRESSURE		Likely low	Normal	On the rise	Elevated	Significantly high	Significantly low
PUPILS, EYES, EYE LIDS		Pupils smaller, lids may be heavy	Pupils smaller, eyes moist, eye lids relaxed	Pupils widening, eyes less moist, eye lids toned	Pupils very dilated, eyes dry, eye lids tensed/raised	Pupils very small or dilated, eyes very dry, lids very tense	Lids drooping, eyes closed or open and fixed
SKIN TONE		Variable	Rosy hue, despite skin color (blood flows to skin)	Less rosy hue, despite skin color (blood flows to skin)	Pale hue, despite skin color (blood flow to muscles)	May be pale and/or flushed	Noticeably pale
HUMIDITY	Skin	Dry	Dry	Increased sweat	Increased sweat, may be cold	Cold sweat	Cold sweat
	Mouth	Variable	Moist	Less moist	Dry	Dry	Dry
HANDS & FEET (TEMPERATURE)		May be warm or cool	Warm	Cool	Cold	Extremes of cold & hot	Cold
DIGESTION		Variable	Increase	Decrease	Stops	Evacuate bowel & bladder	Stopped
EMOTIONS (LIKELY)		Grief, sadness, shame, disgust	Calm, pleasure, love, sexual arousal, "good" grief	Anger, shame, disgust, anxiety, excitement, sexual climax	Rage, fear	Terror, may be dissociation	May be too dissociated to feel anything
CONTACT WITH SELF & OTHERS		Withdrawn	Probable	Possible	Limited	Not likely	Impossible
FRONTAL CORTEX		May or may not be accessible	Should be accessible	Should be accessible	May or may not be accessible	Likely inaccessible	Inaccessible
INTEGRATION		Not likely	Likely	Likely	Not likely	Impossible	Impossible
RECOMMENDED INTERVENTION		**Activate, Gently Increase Energy**	**Continue Therapy Direction**	**Continue Therapy Direction**	**Put on Brakes**	***Slam on Brakes***	***Medical Emergency CALL PARAMEDICS***

The Autonomic Nervous System Precision Regulation Chart is Available for purchase on Amazon for $8.99 (a very high recommend): Babette Rothschild (2017) https://www.amazon.com/Autonomic-Nervous-System-Table-Laminated/dp/039371280X/ref=sr_1_15?dchild=1&keywords=deb+dana&qid=1590326813&s=books&sr=1-15

The Plan for Today

How bad is the electronic media addiction problem? – Current trends

How does the brain get hooked on electronic media?

Early attachment

Trauma – Big T and Little t – ACE literature

The impact of excessive electronic media on the brain and body

Polyvagal Theory – psychoneurological understanding

Solutions:

Ensure **healthy attachment** – begins in utero – right brain to right brain and forms the substrate for a healthy neuroplatform.

Trauma – manage stress/trauma before, during and after delivery and throughout life as this sets us up for poor health and maladaptive behaviors to include addictions – both substance and behavioral.

For **Media Reset** – see Dr. Victoria Dunkley's work – the best program out there

Understand how the **autonomic nervous system** works, i.e., defense versus safety and how to shift yourself and your child/others

Consider my website: **Jeffreyhansaenphd.com** which has several links to many of the best resources available such as **Victoria Dunkley** and **Andy Doan**