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The Rise of School Shootings... Could Sleep Play a Role?



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Overview



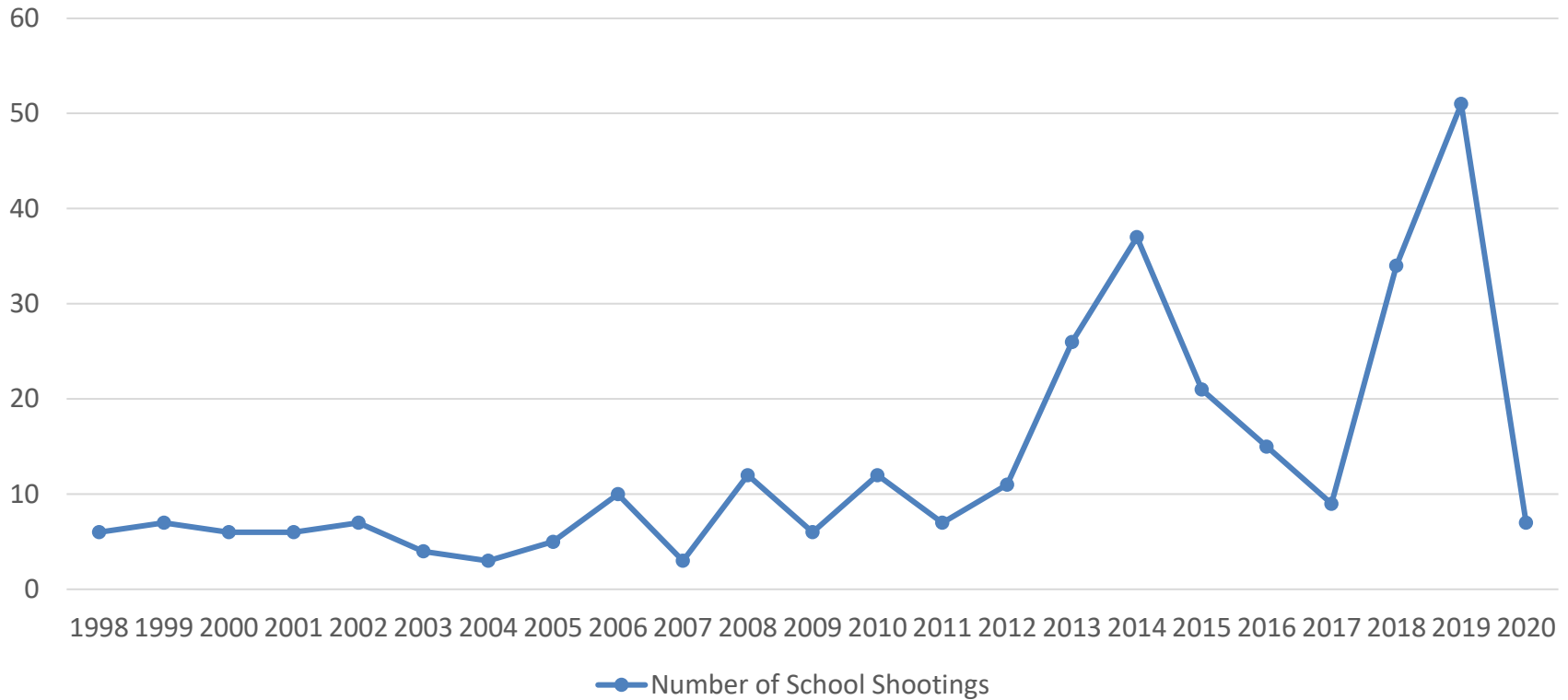
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- Look at school shooting statistics and the mindsets of school shooters
- Discuss the development of the teenage brain
- Examine teen sleep and how sleep deprivation affects the teen brain
- Explore sleep behaviors in the school shooters of Columbine
- Explain how the rise of technology is contributing to poor sleep in teens
- Examine why sleep deprivation is under-recognized in the adolescent population and why it may be a contributing factor to school shootings

Number of School Shootings Since 1998



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School Shootings Since 1998



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- Total number = 299 school shootings
 - 341 people dead
 - 131 of the school shooters were 18 years old or younger
 - Youngest school shooter = 6 years old
 - Average age of the school shooters = 15 years old
 - Most of the shooters were male
 - Over 90% were current or recent students at the school
 - 68% obtained weapons from their home or a relative's home

- Source: Wikipedia (2020) and Everly (2018)

Mass School Shootings



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- 1998 – Thurston High School
 - 4 dead, 25 injured
- 1999 – Columbine High School
 - 15 dead, 21 injured
- 2005 – Red Lake, MN
 - 10 dead, 7 injured
- 2007 – Virginia Tech Shooting
 - 33 dead, 17 injured
- 2008 – Northern Illinois University Shooting
 - 6 dead, 21 injured
- 2012 – Sandy Hook Elementary
 - 28 dead, 2 injured
- 2015 – Umpqua Community College
 - 10 dead, 9 injured
- 2018 – Parkland, FL
 - 17 dead, 17 injured
- 2018 – Santa Fe, TX
 - 10 dead, 14 injured

- Source: Wikipedia (2020)

Observed School Shooter Behaviors



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- Socially awkward and avoidant
- Isolated
- “Strange”
- “Retreat into fantasy”
- Obsessive
- Fascinated with violence, morbid media, or death
- Some have history of cruelty to animals
- Sense of hopelessness
- Dysfunctional home life
- Posted frustrations and anger on social media or in recorded videos
- Absent from school before the attack
- Prior threats

Interviews with Surviving School Shooters



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- Interviews with surviving school shooters have revealed that prior to the shootings...
 - They were bullied by peers
 - Battled depression
 - Were withdrawn
 - Considered or attempted suicide
 - Drinking and doing drugs
 - Listening to songs about killing and dying
 - Watching violent movies and TV shows
 - Playing violent video games
 - Said the violence made them feel like they have control
 - Incidents or threats at home not taken seriously
 - Planned the attacks in advance—the attacks were not random

COVID-19 and a Decline in School Shootings



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- From 2019 peak to lowest numbers in nearly a decade
- COVID-19 may have shut down schools, but did it really stop teen violence?
 - Shift from mass violence to increase in youth suicide

Is the Solution Gun Control?



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- After pretty much all of the school shootings, the answer to the problem has been stricter gun control laws
 - But is that really the solution?
- Let's go back to Columbine...
 - It was not originally planned to be a school shooting but rather a bombing gone wrong
 - Harris and Klebold were seeking infamy on a historical scale
 - Harris was labeled a psychopath while Klebold was more suicidal
- It appears to be more of a mind issue than a means issue

What Drives the Shooters?

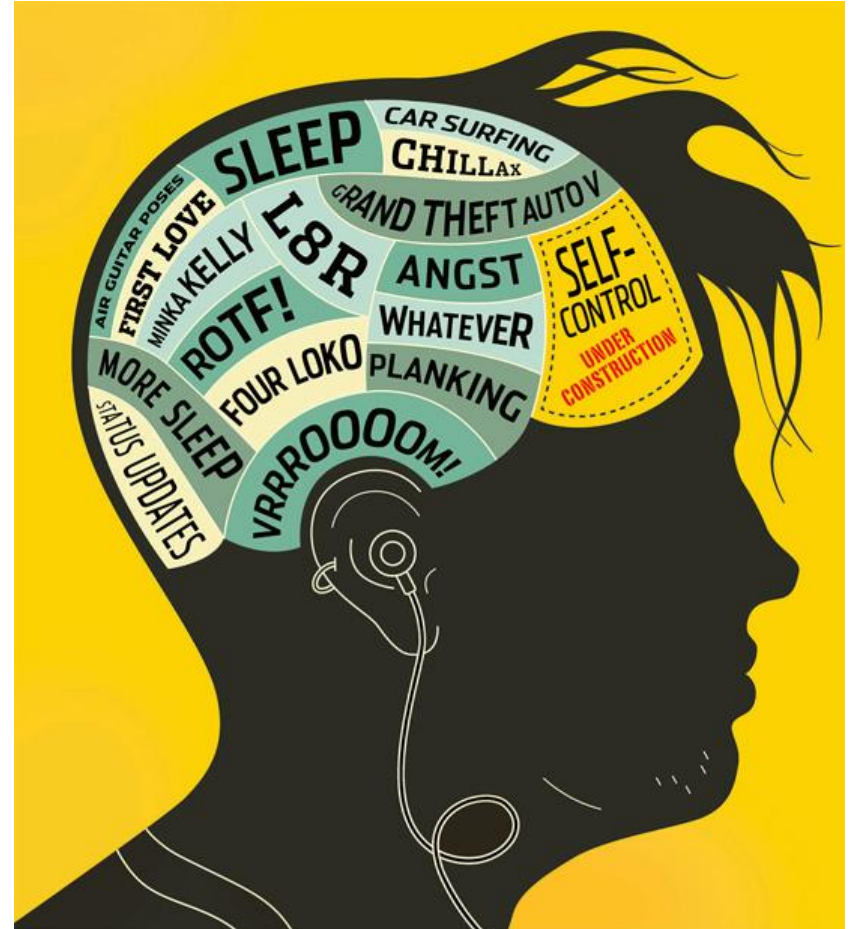


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- Most of the shooters were described as having addictive behaviors or brain/mental illness
- The logic center of the brain is not fully developed in the teenage brain so how can they make logical decisions?
 - The teenage brain is like an entertainment center that's not been fully hooked up

- Source: Edmonds (2008)

First let's look at
what's going
on in the teen
brain...



The Structure of the Teenage Brain



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← Cortex = The logical brain

← Limbic System = The emotional brain

← Brain stem = Controls basic functions

- Source: Hedaya (2010)

What Happens to the Teenage Brain



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- Most dramatic growth spurt of the brain occurs in adolescence
- Picture a highway
 - Info highway is getting a faster speed limit (myelination)
 - Some routes shut down (pruning)
 - Some routes get re-routed and reconnected
 - Old highways connect to new highways (sprouting)
 - It's a major construction project that rarely flows smoothly
 - Why we see personality changes and different reactions in teen years

What Happens to the Teenage Brain



What Happens to the Teenage Brain



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- Growth in synapses
 - Prefrontal cortex area is the last area to be regulated, making it more immature in teens
 - Plasticity
- Prefrontal cortex may not be fully developed until mid-20s
 - Teens use back of brain for decision making
 - Emotional based decision making stemmed from limbic system
 - Adults use frontal lobe for decision making
 - Can identify errors in decision making better
- Nucleus accumbens well developed though in teens
 - Pleasure and reward area
 - Teen brains don't register delayed gratification

- Source: Edmonds (2008)

What Happens to the Teenage Brain



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- More receptors for oxytocin are produced
 - Oxytocin = “Bonding hormone”
 - Linked to the feeling of self-consciousness
 - Peaks around age 15 years old
- What a teen does and is exposed to during this time really impacts their future
- Teens are developing their own identity—often influenced by peers
- Prefrontal cortex and limbic system don’t come into balance until adulthood (mid-twenties)

- Source: Nixon (2012)

The Prefrontal Cortex



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- What it is responsible for:
 - Personality
 - Regulating feelings
 - Controls impulses
 - Determining initiative
 - Judgment and logical decisions

Teens Are More Likely To...



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- Be emotional
 - Tears
 - Anger
- Be rebellious and risky
 - Need higher doses of risk to feel same rush adults do
- Be impulsive
- Develop addictions
- Get less sleep
- Experience social anxiety and seek peer approval

How Does Sleep Factor In?



Sleep in Teens



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- Most teens I've polled say they get 2-8 hours of sleep per night
 - CDC report on teen sleep in 2016 showed 69% of high school students get less than 8 hours of sleep on school nights
 - The National Sleep Foundation said that number was 87% in a 2006 poll
- What things are keeping teens from sleeping?
 - Electronics—97% of teens have at least one electronic item
 - Operating against their circadian rhythm (school start times)
 - Addictions—Phones, Gaming, Social Media, TV
 - Social events
 - Homework

- Source: Gregoire (2015) and Aspen Education Group (2011)

Sleep Deprivation Factors



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- Prefrontal cortex and its underdevelopment in teens
 - Sleep deprivation is much like drinking alcohol
- Heightens an already high emotional response
- Even more prone to inappropriate behavior and paranoia
- More likely to battle depression and substance abuse
 - Each hour of sleep lost is associated with a 38% increased risk of feeling sad or hopeless and a 58% increase in suicide attempts in high school students
 - Research has shown that sleep difficulties predicted substance-related issues
 - Teens who sleep an average of 6 hrs/night are 3x more likely to suffer from depression

Sleep Deprivation Factors



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- Higher risk of diabetes and obesity in adulthood
- Dependence on sleep and anxiety medications
 - 12 times more likely to abuse those medications
- May appear as ADHD
 - ADHD cases have escalated in the digital age
 - More likely to be inattentive, impulsive, hyperactive and oppositional
- More at risk for drowsy driving accidents

- Source: Gregoire (2015)

Insufficient Sleep and Risk-Taking Behaviors



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- The less sleep teens get, the higher the odds of risk-taking behaviors
 - These behaviors preceded accidents, suicides, and teen violence
 - Sleep amounts are usually less than 6 hours per night
 - Increases in mental health concerns, substance abuse, and motor vehicle crashes
- Strongest associations were related to mood and self-harm

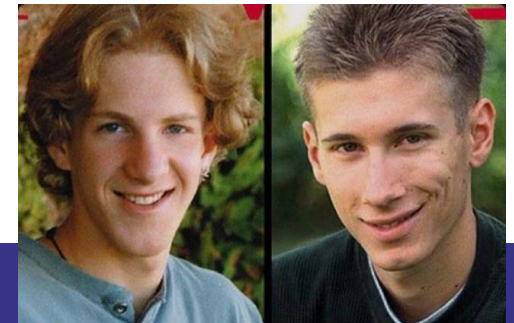
- Source: Brigham and Women's Hospital (2018)

Sleep in the School Shooters at Columbine



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- Dylan Klebold's mother said in her book that Dylan's sleep patterns changed prior to the Columbine shooting
 - She reported he often appeared tired in the months leading up to the shooting
 - Dylan's calculus teacher told his parents that he sometimes fell asleep in class
 - Dylan was depressed in the months leading up to the shooting
- Eric Harris was taking Zoloft, then Luvox
 - Autopsy showed this in his system at time of death
 - Lawsuit stated he was obsessed with homicidal and suicidal thoughts from taking these medications
 - Had a nightmare three times about killing kids at school before Columbine
- Both shooters' brains were found to be awash in serotonin



-Source: Bollyn (2006) and Klebold (2016)

Sleep's Role in Depression



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- Did the sleep changes trigger Klebold's depression?
 - Teens who don't get enough sleep are four times more likely to develop major depression
 - And if they are depressed, four times more likely to lose sleep
 - Was spending a lot more time on the computer in months prior to shooting
- Teens are a high risk group for depression
 - Less sleep due to homework, social activities, afterschool jobs, delayed sleep phase, technology addictions
 - Most times get prescribed anti-depressants, which complicate sleep problems further

- Source: Kryger, Roth, and Dement (2016)

How Has Technology Impacted Teen Sleep?



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- Teens with 4 or more devices are twice as likely to fall asleep in school
- Technology has become main source of teen entertainment
- Tech addiction is highly prevalent in the teen population
- The bedroom has ceased to be the sleep zone
- Study of 125,000 kids shows “strong and consistent association between bedtime media-device use and inadequate sleep quantity, poor sleep quality, and EDS”
- We see a rise in school shootings correlating with the rise in the availability of portable electronics accessible to the teen population
- Greater social media use

- Source: Aspen Education Group (2011) and Ism (2016)

Why Isn't Teen Sleep Deprivation Being Dealt with Effectively?



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- Lack of education for parents, teachers and school administrators
- Teen sleep deprivation can look very different from adults so signs get missed



How to Change the Statistics



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- Sleep education to the major stakeholders—parents, school administrators, teachers, and the teens themselves
- Watching for and responding to abnormal behaviors
 - Keep in mind most of these shooters exhibited warning signs ahead of the act
 - Don't ignore the behaviors
- Monitor what teens are doing electronically
- Help teens develop healthy habits

In Conclusion



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- Teen sleep deprivation is a growing problem
- School shooters have shown sleep disruptions in months prior to the school shootings, showing sleep issues can be a contributing factor
- Electronic availability is a contributing factor to teen sleep deprivation
- Education is needed to help remedy the problem

Resources



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