Tech Curiosity
Session 5 of 6

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Welcome

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Tech Curiosity Presentation Archive

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New Gadget Deals

- Feit Electric LED 1080P HD Smart Flood Security Light
  - Records in 1080P HD Video
  - Record, Screen Capture
  - Receive Instant Notifications to your Smart Device
  - 3000 Lumens Extra Bright Adjustable Flood Light
  - Customizable 270° motion detection zone
- $99 on sale at Costco

New Gadget Deals

PECO Deals on Smart Thermostats + a FREE Google Home Mini

Google Nest Learning Thermostat - Programmable Smart Thermostat for Home - 3rd Generation

- No more programming: With Auto-Schedule, the Google Nest Learning Thermostat learns from you and programs itself.
- Home/Away Assist: don't heat or cool an empty home. Home/Away Assist adjusts the temperature after you leave.
- Remote control: Control your thermostat from anywhere using the Nest app.

Plus **Google Home Mini**

PECO Marketplace deal - $149

New Gadget Deals

- **Wyze Cam Pan v2 ($40, plus shipping)**
  - Color Night Vision
  - Pan/Tilt/Zoom
  - Pan Scan
  - 1080p Full HD
  - Motion Tracking
  - Motion Tagging
  - Live Streaming
  - Real 2-Way Audio
  - Night Vision
  - Motion and Sound Detection
  - Motion Detection Zone
  - Smart Sound Recognition
  - Push Notifications
  - Alert Scheduling
  - Free, Rolling, 14-Day Cloud Storage
  - Secure AWS Cloud Storage
  - Continuous Recording
  - Time Lapse
  - Playback
  - Sharing
  - Flexible Installation
  - Mini-Siren Feature

And a side note

- Re: in-home surveillance and communication for the aging parent

Fall monitoring
SOS

+

Voice activated
2-way communication

+

Video surveillance
2-way communication

More Gadgets

Amazon announced new hardware and software products, including Astro, an Alexa-enabled rolling robot designed for home monitoring. Amazon also unveiled a drone security camera that is currently available on an invite-only basis.

- The Ring Always Home Cam, Amazon's drone camera product, has a 1440x1440 HD camera, with an LED that adjusts based on the lighting of the environment or when recording a path.
- Amazon said the Astro robot will be compatible with an upcoming subscription service, Alexa Together, designed for eldercare.
- The company also unveiled:
  - An Alexa-enabled smart thermostat, built with Honeywell.
  - Echo Show 15, a 15.6-inch 1080p display with side speakers.
  - Halo View, a waterproof exercise watch, with Halo Nutrition, for meal planning; and Halo Fitness, for streamable video work-outs.
  - Amazon Glow, an 8-inch tablet for kids for remote calls with family members. The device creates a 19-inch projectable touch space in front of it.
  - Blink, a 1080p camera-enabled doorbell.

More Gadgets (continued)

- **Amazon's Astro robot is stupid. You'll still fall in love with it.**

The big reveal: Last week, Amazon introduced Astro, a "household robot." It promised that the $999 Astro, which is squat with two wheels and a rectangular screen that features two orbs for eyes, will be able to do things like watch your home or join impromptu dance parties. There's good reason to be skeptical, since Astro is essentially a giant camera on wheels that will watch everything you do.

So… why would anyone be happy to have one? The reason lies in the way our brains are wired. It all starts with trust. We tend to trust machines to do what they've been programmed to do.

Technology in the News

- It’s all about Facebook!

Technology in the News

- **Facebook, Instagram, and WhatsApp were down for more than five hours this week in an unprecedented outage.** For the billions of people around the world who use the apps on a daily basis, the unexpected outage made it difficult to communicate or do business.
  - In a statement, Facebook said that "the root cause of this outage was a faulty configuration change" that caused "a cascading effect on the way our data centers communicate, bringing our services to a halt."
  - Social media users were 'forced' to use non-Facebook apps to communicate. Twitter joked about it, tweeting, "hello literally everyone."
  - 2.76 billion people worldwide use at least one Facebook product every day. WhatsApp has been downloaded nearly six billion times this year.

Technology in the News

- **Facebook, including its WhatsApp and Instagram services, suffered a six-hour outage on Monday.** According to a company statement, configuration changes to the backbone routers that coordinate traffic between data centers caused the outage.
  - At 11:51 a.m. ET a DNS failure stemming from Facebook and its associated services, and the infrastructure IP being unreachable.
  - The outage was linked to Border Gateway Protocol updates that enable the exchange routing of information between systems. The configuration changes took the entire internal backbone offline.
  - It was the largest Facebook outage with 10.6 million problem reports globally.

Technology in the News

- **Facebook executive Antigone Davis, who serves as the company's global head of safety, testified before Congress concerning Instagram's effect on teenagers.** Recent reporting has revealed that even though Facebook was aware of the deleterious effect that Instagram has on teenagers' self-esteem, the company sought to promote the app among youth.
  - According to a WSJ report this week, Facebook found that one in three teenagers felt that Instagram made their body image worse.
  - Among teenagers experiencing suicidal ideation, 14% of British users and 6% of American users said they could trace those thoughts directly to Instagram.
  - Facebook released slide decks from the research.

Technology in the News

- **Facebook has shared two annotated slide decks on Instagram's impact on mental health.** This follows the Wall Street Journal's publishing of internal documents on the impact of Instagram on teenagers and the decision to pause a kids version of the app.
  - 30% of users across age cohorts felt that Instagram "made problematic use worse“
  - 30% of teen girls felt that Instagram makes body image issues worse
  - over 59% of users had sleep problems
  - 52.51% had body image issues
  - 45.8% had eating issues
  - 48.5% had fear of missing out
  - Davis said that 80% of young Instagram users have neutral or positive experiences, while senators drew attention to other Facebook data, including on suicidal thoughts among teens.

Technology in the News

- **Frances Haugen is the Facebook whistleblower instrumental in the leak of several internal documents that laid the foundation for a series of Wall Street Journal stories known as the "Facebook Files."**
  - The WSJ series included articles about Facebook's inaction after internal research revealed the platform's ill effects.
  - The WSJ reported that XCheck, a program meant as a quality control measure for high-profile accounts, instead shielded VIPs from some or all of the platform's rules.
  - It also revealed Instagram's research on its harmful effects on teenage girls.
  - Haugen testified before a Senate subcommittee on Tuesday, seeking federal whistleblower protection from the SEC.
  - She also revealed that all 60,000 employees of Facebook had access to attorney-client privilege documents, presentations to Mark Zuckerberg, and internal research through an internal network called Facebook Workspace.
  - See also: Facebook Whistleblower Frances Haugen: The 60 Minutes Interview

Technology in the News

- Enough about Facebook!
  - How ‘bout those Pandora Papers?

Technology in the News

- **A new trove of leaked financial documents known as the "Pandora Papers" illuminates the complex and shadowy world of offshore tax havens.** The leaked documents detail the financial secrets of over 100 billionaires, world leaders, and celebrities from around the world.
  - The files have been examined by the International Consortium of Investigative Journalists (ICIJ), with over 650 journalists worldwide participating in the project.
  - The documents reveal the owners of over 95,000 offshore shell companies.
  - World leaders whose asset holdings were revealed include King of Jordan Abdullah II bin Al-Hussein, ex-UK Prime Minister Tony Blair, Russian President Vladimir Putin, Czech Prime Minister Andrej Babis, Ukrainian President Volodymyr Zelensky, Azerbaijani President Ilham Aliyev, Kenyan President Uhuru Kenyatta, and more.
    - "They are using those offshore accounts, those offshore trusts, to buy hundreds of millions of dollars of property in other countries, and to enrich their own families, at the expense of their citizens." Ya think?

Technology in the News

- **The release of the Pandora Papers — and revelations about the tax schemes and hidden riches of world leaders and elites — prompted a wave of denials by accused individuals.** At least eight governments announced plans to investigate the leaks.
  - Chilean President Sebastián Piñera denied having been involved in the sale of the Dominga mining company.
    - The Papers show that Piñera's children owned a 33.3% stake in the company. They reportedly used a British Virgin Islands shell company to sell their stake to a friend of Piñera. The $138M sale took place in 2010, during Piñera's first term as president.
  - King Abdullah II of Jordan said the $100M+ spent on luxury real estate in the U.S. and U.K. was paid with his personal fortune rather than public funds.
    - The Pandora files reveal that Abdullah's financial team had set up dozens of shell companies in an attempt to avoid disclosing ownership of the properties.
  - Czech Prime Minister Andrej Babis, who is up for reelection this week, claimed that the leaks were part of a campaign against him.
    - In 2009, Babis paid $22 million for a French chateau with two swimming pools. He used shell companies to hold the property and hide his ownership.
    - The Czech national police agency announced that it would investigate the claims.
  - Australia and the U.K. also plan to launch investigations. Canberra warned: "your secrets are no longer safe."

Technology in the News

- What about DeepMind?

Technology in the News

- **DeepMind, Alphabet's artificial intelligence unit, achieved profitability last year.** Revenues were $59.6M in 2020, up from a loss of $649M in 2019.
  - The unit has recently worked on projects such as improving the voice of Google Assistant and refining estimated arrival times on Google Maps by 50%.
  - Last week, DeepMind announced a new deep generative model that is able to forecast weather in specific locations down to a five-minute window.
  - In July, DeepMind announced it had been able to predict the structure of proteins for humans and a range of other organisms.

Technology in the News

- **DeepMind developed a deep generative model to forecast rain activity in specific locations.** 89% of 56 weather forecasters surveyed at the U.K.'s Met Office found that the model was more effective than other methods.
  - The researchers used deep generative models to learn the probability distributions of observed data and simulate future radar forecasts.
  - The high-resolution forecasting of rainfall and hydrometeors zero to two hours into the future, known as precipitation nowcasting, is crucial for weather-dependent decision-making.

Technology in the News

- And Microsoft is not far behind…

Technology in the News

- **Microsoft has developed DeepMC, a new framework to predict the weather by combining machine learning and local sensors.** A team of Microsoft researchers found a 90% accuracy rate in temperature predictions.
  - The researchers examined solar radiation, soil moisture, temperature, and wind speed using NOAA and DarkSky APIs, as well as sensors installed on farms.
  - The DeepMC model is trained to identify the error between the API and the local sensor readings for improved predictions.

Bottomline

- Improved weather predictions – yeah!

Technology in the News

- Also in the news…

Technology in the News

- **YouTube says it is banning all videos with vaccine misinformation and removing a number of prominent anti-vaccine accounts.** This includes misinformation on the flu shot and the measles, mumps, and rubella vaccine.
  - YouTube says it's removed 130,000 videos since last year for violating its policy on spreading COVID-19 vaccine falsehoods.
  - A YouTube spokesperson said the platform banned accounts for serial spreaders of misinformation like Joseph Mercola, Sherri Tenpenny, and the Children's Health Defense Fund.
  - Meanwhile, Russia has threatened to block YouTube unless it reinstates two German-language channels managed by Russian state media arm RT. YouTube banned the channels saying that they spread misinformation about COVID-19 and vaccines.

Technology in the News

- **TikTok plans to add user, advertisement, and shopping features, including interactive ads.**
  - TikTok also announced its "super like" feature, in which users tap the like button to display icons, and "storytime tool", which allows users to control the narrative of the story.
  - According to TikTok, its users are 1.7 times more likely to purchase an item discovered through the app.
  - Earlier this week, TikTok said it had surpassed 1 billion monthly active users, up from 788 million in Q1.

Yikes!

Technology in the News

- **A recent survey of 597 IT healthcare security professionals found 20% worked at a hospital that experienced an increase in deaths following a ransomware attack.** 70% worked at a hospital that delayed procedures and tests, resulting in "poor outcomes."
  - 67% of hospitals experienced one ransomware attack, and 33% experienced at least two.
  - 70% of patients had to extend their stay at a hospital due to a ransomware attack.

Technology in the News

- **GraphWear, a company that develops wearables for glucose monitoring, has raised a $20.5M Series B.** The company's devices use a graphene sensor that converts molecules into electrical signals.
  - GraphWear is developing a wristwatch and a device for the torso which allow for data monitoring via an app.
  - The company aims to use the funds to complete a clinical trial and apply for FDA clearance.

Technology in the News

- **Samsung plans to provide support for digital car keys on its phones.**
  - The feature will be rolled out to the Note 20 Ultra, the Galaxy Z 2 and 3, and the Fold Galaxy S21 Plus and Ultra, starting in South Korea.
  - The keys can be stored in Samsung Pass, which will contain the option to adjust vehicle mirrors and seats remotely.
  - The feature allows automatic locking and unlocking when the device is near the vehicle.
  - Samsung Pass will allow the sharing of keys with devices running Android 11.

Technology in the News

- **Global chip shortages and their effect on the automotive industry, in particular, have led to semiconductor startups raising record-level funding this year.** According to a report by Crunchbase, global investments have surpassed $3.7B in 85 deals to date.
  - Investments have been focused on chip design and development startups that can create new, well-designed chips that will reduce the number of chips needed.
  - Tech giants like Apple, Amazon, and Tesla have started to design and develop their own chips.
  - Separate but related: Consulting firm AlixPartners estimates that the global shortage will cost the automobile industry $210B in lost revenue this year.

Technology in the News

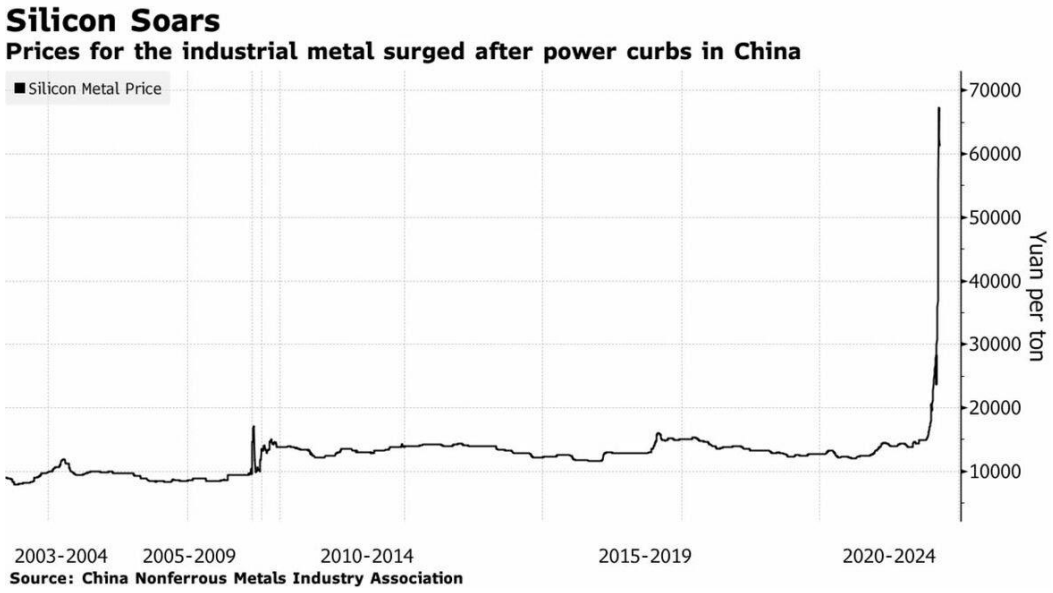
- Of course China is back in the news!

Technology in the News

- **China's AI governance committee has released the country's first ethical guidelines for governing AI.** The guidelines by the committee, which was established in Feb. 2019 under the Ministry of Science and Technology, place emphasis on user rights and preventing risks, and align with Beijing's effort to crack down on Big Tech influence.
  - Titled "New Generation Artificial Intelligence Ethics Specifications," the document says that its primary goal is to ensure that AI is always controlled by humans.
  - The guidelines include five other basic principles for AI systems - controllable and trustworthy; improving human well-being; promoting fairness and justice; protecting privacy and safety; raising ethical literacy.
  - They prohibit AI from getting involved in illegal activities and endangering national security, public security, or manufacturing security.
  - The guidelines have been set with the aim of helping China AI developers make a major AI breakthrough by 2025 and becoming a global leader by 2030.

Technology in the News

- **Silicon prices have surged over 300% in the past two months, following a production cut in China.** The country's effort to reduce power consumption and curb electricity use has disrupted silicon production, forcing companies to slash output by 90% below August levels.
  - Silicon is the second most abundant element on Earth and is used across manufacturing industries like electronic goods, automobiles, glass, medical equipment, and solar panels.
  - The surge in price has forced many companies to declare force majeure, while chemical manufacturers like Elkem ASA have suspended sales.
  - The effort to curb power consumption has led to a surge in the price of magnesium that is expected to last till next summer.



Technology in the News

- And a video to lighten things up a bit

Technology in the News

This is NOAA and Saildrone Inc.’s Saildrone Explorer for weather data collection at sea

Agenda for Session 5

- Joint "Surgery“
- Can a watch or remote monitoring replace the yearly physical?
- Male Fertility - US military is leading - soon will be doing so for Special Operations Forces
- Acoustic epidemiology
- Lithuania says throw away Chinese phones due to censorship concerns
- At lower 5G frequencies, EMF are probably carcinogenic for humans - Health Impacts of 5G
- **Swisstex** - Robots measure amounts of dye to use for a project
- Yoel Fink and AFFOA = fibers that can perform multiple functions - digital fibre & fabrics as a "service“
- Wearables: **https://www.wsj.com/news/tech/future-of-everything?mod=nav_top_subsection**
- NUDES - “Solar Mountain”
- PowerPod is a prototype small-scale wind turbine
- back-log of container ships at many ports - LA and NY
- Targeted Dream Incubation
- How an 11-Foot-Tall 3-D Printer Is Helping to Create a Community
- Titanium infused clothing or fibers
- Personal thermal management

Can a watch or remote monitoring replace the yearly physical?

Smart wearable devices in cardiovascular care: where we are and how to move forward

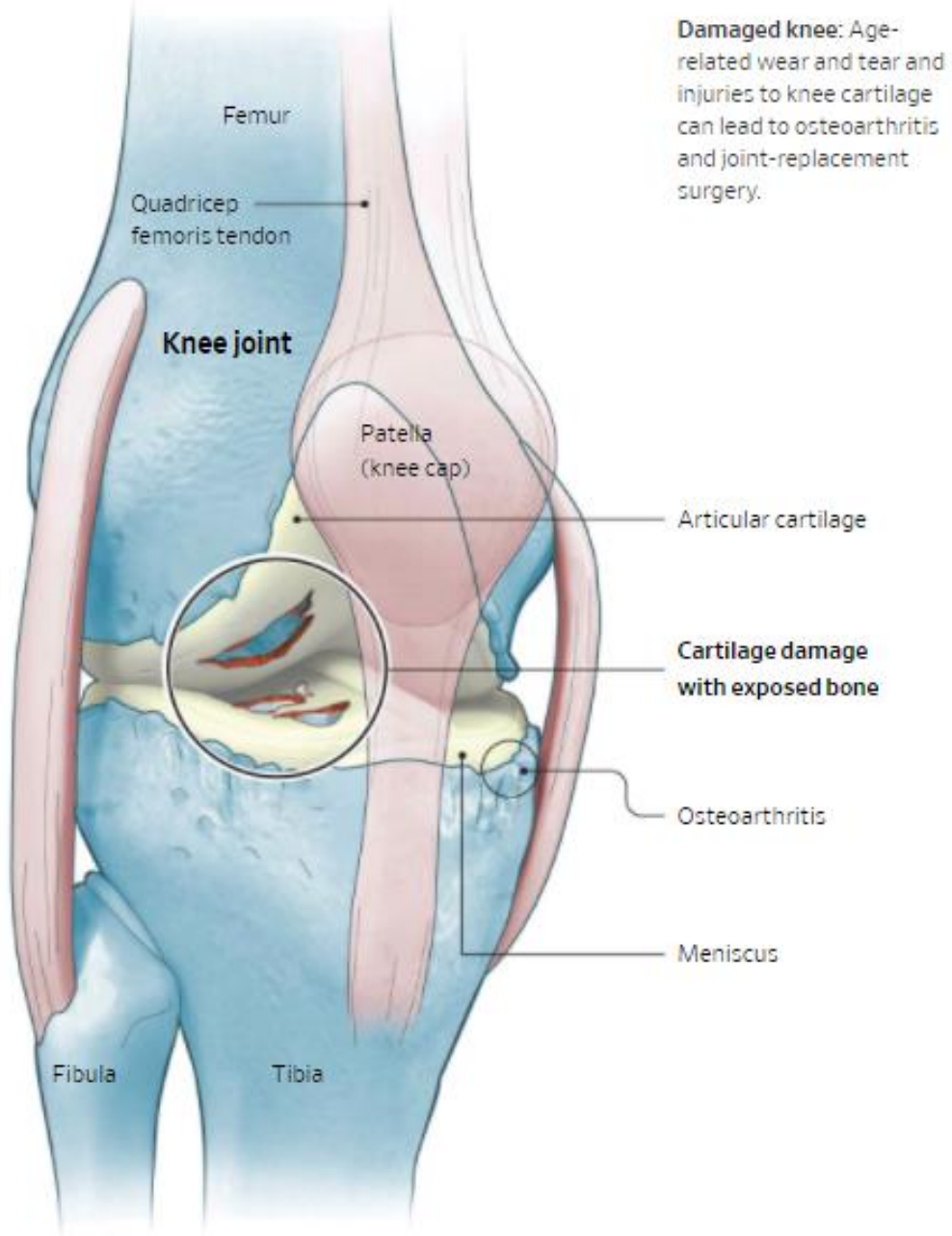
- Smart wearables generate a plethora of data through various sensors and software algorithms and understanding their basic engineering principles and limitations can be helpful for clinicians and scientists.
- Evidence supports the use of wearable devices in cardiovascular risk assessment and cardiovascular disease prevention, diagnosis and management, but large, well-designed trials are needed to establish their advantages.
- Several challenges still hinder the widespread adoption of wearables in clinical practice, including a concern for device accuracy, patient privacy and cost, and how to separate actionable data from noise.
- Overcoming these challenges requires that various stakeholders come together to develop comprehensive evaluation frameworks, pragmatic regulatory policies, clinical trials and medical education curricula.
- A practical ‘ABCD’ guide for clinicians can facilitate the integration of these devices in routine clinical practice.

Joint "Surgery“

- **A KNEE OR HIP ‘REPLACEMENT’ WITHOUT SURGERY? WSJ, SEPT. 9, ‘21**
  - Researchers are developing new techniques to protect, repair and regrow articular cartilage to stop the progression of osteoarthritis and curb the need for joint replacement surgery.
  - Osteoarthritis affects more than 32.5 million people in the U.S. More than 754,000 knee replacements and 448,000 hip replacements took place in 2017
  - Dr. Chan discovered in 2018 that skeletal stem cells at the ends of bones can give rise to cartilage, bone marrow or bone. Before turning into bone, the cells go through a cartilage stage.
  - Dr. Chan and his team found a way to steer the development of cells toward cartilage and away from fibrocartilage. They used a powerful molecule called bone morphogenetic protein 2 to encourage skeletal stem cells to start bone formation. Then they stopped the process at the cartilage stage with a molecule called VEGF that blocks another molecule important for bone formation.

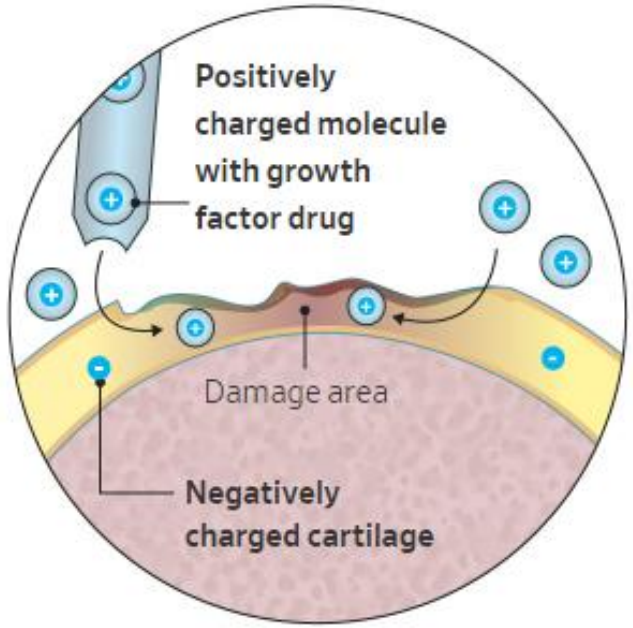
Joint "Surgery“

- Cartilage, the shock-absorbing layer that enables joints to move smoothly, can’t easily regenerate. Researchers are testing methods to repair damage and regrow articular cartilage

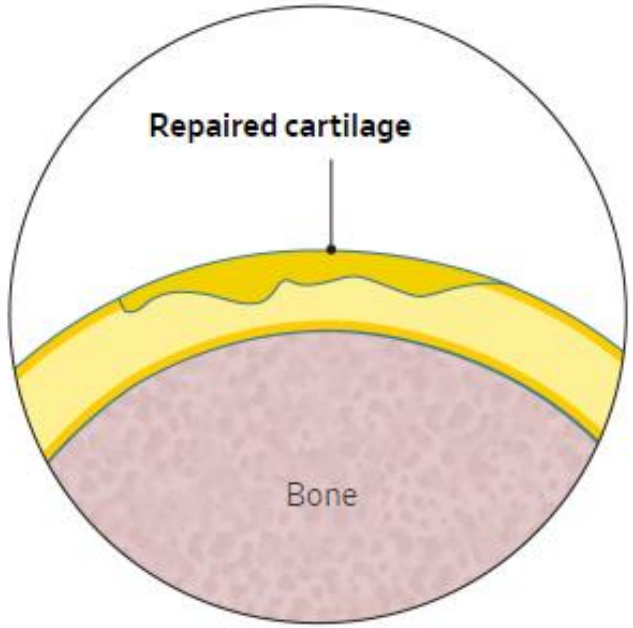


Joint "Surgery“

Keeping drugs on target



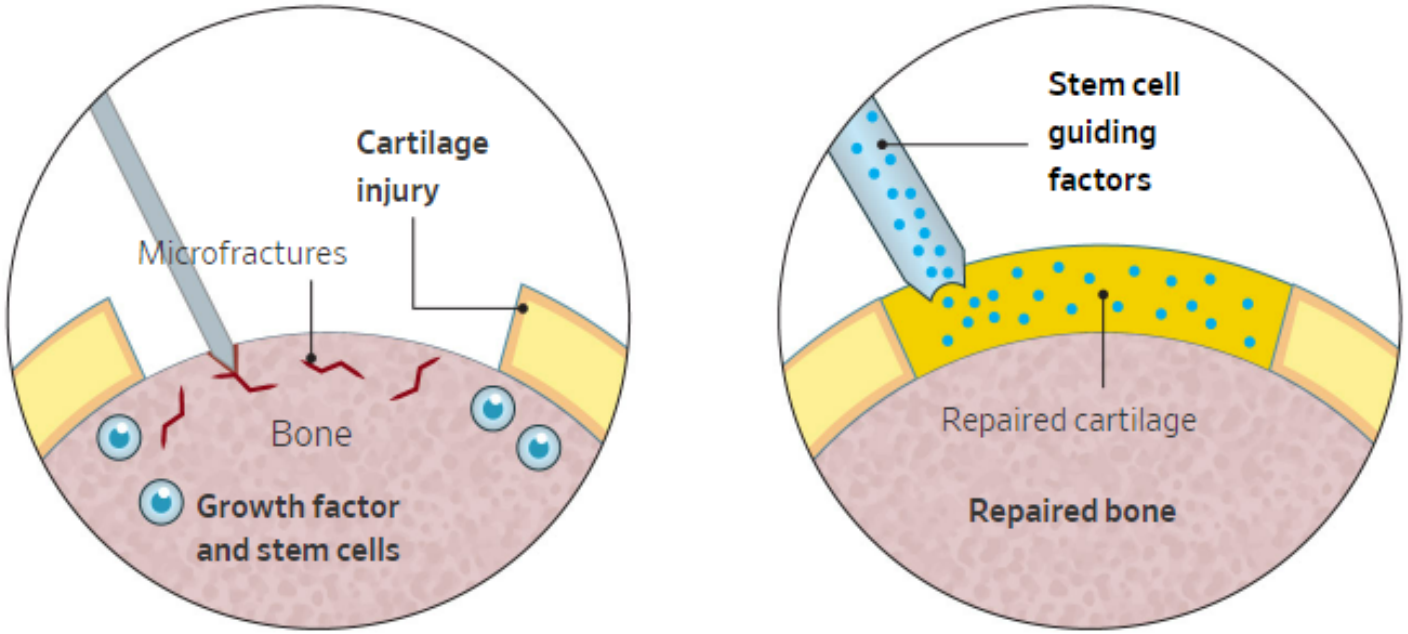
Some osteoarthritis drugs that held promise in animal studies didn't perform well in human trials because the body cleared the drug from the joint before it could reach its target. Researchers have designed a molecule whose positive charges bind to negatively charged cartilage; this acts as a carrier to help IGF-1, a growth factor, penetrate into the deep layer of cartilage cells.



When injected into a joint, the particles coat the surface of the cartilage and diffuse through it. The attached drugs promote tissue growth and repair and prevent cell death. The drug concentration in the joints remained high enough to have a therapeutic effect for about 30 days.

Joint "Surgery“

Growing new cartilage



Researchers intentionally give small fractures to the bone under injured cartilage, prompting a healing response. Then, they inject stem cells paired with a growth factor that tells the cells to create new bone.

Before creating bone, the stem cells create new cartilage. The researchers introduce a molecule called VEGF that blocks the bone regeneration, leaving the new cartilage to repair the injury.

Source: Massachusetts Institute of Technology (charged molecules); Stanford School of Medicine (microfractures); Kevin Hand/THE WALL STREET JOURNAL

Acoustic epidemiology

- Vestibular schwannoma (aka Acoustic neuroma)
  - a benign tumor that develops on the vestibulocochlear nerve that passes from the inner ear to the brain
- Neurofibromatosis (aka Acoustic neurofibromatosis)
  - a genetic condition that may result in the development of bilateral benign brain tumors in the nerve sheath of the cranial nerve VIII, which is the "auditory-vestibular nerve" that transmits sensory information from the inner ear to the brain
- Acoustic trauma
  - an injury to the eardrum as a result of very loud noises over time
- Tinnitus
  - tinnitus is a symptom that may result from various underlying causes including noise-induced hearing loss or age-related hearing loss, known as presbycusis (tinnitus is common, affecting about 10–15% of people. Most, however, tolerate it well, and it is a significant problem in only 1–2% of people. The word tinnitus comes from the Latin *tinnire* which means "to ring“)

Cellular Telephone Use and Risk of Acoustic Neuroma

- a number of environmental factors have been suspected to increase the risk of acoustic neuroma
  - suspected factors include electromagnetic fields emitted by hand-held cellular telephones, since this type of tumor is located in an anatomic region where a considerable amount of the power emitted from cell phones is absorbed
  - electromagnetic fields emitted from cellular telephones do not have enough energy to break chemical bonds or damage DNA
  - electromagnetic radiation from a cell phone can penetrate the skull and deposit energy 4–6 cm into the brain
  - the biologic basis for a possible association between cell phone use and cancer risk has been proposed to be a thermal mechanism, such as changes in protein phosphorylation, or a nonthermal mechanism that promotes tumor growth

Cellular Telephone Use and Risk of Acoustic Neuroma

- Study results
  - there was no significantly increased risk of development of acoustic neuroma among regular users of handheld cellular telephones
  - the pattern of use of a cellular telephone did not correlate with the location of the tumor or symptoms of the disease
  - there is no correlation between the side on which the telephone was most frequently held and the site of the tumor, and
  - there's no increase in risk according to the telephone operating system first used (analogue or digital)

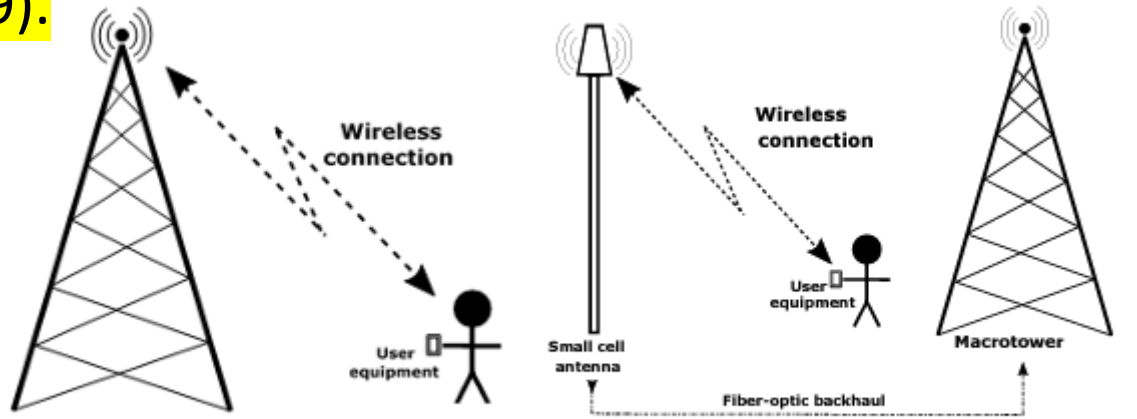
I guess that means 'cell phones are safe'

But how about 5G? Is that safe?

Health Impacts of 5G

- Current state of knowledge of 5G-related carcinogenic and reproductive/developmental hazards as they emerge from epidemiological studies
  - The International Agency for Research on Cancer (IARC) classified radiofrequency (RF) EMF as 'possibly carcinogenic to humans' (Group 2B) and recently recommended RF exposure for re-evaluation 'with high priority' (IARC, 2019).

4G LTE connects the user directly to the macrotower



(a) The 4G LTE cellular connection process between a macrotower and a UE.

(b) The 5G cellular connection process between a macrotower and a UE through backhaul.

Now 5G works;
the small cell receives information from or to the user, then sends the data through the fiber-optic backhaul to the nearest macrotower, where the data is then sent to the network servers.

Health Impacts of 5G

- Study results
  - **cancer**: FR1 (450 to 6 000 MHz): EMF are probably carcinogenic for humans, in particular related to gliomas and acoustic neuromas; FR2 (24 to 100 GHz): no adequate studies were performed on the higher frequencies;
  - **reproductive developmental effects**: FR1 (450 to 6 000 MHz): these frequencies clearly affect male fertility and possibly female fertility too. They may have possible adverse effects on the development of embryos, fetuses and newborns; FR2 (24 to 100 GHz): no adequate studies were performed on non-thermal effects of the higher frequencies.

Hmm - Verizon's millimeter wavelength (mmWave)-based 5G, operates at frequencies of **about 28 GHz and 39GHz**

Next

Targeted Dream Incubation

- **What Is TDI?**
  - Targeted Dream Incubation is a method for guiding dreams towards specific themes
    - Ancient Egyptian spiritual practices
    - Canadian Indigenous dream sharing rituals
    - treatments for PTSD-related nightmares
    - And more
  - **Ethics on the use of dream influencing technologies**

Targeted Dream Incubation

- **How does it work?**
  - The key to TDI is a special state of sleep called hypnagogia, or NREM 1
  - we aim for the middle of this descent into unconsciousness, at a moment when the brain has begun to enter the dream-state but the senses are still engaged
  - At this moment, we take **TDI Step 1** and simply play an audio reminder to "think of theme (X)”
  - Words spoken outside become images inside, and slip into the dream
  - a sleeping brain is listening (ex. deepen sleep by 81% simply by playing the audio clip "sleep deeper“)
  - the subject is left undisturbed to descend deeper into sleep and let that imagery grow into the dream

Targeted Dream Incubation

- **How does it work?**
  - But if subjects get too far into sleep, they are likely to forget their dream! This leads us to **TDI Step 2**
    - we play audio prompting a dream report, i.e. "can you tell me what you are thinking about?“
    - Subjects mutter a dream report for ~30s, after which they are allowed to fall back asleep again
    - When sleep onset begins, **TDI Step 1** is prompted again.
    - This cycle continues, allowing for serial dream incubations and serial dream reports.

Note: This technique is similar to one called Targeted Memory Reactivation , or TMR. In this technique, sensory cues are paired with some learning material while subjects are awake and then, during subsequent N2 or N3 sleep, these cues are presented again.

Targeted Dream Incubation

- **Why Incubate Dreams?**
  - Nobel Prize winner Eric Kandel said, "human creativity...stems from access to underlying, unconscious forces."
  - To know ourselves, and to be our most creative selves, we are interested in building tools for self-exploration in this sleep state. TDI aims to be a tool to hand people, that they can take home, and on their own terms explore and augment themselves.
  - **Scientifically**, having a method to control dreams means that we can now do controlled experiments on how dreams influence emotion, creativity, memory, and more
  - **Therapeutically,** TDI gives patients and clinicians a lever of control to gain insight via dreams and to combat nightmares, which take a huge toll in people who struggle with anxiety and trauma

And now for something completely different

Yoel Fink and AFFOA = fibers that can perform multiple functions - digital fiber & fabrics as a "service“

- Prof. Yoel Fink has published a paper in *Nature Communications* about producing tens of meters of flexible fibers containing temperature sensors and memory devices.
- From the paper: “The digital fiber, when incorporated within a shirt, collects and stores body temperature data over multiple days, and enables real-time inference of wearer activity with an accuracy of 96% through a trained neural network with 1,650 neuronal connections stored within the fiber.”

Our brains on technology

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7366948/#:~:text=Potential%20harmful%20effects%20of%20extensive,brain%20development%2C%20and%20disrupted%20sleep.
- https://wexnermedical.osu.edu/blog/how-internet-affects-your-brain
- https://www.scientificamerican.com/article/are-digital-devices-altering-our-brains/

Our brains on technology

- Some say our gadgets and computers can help improve intelligence. Others say they make us stupid and violent. Which is it?
  - **Research shows that by constantly distracting us**, the Internet affects cognitive performance but does not radically alter our brains.
  - **The findings also suggest that although video games** and brain training influence aggression and cognitive performance, respectively, the extent of that influence is much less than many would think.
  - **The risks of digital devices might be minimized** by educating people in ways to enhance concentration, self-control and critical-thinking skills.

Our brains on technology

- Discussion:
  - Are we becoming ‘stupid’?
  - Have we become (better) multitaskers?
  - What about our ‘attention span’?
  - Do video games increase aggression?
  - Is gaming better for our brains?

  Fact: young people must be taught to develop their concentration, self-control and critical-thinking skills!

Our brains on technology

- More on this topic can be found in this series of book reviews I taught in 2017:
  - Born Digital by Urs Gasser & John Palfrey
  - Alone Together by Sherry Turkle
  - Reclaiming Conversation by Sherry Turkle
  - The Shallows by Nicholas Carr
  - The Glass Cage by Nicholas Carr
  - What Technology Wants by Kevin Kelly
  - The Inevitable by Kevin Kelly
  - Irresistible by Adam Alter

What’s on your mind for next week?

Extra Credit

Some slides from my 2017 class

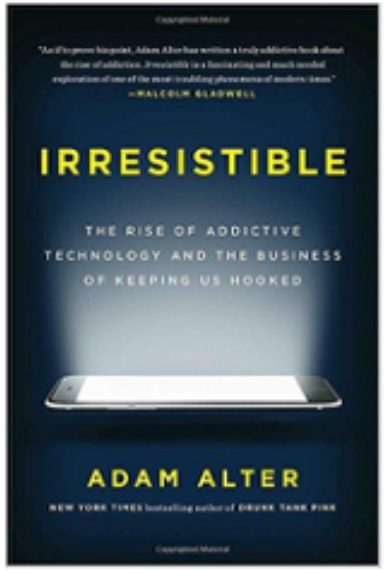
Tech Talks: Tech for Seniors

Addiction by Adam Alter

Center for Learning in Retirement - Fall 2017

Glen Maxson

seniortechadvisor.com



Irresistible:
The Rise of Addictive Technology and the Business of Keeping Us Hooked

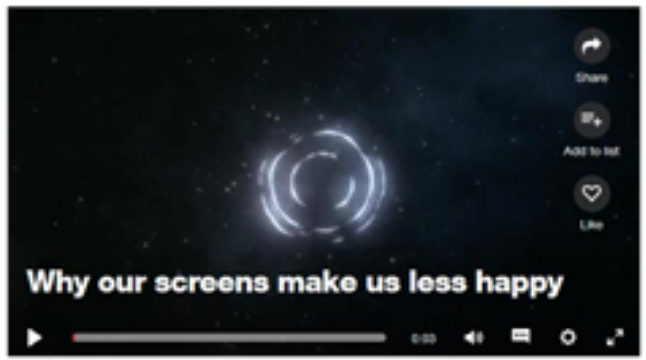
Review of a book by Adam Alter

Introduction

Adam Alter is an Associate Professor of Marketing at New York University's Stern School of Business, with an affiliated appointment in the New York University Psychology Department.

Adam is the *New York Times* bestselling author of two books: *Irresistible* (March, 2017), which considers why so many people today are addicted to so many behaviors, from incessant smart phone and internet use to video game playing and online shopping.

2017 TED Talk



What are our screens and devices doing to us? Psychologist Adam Alter studies how much time screens steal from us and how they're getting away with it. He shares why all those hours you spend staring at your smartphone, tablet or computer might be making you miserable -- and what you can do about it.

NPR Interview (Mar. 13, 2017)

'Irresistible' By Design: It's No Accident You Can't Stop Looking At The Screen (30:20)

Adam's definition of "addiction"?

It is something you enjoy doing in the short term, that undermines your well-being in the long term — but that you do compulsively anyway.

Play Intro

The Addicted Brain (Sept. 17 National Geography)

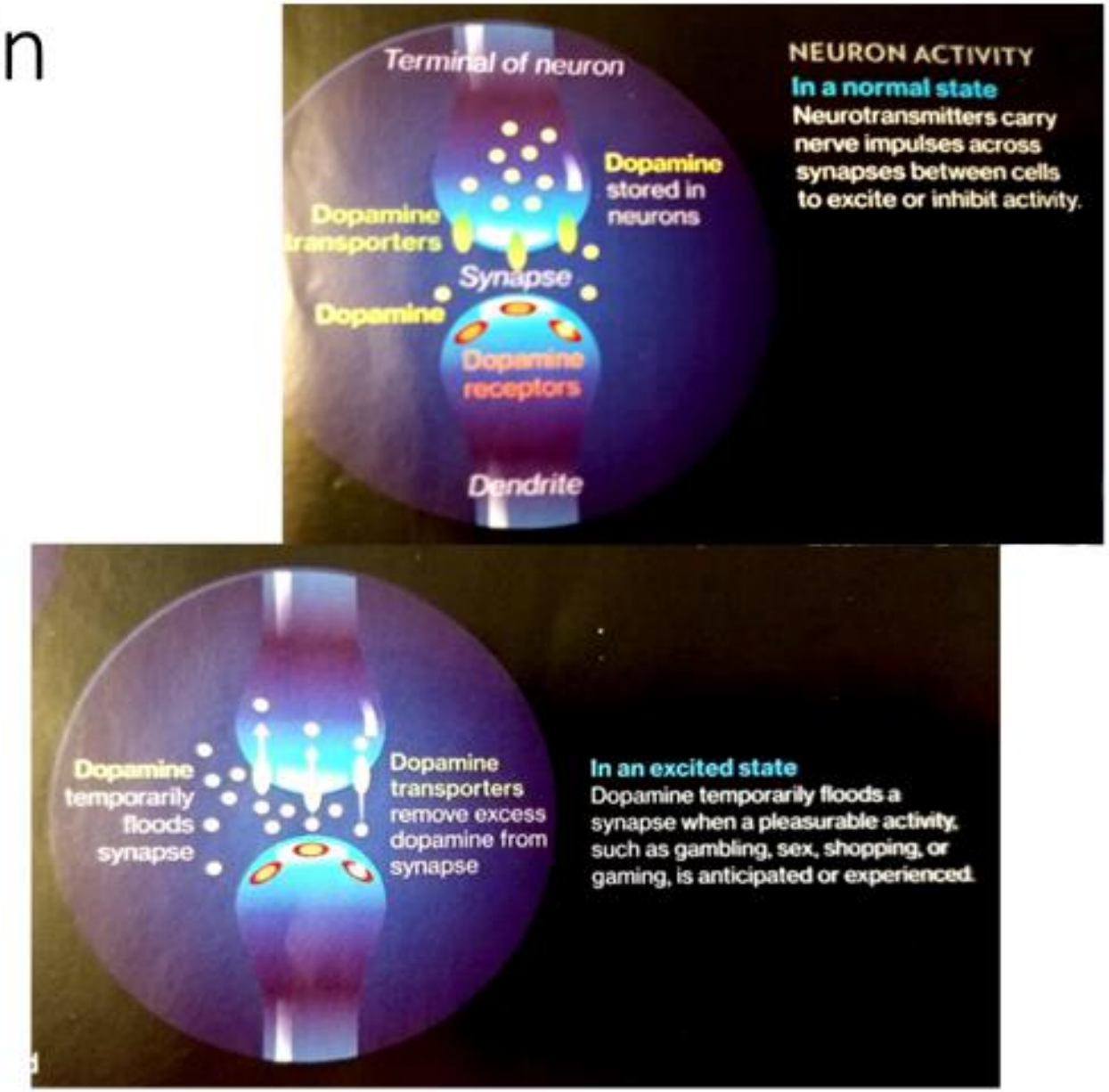
p. 41 – In the Grip of Gaming

In Seoul, e-stadiums and game parlors charge about a dollar an hour, and some venues are open around the clock. Soon after South Korea made super-high-speed Internet cheap and widely available, it became clear that some people were ruining their lives through obsessive game playing. The government now pays for treatment. The American Psychiatric Association hasn't recognized compulsive gaming as an addiction, but it lists Internet game disorder as 'requiring more study'.

Hijacking the Brain (continued)

A NATURAL HIGH

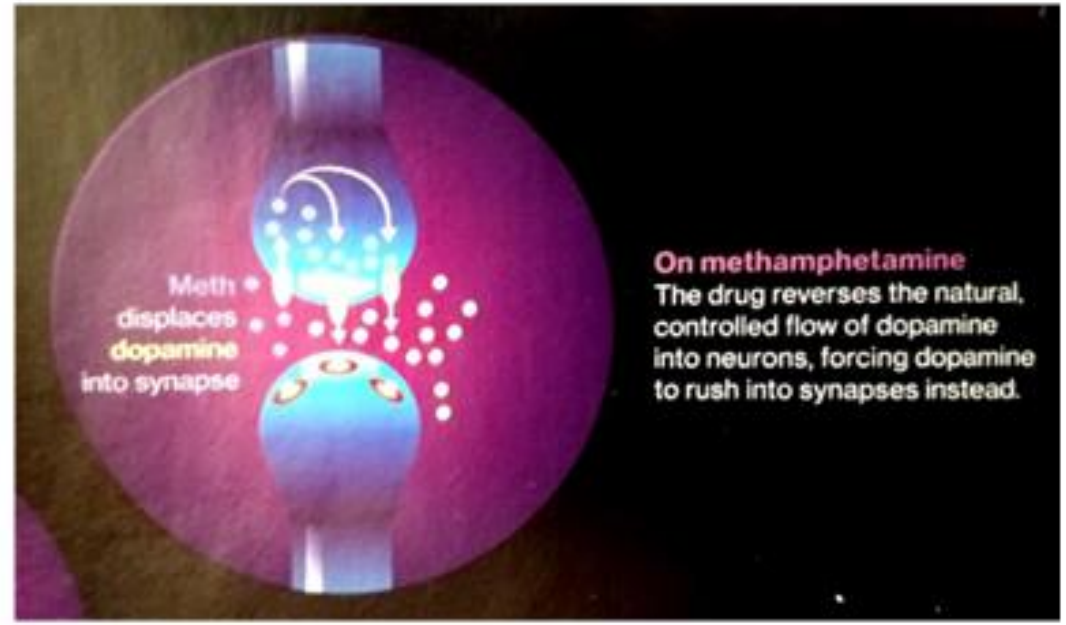
Our brains evolved a dopamine-based reward system to encourage behaviors that help us survive, such as eating, procreating, and interacting socially.



Hijacking the Brain (continued)

A CHEMICAL RUSH

Different drugs interact with the reward system in unique ways to keep synapses artificially flooded with dopamine. That dopamine rush can rewire your brain to want more drugs, leading to addiction.



Common ‘behavioral addictions’:

- Exercise
- Video games
- Gambling
- Work
- E-mail (p 109)
- Social media
- Binge watching
- Hoarding
- …

What do these have in common?

- Behavioral addiction is rooted in environment + circumstance
- Might fulfill a psychological need, obsession, compulsion
- May be detrimental to work, health, hygiene, social interaction…
- Often becomes something we ‘want’ versus something we ‘like’

What makes tech so ‘irresistible’?

By design,

- Goal setting, perfectionism – time and numbers (e.g. FitBit)
- Classic reinforcement – provide small doses of positive feedback (work)
- Uncertainty - Facebook, Instagram… (social media)
- ‘Loss as motivation’ – the gambler’s paradox (slots)
- Mobile access – iPad and iPhone enabled (mobile devices)
- Ludic loops – complete one challenging element, then the next… (video games)
- ‘Flow’ - proximal (skill) development – skill vs. challenge (video games)
- Zeigarnik effect – incomplete experiences (e.g. cliff-hangers) (TV shows)
- MUDs & MMOs - immersion, achievement, social (connection) (video games)
- Absence of Stopping rules (all)

Bottomline: Every technique in the book is used to get and keep us hooked!

GDPR vs privacy US laws

- https://www.ispartnersllc.com/blog/us-nationwide-data-privacy-law-gdpr/
- https://edaa.eu/a-legislative-comparison-us-vs-eu-on-data-privacy/
- https://www.forbes.com/sites/forbestechcouncil/2020/07/29/the-privacy-mindset-of-the-eu-vs-the-us/?sh=57bff0597d01

The Privacy Mindset Of The EU Vs. The US

- The norm in the U.S. that online behavior gets tracked and used for a slew of subsequent manipulation. U.S. legislation isn't even close to providing adequate protection of consumer privacy interests.
- Americans choose to believe that their online behavior being tracked happens in their best interests or is a price to pay for getting free or discounted products.
- GDPR was adopted on April 14, 2016, and before it became enforceable on May 25, 2018, the U.S. Congress enacted the Clarifying Lawful Overseas Use of Data (CLOUD) Act on March 23, 2018. Rather than being compatible with the GDPR, the U.S. CLOUD Act overrules it.

The Privacy Mindset Of The EU Vs. The US

- Federal law requires U.S.-based software companies and IT service providers to ensure that authorities can have access to all stored data, including data stored on foreign servers. Furthermore, it guards U.S. service providers from having to tell customers whether authorities have requested their data.
- One lobbying group that represents internet companies is striving for a federal privacy law that would preempt more state regulations like the California Consumer Privacy Act (CCPA), which actually makes real progress. Its ideal federal privacy law would undermine the CCPA to essentially let companies return to business as normal and also make it impossible for other states to set the bar even higher.

What is GDPR, the EU's new data protection law?

- In May 2018, the EU implemented the General Data Protection Regulation (GDPR) which became the new legal backbone on data protection and privacy in the EU.
  - It imposes obligations onto organizations anywhere, so long as they target or collect data related to people in the EU.
    - **The GDPR applies to you even if you're not in the EU**
    - **Fines for violating the GDPR are very high**

What is GDPR, the EU's new data protection law?

- If you process data, you have to do so according to seven protection and accountability principles outlined in Article 5.1-2:
  1. **Lawfulness, fairness and transparency** — Processing must be lawful, fair, and transparent to the data subject.
  2. **Purpose limitation** — You must process data for the legitimate purposes specified explicitly to the data subject when you collected it.
  3. **Data minimization** — You should collect and process only as much data as absolutely necessary for the purposes specified.
  4. **Accuracy** — You must keep personal data accurate and up to date.
  5. **Storage limitation** — You may only store personally identifying data for as long as necessary for the specified purpose.
  6. **Integrity and confidentiality** — Processing must be done in such a way as to ensure appropriate security, integrity, and confidentiality (e.g. by using encryption).
  7. **Accountability** — The data controller is responsible for being able to demonstrate GDPR compliance with all of these principles.

What is GDPR, the EU's new data protection law?

- GDPR recognizes a litany of new **privacy rights for data subjects**, which aim to give individuals more control over the data they loan to organizations. Data subjects' privacy rights:
  1. The right to be informed
  2. The right of access
  3. The right to rectification
  4. The right to erasure
  5. The right to restrict processing
  6. The right to data portability
  7. The right to object
  8. Rights in relation to automated decision making and profiling.