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Honors Writing

Feedback Loops and Addiction

Technology is thought to grow at an exponential rate. This is shown by Moore's law, which states that the number of transistors on an integrated circuit doubles approximately every two years. This doubling effect creates an exponential rate of growth, and in recent years we have even seen technology progressing at a speed even greater than Moore's law predicts (Roser, 2013). This means that we are currently living in the fastest evolution that humans have ever observed. With this evolution of our technology comes products like effective medicine, better treatments, quicker communications and transportations and an overall better standard of living.

Because of the exponential advancements in communications and other technologies, the modern person is being constantly bombarded by technologies hundreds of times a day. This fast-paced growth and change has overexposed the average human to too much information for them to accurately process. Earl Miller, a neuroscientist at MIT and one of the world experts on divided attention, says that our brains are "not wired to multitask well… When people think they are multitasking, they are actually just switching from one task to another very rapidly. And every time they do, there is a cognitive cost in doing so." Even though our population is generating more useful tools through technology, it is becoming more difficult for a person to complete all of their required tasks (Levitan, 2015). Since technology is embedded within society, humans have no other choice than to continue overstimulating their minds to complete their required tasks like going to work, looking for a job, or attending school. Earl argues that multitasking creates a dopamine-addiction feedback loop. Our brain begins to reward itself for losing focus on the current subject and constantly searching for external stimulation. The human body is also predisposed to losing attention; the prefrontal cortex is easily hijacked by something new or unknown. These chemical processes are vital when it comes to looking at addictions in a person (Levitan, 2015).

Because there is a noticeable effect in the work and production of a person, this exponential technological change has provided us with new ways to access resources that give us pleasure. For the sake of this paper, these particular types of technological advancements will be referred to as 'pleasure centers'. These pleasure centers include resources like online casinos, social media, video streaming, video games, pornography and even applications like food delivery. These pleasure centers are the ones that humans can easily become addicted to. The US department of health has even recently classified new addictions for pornography, social media and video games (Watkins, 2021). Because of the exponential advancements in communications and other technologies, the modern person is being constantly bombarded by technologies like pleasure centers.

A particular pleasure center, social media, has been a massively popular topic for the last couple of years, with viewpoints ranging from extremely positive to terrible. This is because social media is becoming a much more prominent force in everyday life. According to Pew Research, 69% of adults and 81% of teens in the U.S. use social media (Smith, 2020). And in more recent years, issues like political polarization, false information and mental health have been controversial topics. The "algorithms" have been the center off attention for most of these issues and that's because these social media algorithms are designed to take advantage of a human's biological makeup (Robinson, 2022). These platforms exploit dopamine levels and create that "dopamine-addiction feedback loop" that Earl Miller describes (Levitan, 2015). This method helps keeps the user engaged within the app for as long as possible. This

seems okay when looking at it from a business perspective, but this feedback loop combined with 2-4 hours of cellphone use a day can create a real health problem or even addiction (Hanes, 2021). This is due to the process called long-term potentiation in which the brain releases the dopamine or "reward chemical". This process strengthens frequently used connections between brain cells called neurons by increasing the intensity at which they respond to particular stimuli (Hanes, 2021). This basically means that the more a person uses social media, the more ingrained that activity will become in their pathways, and the person will continue to need that stimulation to provide adequate responses in that pathway (Lloyd, 2020).

Even the premise of social media is inherently addictive for a human being. Goldman A. B. (2021) argues that the reason social media is inherently addictive is because of ancient behaviors. Before humans became a developed society, we focused on tribal living. Within these tribes, there would be around 150 other people. Our brains developed to socialize with this group and reward itself when making connections, mainly because groups or tribes would have a greater rate of survival. Although our societal bounds have evolved massively and the new "tribe" is everyone on the internet, our brains have not evolved. We are still evolved to be socializing with 150 other people, but apps like Facebook and Instagram allow connections with billions of people (Hiliard, 2021). Now our brain is rewarding itself for making hundreds if not thousands of new connections, which leads to an exploitation of dopamine and again, creates the dopamine feedback loop.

This dopamine feedback loop is used in all other pleasure centers as well. Video streaming uses the same idea as social media; find something that triggers your dopamine loop, find similar content that will trigger the loop and constantly recommend that content. Gambling addicts fall into this same trap, however, they may have a more intense addiction due to the factor of uncertainty. Casinos and online casinos take advantage of a feature of our dopamine neurons called reward prediction error (RPE) encoding. Because games like slots and roulette have a couple of seconds of uncertainty, our RPE is triggered which raises the dopamine levels in hope of a positive outcome. Even though the outcome is usually negative, there is enough variation to continue raising the levels of dopamine during that moment of uncertainty (Hanes, 2021).

Pornography addiction can be an intense addiction because of the chemicals released during masturbation. Serotonin and norepinephrine are released during this activity. Serotonin is considered the "pleasure chemical" and gives that feeling of euphoria. It is possible to get the same "feedback loop" that dopamine commonly has with serotonin. The combination of these two feedback loops can create intense addictions that may even begin to feel physical during withdrawals (Patterson, 2022).

Even in industries like food-delivery, we see a similar exploitation of the feedback loop. When looking at Uber Eats, they recommend food that they think you will order. They also push previous orders to try to increase their order rate. The more someone uses the app, the more combinations of food Uber can try before finding the one that hooks you into their app. Because of the ease and simplicity of the app ordering food becomes a hassle-free option that gets you exactly what you want within minutes. Although the app may not boost dopamine levels, the food certainly can and may increase dependability on the application.

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Because of the exponential advancements in communications and other technologies, the modern person is being constantly bombarded by technologies hundreds of times a day. This bombardment also consists of “pleasure centers” which may cause addictions. Because these addictive “feedback loop” apps are being pushed on humans thousands of times a day, the rate at which humans are getting addicted to these “pleasure centers” is growing at the same technological rate and shows no signs of slowing down. The exploitation of this feedback loop is being utilized in every aspect of society because successfully exploiting that feedback loop, as a business, will reap great returns for the shareholders. Businesses will continue exploiting this defect in our brains so long as it produces results. And this method will continue to produce results because the end-users are now addicts.