Internet Addiction: Gambling, Gaming & Pornography

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Introduction

In this chapter we briefly explore through the lens of neuroscience of how gambling, gaming, and pornography, without careful self-regulation, can lead to addiction. To demonstrate this, this chapter examines how the aforementioned process addictions correlates with dopamine and its impact on human behavior and health. It is critical for educators to be aware of this topic due to the convenience and availability mobile technology affords for access to online gambling, gamine and pornography via mobile technology. This chapter recommends to educators a few best practices on how to regulate one's dopamine through healthy and alternative activities. Although these forms of addiction are not directly linked with the teaching profession itself, their devastating effects can transfer over into the profession causing personal, or even legal issues.

During this chapter we will review in depth the physiological and psychological effects of various forms of addiction on humans. The first part is composed of definitions of key phrases that help inform the reader as they progress through this chapter. Second, a simple but important medical overview on how dopamine interacts within our body helps the reader understand how gambling, gaming, and pornography, if not regulated, can become an addiction. Third, the chapter dives into more detail on how online gambling, gaming, and pornography affect people in their bodies, and their behaviors. Fourth, this chapter recommends a few best practices for people to help keep their dopamine levels balanced. Finally, the chapter concludes with a summary of this chapter and its main points.

Definitions

Addiction - A compulsive, chronic, physiological or psychological need for a habit-forming substance, behavior, or activity having harmful physical, psychological, or social effects and

typically causing well-defined symptoms (such as anxiety, irritability, tremors, or nausea) upon withdrawal or abstinence (Merriem Webster's)

Addiction - A primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors (American Society of Addiction Medicine (ASAM)).

Dopamine - Neuro-modulator involved in motivation, desire and pleasure.

Neuro-modulator - A chemical molecule, which is capable of changing the effect of impulse transmission on neurons without disturbing the rate of the transmission.

Neuro-transmitter - A group of chemical agents released by neurons (nerve cells) to stimulate neighbouring neurons or muscle or gland cells, thus allowing impulses to be passed from one cell to the next throughout the nervous system.

Reward Prediction Error - The difference between a reward that is being received and the reward that is predicted to be received.

Nucleus Accumbens - A part of the basal ganglia and is responsible for the reward seeking behavior humans are known for.

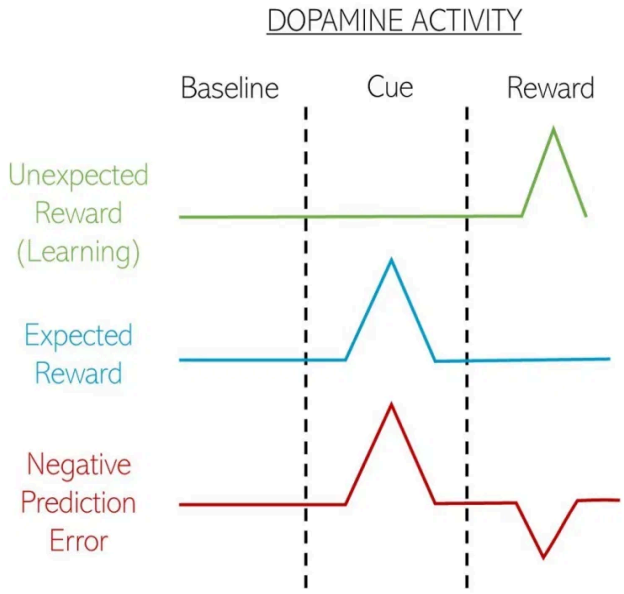
Mesolimbic Pathway - Major dopamine pathway that involves the ventral tegmental, and connects the nucleus accumbens, amygdala, hippocampus, and prefrontal cortex.

Overview on Dopamine

When associated with joy or pleasure; food, sex, an individual, hobby, activity, substance, or anything that elicits positive stimulation, will lead people to actively pursue them. Humans are biologically driven to seek what makes them feel pleasure and avoid discomfort. Both seeking pleasure and avoiding discomfort enables the release of dopamine. The mesolimbic pathway, or, the system responsible for rewarding behavior, can be likened to a seesaw. The dopaminergic neurons, known as the neurons responsible for pleasure and motivation are also responsible for pain. Hence, on one end is pleasure while on the other end is pain. By maintaining a healthy balance between, neither side is elevated. A dopamine deficit occurs when either side is elevated causing imbalance.

Conversely humans also seek to avoid anything painful or what brings discomfort. When an individual indulges in a pleasurable activity, the body releases dopamine. However, when the individual is overwhelmed with that pleasurable activity, the body seeks more of it. Hence, as the

dopamine levels increase, people seek more of that pleasurable activity, or, avoid what brings them discomfort and pain as both sides of the dopamine seesaw elicits a sense of comfort and joy. In turn, dopamine plays a significant role in a person's behavior and mood.



In the blog article, *Dopamine, Smartphones & you: A battle for your time,* Trevor Haynes explains how dopamine functions within the human body. The above chart, created by Rebecca Clements, highlights dopamine levels in three different scenarios. First, in the unexpected reward scenario, dopamine levels spike in an individual unexpecting a reward. Second, the expected reward scenario illustrates the dopamine levels when an individual draws on previous experience that brought pleasure and joy. Hence, dopamine spikes on cue as the user expects the pleasure to be forthcoming. Finally, the negative prediction error scenario is when an individual expects reward but fails to receive it. The dopamine levels rise in anticipation of the reward but drops when the reward fails to materialize.

Additionally, when the pleasurable feeling of reward or the joy of indulging in that activity comes to an end, our dopamine levels also drop. As a result, our bodies crave replenishment of dopamine. The problem lies not in the indulging in such activities; yet, it is in the repeated and uncontrolled indulgence of such activities that cause the dopamine levels to eventually drop so low causing one to become addicted.

Gambling

Similar to other addictions, gambling can bring about intense emotional rewards when people win. Additionally, the thrill of almost winning can also be addicting. While in fact almost

winning is technically a loss, gamblers still find great joy in knowing how close they were to winning. This unpredictability, according to new research, is causing dopamine levels to rise. In fact, according to Zack and Poulos (2009), research shows that if the probability of winning was 50%, gamblers felt the maximum effects of dopamine levels rising. Interestingly, NPR once reported on a study where they explore the thrill of being close to winning. When gamblers feel that they are close to winning, that excitement becomes the motivating factor. To demonstrate this, researchers at the University of Florida trained pigeons to peck at different colors with unpredictable possibilities to win a treat. What they found was that pigeons were not interested in near wins. In fact, pigeons avoided those options that yielded near wins. The study concluded that humans derived pleasure from a near win. It gave them an illusion of control. Hence, the thrill of nearly winning as well as winning while gambling all cause dopamine to be released.

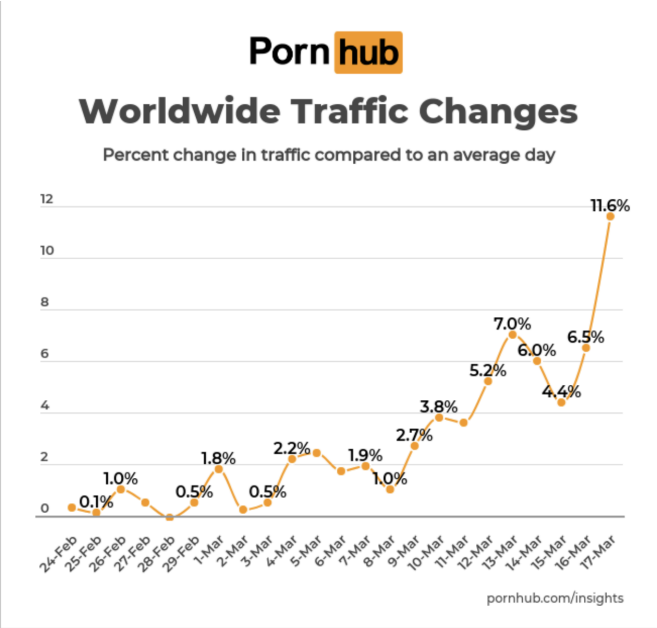
Traditionally, gamblers would go to casinos or at specialized venues. With the advent of newer mobile technology, the use of computers, laptops, tablets, and smartphones, have shifted gamblining from a traditional setting to that of online nature without sacrificing the aesthetics, mechanism, and sounds associated with traditional gambling in a casino. Levers, dials, wheels, and sounds are all replicated on the mobile device for the ease and convenience of the individual.

Gaming

According to Pew Research, 97% of teenage boys play video games. Conversely, 83% of girls also game on some kind of device. Yet, only 26% of gamers believe they play too much while 22% feel they are playing too little. These statistics are alarming as they show how easily accessible games are for young children. Gaming has a very strong effect on gamers. So much so that Cam Adair, who describes himself as a "video game addict," argues that online gaming provided for him four benefits that were powerful incentives that keep gamers addicted. These include (a) games provide a temporary escape; (b) social aspects of online gaming; (c) games are a challenge; and (d) games provide constant measurable growth. Adair explains that many students find gaming to be a great outlet to escape from their life troubles. Instead of dealing with one's troubles, gaming becomes an outlet for some individuals. Additionally, some individuals feel unrestrained playing online as the anonymity allows their true personalities to come forth. In person interactions, on the other hand, are sometimes challenging because it requires people to fit within specific social and behavioral constructs. Gaming provides in-game challenges that can be conquered by gamers. Gamers find the rewards gaming provides as a source of joy and pride. Finally, gamers find joy and pleasure in seeing their continuous progress while gaming. Combining all of these four elements along with the mobility and convenience online gaming provides creates an inextricably complex situation where gamers are at risk of gaming addiction.

Pornography

With the advent of Covid-19, pornography consumption increased. The largest pornography site in the world, Pornhub, reported a global spike of 11.6% on March 17, 2020. In the United States, however, this spike was about 6.4%. Nevertheless, this spike was limited to the onset of Covid-19. As the pandemic progressed, pornography consumption also dropped. See figure below.



Norman Doidge reports that "pornography is more exciting than satisfying because we have two separate pleasure systems in our brains, one that has to do with exciting pleasure and one with satisfying pleasure." (2008, p. 108). In this way, pornography can become highly addicting to certain individuals. Teachers should be vigilant about the availability of pornography as cell phones and computers along with highspeed internet bring about high definition videos at the click of a button. This is critical as many children now have cellphones and pornography becomes increasily available and accessible.

Recommendations

Activities and substances that bring us pleasure and elevate our moods, depending on its frequency will raise dopamine levels. In order to keep our dopamine levels balanced, limiting the frequency in which we indulge in pleasurable activities is critical. This will allow the dopamine levels to taper off and achieve equilibrium. For example, usage of social media can be limited by reducing its notifications on our phones. Additionally, for video games, taking a break from

multiplayer games would be a great recommendation. Playing single player games, and going up against AI instead of real players will not elevate dopamine levels as much as playing against others. Teachers are recommended to engage their students in learning about the effects of online gaming through an anonymous survey. Explore how often students game and discuss the dangers of obsessive gaming on one's health and mental state through group research. Regarding gambling, reduce the monetary wager. This will reduce the thrill of near-win experiences and allow dopamine levels to taper off. For pornography, it is advised for viewers to reduce viewership as well.

Conclusion

This chapter explored the effects of dopamine on a person's behavior and body. Dopamine levels are elevated when a person indulges in a pleasurable or joyful activity, as well as when one successfully avoids anything that brings discomfiture and pain. Like a seesaw, dopamine levels go up in anticipation of reward, as well as after an unexpected reward is given. Dopamine levels also spike when there is a mistaken anticipation of reward. Logically, dopamine levels plummet when said reward is not received.

Additionally, this chapter explored three areas of critical importance. First, online gambling has been increasingly accessible without sacrificing the auditory and visual experiences at a casino. When unregulated, gamblers are likely to indulge in gambling as the thrill of winning, the thrill of a near win, and the high monetary stakes raise dopamine levels. In turn, the repetitive nature of gambling without regulation will cause dopamine levels and endanger gamblers to possible addiction. Second, online gaming provides players a temporary escape, social comfort, overcoming in-game challenges, and measurable growth through the progress bar. When playing online games, gamers need to be cautious of limiting their online game time to avoid repetitive spikes in their dopamine levels. Finally, pornography has the unique ability to spike dopamine levels as viewing spikes pleasure and excitement within viewers. This unique combination can become problematic for individuals when dopamine levels spike.

In short, it is recommended for all online gamers, gamblers and and viewers of pornography to be highly cautious of their dopamine levels. But specifically, teachers should remain vigilant of the effects of high or low dopamine levels. By instructing students on the dangers of uncontrolled dopamine levels, teachers can raise awareness on how the accessibility and convenience of online gambling, gaming and pornography pose a greater risk of addiction for certain individuals.

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