# The Dangers and Addiction of Social Media

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## Abstract

With the rise of smartphones and constant internet access, social media has become an almost inescapable part of our lives—woven into the everyday fabric of our existence. But what are the true and potentially harmful consequences that lie in wait with this consumption? This research takes a closer look at the phenomenon of social media addiction, its impact on mental health and how various platforms such as TikTok manipulate our brain chemistry to leave us wanting more. As research progresses, a deeper understanding of the neurological mechanisms involved is crucial for effectively addressing the rising issue of digital addiction.

## Introduction

Have you ever wondered how much time you have spent on your phone? Most have not thought deeply about this before, for in our time and age, screen time has created a false sense of necessity in most people's lives. Alongside sleep, food, and drink, screen time has disguised itself as one of these pillars, creating adverse consequences to its unknowing victims. Though humanity's movement to an ever-increasing digital age has its benefits, implementation of social media into most people's lives may be causing more harm than good. Studies show that 69% of adults and 81% of teens in the U.S use social media on a near daily basis; that is nearly 200 million people, highlighting the sheer scale of social media usage [1]. Unknown to this population, social media affects the brain in a variety of ways. Like gambling and drug usage, social media usage releases massive amounts of dopamine to our brain pathways all at once. The reason for this is that social media stimulates the brain circuitry involved in the mind's reward system, activating dopamine receptors, and giving the user a dopamine surge [2]. Naturally, huge dopamine surges keep users coming back for more, which contributes to the addictive aspect of social media. Social media companies have started to exploit these surges to keep users engaged, using strategies such as smart algorithms and infinite scrolling to maintain constant stimulation [9]. It is important to emphasize the addiction that comes with social media usage, as over usage can lead to feelings of withdrawal, anxiety, and even depression [3]. Also, with so many users being teenagers and still developing, social media often harms the human mind's development [4]. It is important to bring awareness to these dangers. By relating the topics of social media consumption and the effects it has on the human mind, we can create awareness for these potential dangers.

## History of Social Media

Around 14 years after the birth of the internet, the first social media Platform *Six Degrees* was launched in 1997 [5]. Though the platform failed to gain traction, eventually shutting down in 2001 due to its inability to sustain itself, the idea was there now. Flash forward a year, Friendster launched in 2002 [6]. Another year after that, Myspace launched in 2003. Compared to their predecessor Six Degrees, these platforms did exceptionally well for themselves, laying the groundwork for social media's future growth. Over the years, groundbreaking platforms such as Facebook in 2004, YouTube in 2005, and Twitter in 2006 launched social media sky-high, reaching its first billion global users in the year 2010 [7]. The growth did not stop there though, as in 2018, the world changed. Tik Tok took the global stage in October 2018 after merging with Musically, another popular social media platform at the time. Why was this so important though, isn't it just another platform? Tik Tok was just another platform, but it did something different from your typical social media apps, it made your experience *endless*. The app's launch was groundbreaking, creating a community and culture for "TikTokers" across the globe. Numbers soared to an estimated 1.719 billion global users in 2022, officially making TikTok the fastest growing social media platform ever [8].

## Social Media Engagement Strategies and Impacts

Behind the phenomenon of absurd platform growth was the introduction of engagement approaches never seen on social media platforms before. One of these strategies includes TikTok's iconic infinite scrolling feature. What appeared to users as an easy and accessible way to view content was a complex algorithm designed to keep users engaged. TikTok allows users to scroll through a heap of short videos endlessly. While watching these videos, TikTok analyzes every action you make, including what videos you watch, like, comment, and share, and determines what video you want to see next [9]. This tactic makes consuming content very easy, only requiring you to scroll down to see another video or post that is catered to your liking. Infinite scrolling loads content before the user even scrolls down, allowing users to explore a large amount of content without a distinct end. TikTok was one of many social media platforms that implemented these experiences. The rise of algorithms and other neural strategies has amplified how social media captivates its users [10], and although not all social media use is harmful, much of its negative impact goes unnoticed by the common user. In the end, constantly checking social media keeps the dopamine flowing, which makes it harder to break the habit. The more we chase that quick hit of satisfaction, the more we feel the need to keep scrolling, and it becomes harder to put our phones down. Whether users know it or not, they are stuck in an endless cycle. Since social media is a newer form of content, the effects of prolonged social media usage are still majorly unknown, but how it makes users feel is remarkably similar to how gambling affects a gambler [11]. Yes—gambling. When gambling (notably when winning), the brain releases a surge of dopamine, giving the gambler a sense of happiness and accomplishment, similar to the effect of social media. Just like pulling the slot machine lever, a

person will open a social media app to " win " and find something interesting or gratifying. More times than not, this is not the case, but that's what makes it fun, right? Dr. Jacqueline Sperling, a McLean Hospital social media expert, states, "When the outcome is unpredictable, the behavior is more likely to repeat." [1] Many aspects of social media are unpredictable —like who will like your post, how many likes it will get, and how many followers you may gain. Simple things like this are enough to keep a person engaged and checking their devices. Similar to gambling, users never know if they will win or not. It is a game we are often unaware we're playing.

**Psychological Impacts of Social Media Use**

In addition to social media's addictive nature, "Fear of Missing Out" (FOMO) is also prevalent on these platforms [12]. When users see others leading better lives than themselves, this results in FOMO. These perceptions can detract from self-esteem and increase anxiety. This encourages people to engage with social media more frequently to avoid missing anything. Ironically, excessive social media usage is linked to heightened feelings of loneliness, replacing essential face-to-face interactions necessary for mental well-being [13]. Prioritizing online relationships over in-person connections can increase the risk of depression and anxiety [12].

If FOMO wasn't enough, social media also drives an unrealistic and idealistic portrayal of life [14]. Many users edit or apply filters to their photos and videos, creating a distorted sense of reality that highlights only the positive aspects of life while omitting the negative. Though anybody can suffer from FOMO, teenagers, and adolescents are most vulnerable to its adverse effects. Teens, especially those who lack social skills, often turn to social media as an escape from real life and in-person social interactions. By relying on social media platforms to engage with others, they avoid the challenges of face-to-face communication, which many teens deem uncomfortable or intimidating [15]. However, what may seem like an easy way out of these social hurdles often fosters a dependence on these platforms. As a result, teens who rely on social media experience heightened feelings of FOMO and angst [16].

**Social Media and Self-Portrayal**

Living life through this lens can cause viewers to feel insecure, envious, and dissatisfied with their own lives. There are plenty of examples of this occurrence, but one of the most pressing issues is the rising number of eating disorder cases. Ever since social media became prevalent, adolescents, specifically girls younger than 19, are especially prone to becoming anorexic or developing unhealthy eating habits [17]. Since 2018, eating disorders in women have skyrocketed [18]. Is it just a coincidence that TikTok and other social media platforms became especially prevalent during this period? Probably not. In the 20th century, western society shifted toward a “slender and athletic” female body ideal [19]. Standards such as these explain why many adolescents are dissatisfied with their body images. These ideals are widespread throughout social media, spreading their influence and causing more people to want

to embrace these ideals. The desire for these ideals often leads to unhealthy and dangerous methods of attaining these standards, most of the time being some form of an eating disorder.

**Social Media Usage**

Social media addiction is much more prevalent than many realize. Alarming statistics reveal the sheer extent of social media consumption. On a global scale, the average person's screen time is about 6 hours and 35 minutes a day, a figure that highlights the true integration of digital devices into a person's everyday routine [20]. Given that most people are awake for about 16 hours a day, nearly half of one's day is spent in front of a screen. Among other things, 2 hours and 24 minutes of this screen time is spent on social media apps. However, given this data, it is crucial to understand these statistics, including people of all ages; teenagers are a whole different story. Teens, on average, spend 4 hours and 48 minutes on social platforms every day [21]. These absurd numbers contribute to other concerns, such as mental health, sleep patterns, and even academic performance.

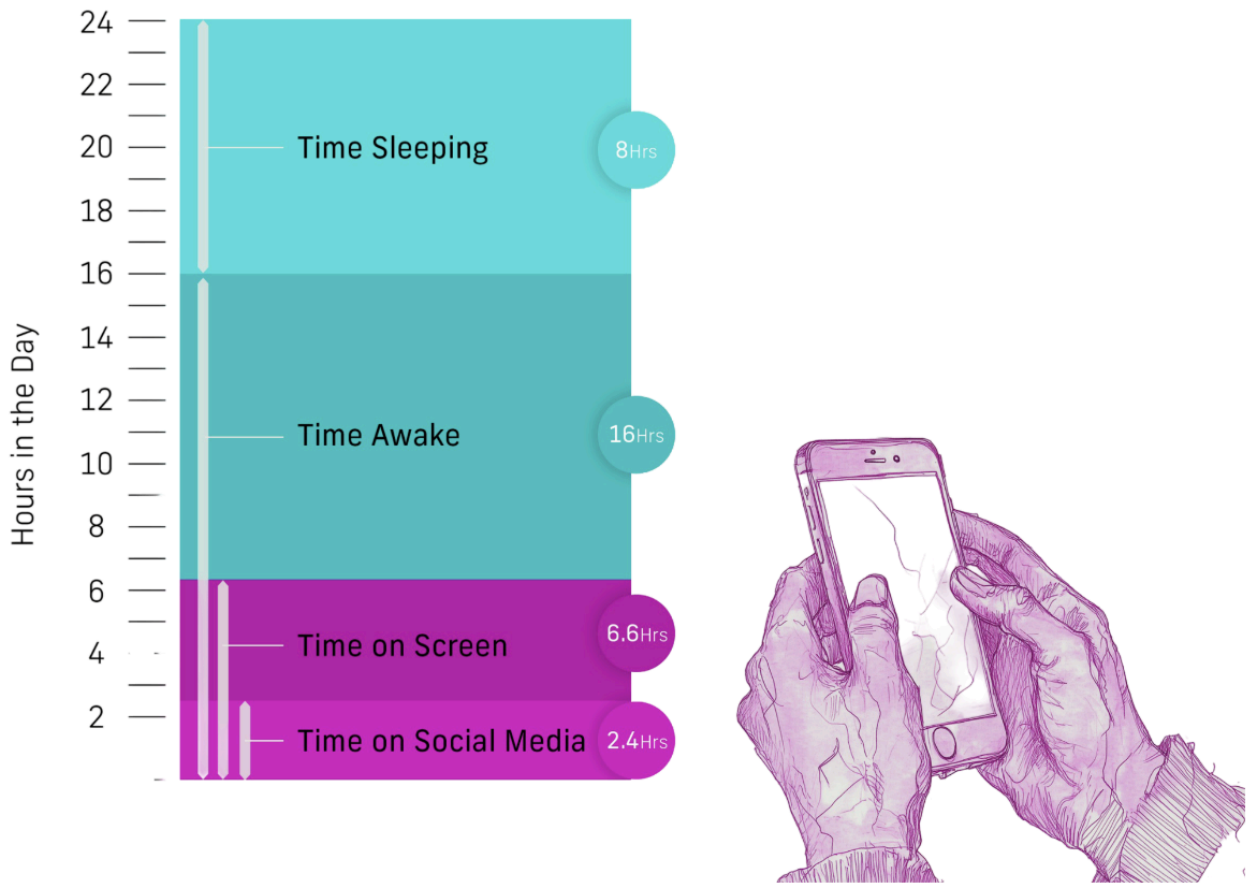


*Figure 1: Increasing Hours of Screen Time & Social Media Use*

## Neurological Impacts

The physiological and neurological study of addiction is not a new field of study and is well understood in terms of substance addiction, which is the most studied form of addiction. However, social media is a new addictive phenomenon and as previously mentioned, is more akin to gambling addiction [22]. Though it is a new field of study, we can begin to understand the scientific explanation for social media addiction. Unlike substance addiction, which involves the consumption of external chemicals, social media addiction engages the brain's reward system through non-chemical stimuli. Social media leverages minute tasks such as liking, commenting, and notifications to exercise the reward system's release of dopamine. Social media stimulation activates neural pathways that mimic those of other behavioral addictions, namely gambling [23]. To understand the process of social media addiction, we must dive down to the neural level.

Addictive processes start at the neuron level. The brain is composed of billions of neuron cells, which are organized into highly specialized circuits and networks which help to perform a variety of neurological functions such as motor planning, auditory conception (auditory and visual perception), speech, emotional regulation (pleasure and anxiety), and cognitive tasks such as learning and memory [24]. Neurons communicate through electrochemical signals, which are performed by releasing neurotransmitters into synapses (the gap between the neuronal spaces) that then attach to receptors on the surface of other neurons and activate certain signaling pathways, resulting in some type of cellular change [25]. Dopamine itself is one such neurotransmitter and is and important component of the brain's reward system. The reward system functions as the body's born analyst of desirable behavior, as it associates varied stimuli (substances, situations, actions) with a positive or rewarding outcome [26]. Experiencing rewarding stimuli activates dopaminergic pathways within the brain, namely the mesolimbic system, which sequentially releases dopamine to travel through these systems. Dopamine then attaches to dopamine receptors, causing feelings of pleasure and happiness [27].

The natural function of this process is to encourage a person to perform such action again; for example, when a person eats a small amount of dopamine is released, encouraging the person to eat again. The reward pathway is intended to motivate people to repeat behaviors that will help them survive, but the introduction of artificial feel-good activities such as social media initiates a change in the brain [27]. This happens because high dopamine activities trigger an outsized response of dopamine. Instead of a simple, pleasurable release of dopamine, large quantities of social media use causes dopamine to flood the dopaminergic pathways, much more than any natural stimuli [28]. This exercise is terribly similar to gambling. The brain will remember this surge of pleasure and happiness and will associate it with social media, creating a longing to indulge in these feelings again. Though the reward pathways exist in a level of homeostasis and are tightly regulated, it is possible for these pathways to become dysregulated. Studies show that dopamine receptors are decreased by long term self-administration of dopamine surges [29]. Social media is a notable example of this phenomenon. When somebody starts using social media, they experience an elevated level of

gratification. As previously mentioned, this is a result of flooding the brain with dopamine artificially opposed to naturally. As the consumption of media continues over time, the areas of the brain responsible for releasing dopamine gradually become less active during social media use, leading to a diminished sense of reward and satisfaction [30]. As a result, users must increase their social media usage to attain the initial "high" they experienced when they first began using it. Dopamine produced by social media is okay in moderation, but extended daily use stimulates the brain with an unhealthy amount. To counter this over-stimulation, the brain naturally adapts by either reducing the number of dopamine receptors or reducing the sensitivity of already existing ones. This process called dopamine downregulation raises the brain's "standard" for dopamine, making it more difficult to feel pleasure from everyday activities such as eating, exercising, and even social interaction [31]. When separated from social media, avid users often experience feelings of depression and anxiety, as tasks and activities just do not provide the same gratification they once felt from them. This constant need for heightened stimulation sets the stage for social media addiction, as users begin to rely on media usage to fill the emotional void that everyday activities no longer fill.

The overstimulation of the brain's reward pathways is just one piece of the puzzle. To fully understand the development of social media addiction, it is important to explore the different regions of the brain and how they govern motivation, withdrawal, and impulses, all of which play crucial roles in addiction. One region of the brain is the basal ganglia, which is responsible for positive motivation. This area triggers the brain's reward circuitry, which floods dopamine throughout the brain and causes feelings of happiness [32]. This region of the brain is what the actual addiction stems from, as this area produces the pleasure experienced by social media. However, continued use of activities such as drugs, gambling, and, in this case, social media causes the reward circuit to adapt, making it harder to feel pleasure from such activities [33]. The extended amygdala is the part of the brain that processes anxiety and unease and where feelings of withdrawal stem from. Frequent high dopamine activities like daily social media use make this area more sensitive, amplifying feelings of withdrawal [34].

The prefrontal cortex is the section of the brain responsible for thinking, planning, and solving problems. It is also where compulsive actions come from due to a lack of impulse control. Neuroscientific research has shown that the prefrontal cortex is still developing in teenagers. These teens are more susceptible to addictive behaviors, as their brains are less equipped to resist the immediate gratification offered by social media. Over time, the brain's reward pathways become increasingly reliant on these dopamine surges, making it difficult for individuals to find pleasure in other, less stimulating activities [35].

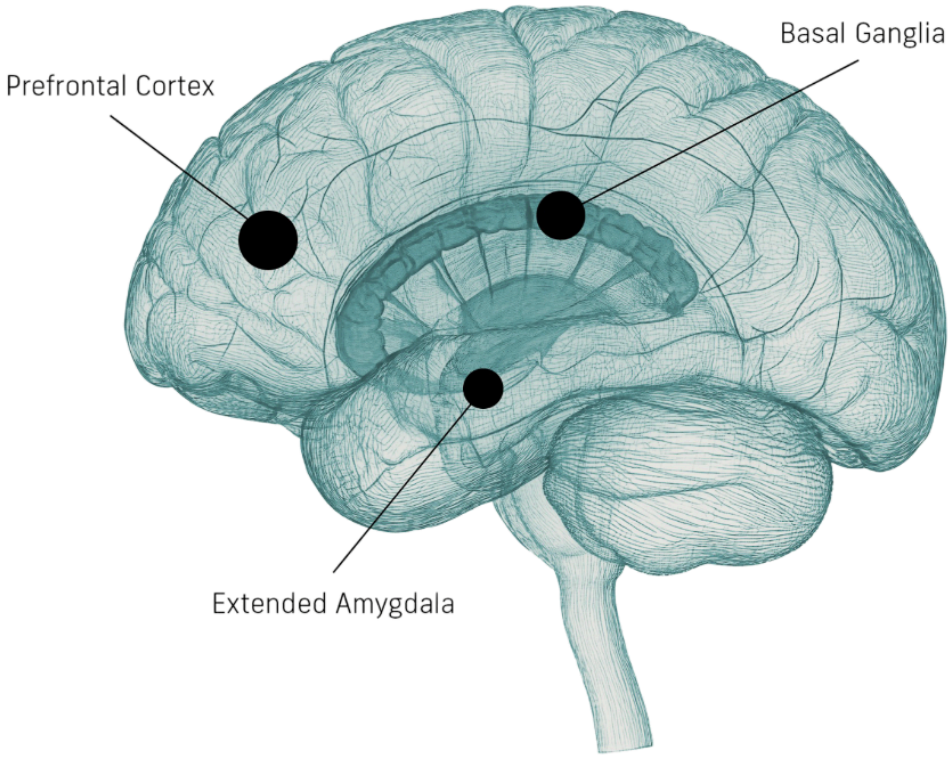


*Figure 2: Regions of the Brain Impacted by Addiction*

To sum up, even though the addictive properties of social media are a moderately new field of study, it presents prominent similarities to behavioral addictions such as gambling, emphasizing the consequences that it has on our brain and its reward pathways. As research continues to uncover the neurological mechanisms at play, understanding how social media alters dopamine pathways will be essential in addressing the growing concern of digital addiction.

## Discussion

As a world, we are facing a major epidemic when it comes to social media addiction. The cycle of consumption grows ever more intense. While strategies like reducing screen time have shown to have some positive effect, they don't combat the underlying source of our behavioral reprogramming. As we witness entire generations becoming intertwined with these platforms, we risk cultivating a society conditioned to crave the instant gratification that social media provides. The addictive nature of these platforms—mirroring the effects of gambling—can have profound impacts on mental health, especially among our youth whose brains are still developing. It is critical that we continue to explore and implement more effective methods to

mitigate this digital dependency — including policy changes with platforms. We must be proactive about reclaiming our engagement with the analogue world around us, before social media seduces and shapes a generation that is not only disconnected from reality but also lacks genuine human connection. The time to act is now; our future depends on it.

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