

## **SOCIAL MEDIA ADDICTION: OVER STIMULATING THE BRAIN'S COGNITIVE SYSTEM**

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### **ABSTRACT**

Social Media addiction acts as a “digital dopamine” delivery system that overstimulates the brain's cognitive systems. Chronic overstimulation leads to “digital anhedonia”, a diminished capacity to find pleasure in real world, less intense experiences. In recent years, social media addiction has become deeply embedded in the everyday lives of human brain. These platforms, designed to capture and sustain user attention through different aspects like messages, comments, notifications and algorithm driven content, contribute to fragmented sustained attention reduced concentration and overstimulation. Social media influence on our brain function and cognitive abilities are not ignored. This review article aims to explore the negative impacts of social media on crucial cognitive brain functions. It was found that heavy social media users become less able to ignore distraction in general, which leads to poorer cognitive performance and shrinks parts of the brain associated with maintaining concentration.

**Key Words:-** Social media, Cognitive processes, Attention, Decision-making, Neural pathways, Algorithm

### **INTRODUCTION:**

In the past two decades, social media has transformed the way humans communicate, interact and perceive the world. ‘Platforms’ such as Instagram, Facebook, and the Twitter have become deeply integrated into daily life, offering instant connectivity and endless streams of information. While these technologies provide numerous benefits, excessive use has led to what is increasingly described as “**Social Media Addiction**”.

This phenomenon is not merely a behavioral habit; it is actively reshaping the human mind. From attention span to emotional regulation and self-identify, social-media is influencing cognitive and psychological processes in profound ways.

Social-media addiction refers to the compulsive and excessive use of social networking platforms despite negative consequences. It shares similarities with other forms of behavioral addiction, such as gambling in that it activates the brain's reward system. Notification likes, comments, and shares act as rewards that release dopamine a neurotransmitter associated with pleasure and reinforcement over time users develop a dependency on these digital rewards, seeking validation and satisfaction through online interactions. Similar to substance addiction. The brain tries to adapt to the constant stimulation which can result in a “**dopamine deficit state**” when not engaging with social media, causing frustration.

One of the most noticeable effects of social media addiction is the decline in attention span. Constant exposure to short, fast paced content trains the human brain to process information quickly but superficially. As a result individuals may struggle to focus on tasks that require sustained concentration, such as reading, studying or problem solving. Research suggests on that multitasking, often encouraged by social media use of further impairs overall cognitive efficiency. Switching

between apps, messages and notifications divide attention and reduces the brain's ability to process information deeply. Overtime, this can weaken memory retention and critical thinking skills. The brain becomes accustomed to fragmented information rather than coherent long-term content and weakens the ability to focus a phenomena sometimes associated with "brain rot" or chronic cognitive fatigue. Emerging research suggests that excessive social media use may lead to changes in brain structure and functions.

Research suggests a link between Neurotransmitter levels and social media addiction. Excessive screen time may alter the balance of Neurotransmitters like GABA, which has inhibitory effects, and glutamate, which has excitatory effects. An imbalance in these Neurotransmitters can contribute to mood disorders, anxiety, and cognitive dysfunction; Social media addiction may also affect levels of Serotonin, Neurotransmitter associated with mood regulation. Low Serotonin levels are linked to depression, anxiety and other mood disorder.

Heavy use of social media is linked to reduced gray matter in the prefrontal Cortex, which is responsible for decision making, impulse control and focusing attention and conversely, a potential enlargement of the amygdale, which regulates emotions and social processing. The brain reward pathways become highly sensitive to digital stimuli, reinforcing addictive behaviours. At the sometime, areas responsible for self-control and decision-making may become less active, making it harder to regulate usage.

Neuroplasticity, the brains ability to adopt and recognize itself plays a key role in this process. Repeated behaviors strengthen than neural pathways, meaning that habitual social media use can rewire the brain to prioritize instant gratification over long-term rewards.

Mostly researchers found that adolescent brains are uniquely susceptible to social- media, with frequent checking altering how they react to social feedback, potentially increasing imposing and decreasing emotion regulation. The "**Teen Brain**" factor is very familiar now a days. Adolescent brains are unequally susceptible to social media, with frequent checking altering how they react to social feedback, potentially increasing impulsivity, and decreasing emotion regulation. Some studies have suggested that excessive use of social-media, particularly when it replaces face to face interactions, may often even reduce empathy. This is because the brain's mirror neuron systems, which is involved in understanding others.

The blue light from devices suppresses melatonin, while constant connectivity raises cortisol level(stress) contributing to anxiety, depression helplessness, disrupted sleep, and "learned helplessness" where individuals feel unable, to break free from the cycle. Interestingly, some studies suggest that in older adults, digital searching can increase brain neural activity.

## REVIEW OF LITERATURE

Indeed, concerns about the effects of social media use on brain function and structure as well as physical and mental health, education, social interaction are increasing. In 2019 World Health Organization published strict guidelines about children's screen time. And announced a law (Assembly bill 272) that permits schools to restrict smartphones usage. The most straightforward and simple approach to elucidating whether social media use has a profound effect on the human brain is to cause various stress and anxiety symptoms. For eg. many users have reported experiencing "**Phantom Vibrations**"-the sensation that their phone is vibrating when it is not. This occurs when the brain develops a heightened state of vigilance and anxiety about missing a notification. Meanwhile constant stress of being connected and **Fear of Missing Out (FOMO)** can lead to chronically

elevated cortisol levels. High cortisol can impair cognitive function reduce immune response, and contribute to development of anxiety and depression.

Recent research tells us it's clear that social media has become deeply woven into the everyday lives of human being. "Online platforms have algorithms designed to keep us active and engaged, causing the brain to create short bursts of dopamine with each like, share on funny video." said **Dr. Lotkowski** "Overtime, this form of constant stimulation can effect yours cognitive health. Prolonged exposure to low quality digital content does not just make us feel sluggish into the moment. Which can have longer term brain rot effects. Explore several studies (**Levenson et al., 2017; Scott and Woods, 2019**) found that for many young adults, bedtime scrolling has become a routine, often at the expense of restorative rest. Sleep in turn plays a fundamental role in cognitive functioning, inadequate or disturbed sleeps has been associated with issues like impaired memory, decreased attention and reduced problem solving abilities. **Kiligore, (2010)**, Studies exploring this relationship have found that those who are more active on social media platforms are more likely to report cognitive lapses in daily life. These lapses include forgetfulness difficulty concentrating, and increased mental **Alfonsi et al., (2020)**.

Moreover, **Scott and Woods (2019)** emphasized that social media overuse may compromise executive functions like memory and attention which are particularly vulnerable to sleep related deficits. **Wilcockson Ts (2019)** studied that taking regular breaks from social media can help restore attention spans and reduce dependence on constant stimulation. Short-term detoxes, which may last from a few hours to several days, allow the brain to recover from overstimulation, leading to improved focus and productivity.

According to Pew Research, more than 69% adults and 81% of teen use social media daily, with more than 90% of teen using it more than 4 hours a day. The constant ability to access social media through smart phones means our brains are exposed to high volumes of stimulation and neurons are finding all day long, which creates changes in the neurological architecture of our brain.

Researchers believe social media is affective our transactive memory the way our brain divides information and decides where to store it.

**Maxwell at al., (2022)** found in his studies that digital dementia can lead to a range of cognitive impairments, including memory loss, attention deficit, reduced ability to communicate, and impaired decision making abilities.

**Dahman and Bahbot (2020)** increased usage of GPS has also been linked to Steeper declines in hippocampal dependent Spatial Memory.

**Chem et al., (2023)** found that excessive use of social media can alter brain structure and function leads to a range of cognitive impairments. Internal addiction was associated with reduced gray matter density in the brain's fontal cortex, which is responsible for decision making and impulse control.

**Puukko et al. (2020)** reviewed that excessive social media use is associated with increased emotional reactivity and decreased emotional recovery, indicating difficulties in regulating emotional responses.

**Aimeur at al., (2023)** found that social media use can lead to a decrease in critical thinking skills, which can further impair decision making abilities. Participants who were exposed to social media posts with misleading information showed a decrease in their ability to critically evaluate the information presented leading to impaired decision making skills.

**Machete and Turpin (2020)** Mitigate the impact of digital use on decision making skills. It is important to develop critical thinking skills and establish healthy digital habits. Individuals who are

engaged in critical thinking while using social media were less likely to be influenced by misleading information, highlighting the importance of developing critical thinking skills in the digital age.

**Carr, (2020)** found that constant distractions of the digital world can lead to a decreased ability to concentrate and think deeply.

### **CONCLUSION:-**

Overall the existing body of research emphasizes the need to understand the broader consequences of social media on human brain. While brain rot is often associated with younger people immersed in social media culture, older adults are not immune to the effects of screens on cognitive health. “Excessive screen time and poor digital habits may exacerbate age related cognitive decline”. Said **Dr. Lotkowski**. “**Adopting strategies to maintain a healthy brain can boost memory, focus and overall mental agility as you age.**” Existing research highlights that prolonged usage of social media may disrupt cognitive functioning of human brain. These insights may contribute to the development of healthier platform feature, researchers and clinicians may also leverage some markers to identify here to monitor and manage problematic social media use more effectively. Further interdisciplinary collaborations between Neuroscientists’ Technologists and Policymakers will be essential to translate these insight into actionable interventions that support healthier social media usage habits.

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