International Journal of Sustainable Science and Technology
Vol.3 No.1 (2025) pp. 52–55

Research Article

Social Media Addiction and Its Overlay with Mental Disorders: A Neurobiological Approach to the Brain Subregions Involved

Vishwanath Pradeep Bodduluri*

Research Collobrator , CPAH , Portugal
* **Corresponding Author Email:** pradeep.bodduluri@gmail.com- **ORCID:** 0000-0003-3669-1260

Abstract: The constant use of social networks is far from being just a cultural or technological phenomenon — it has become a relevant clinical and neurological topic. This study proposes an analysis of digital addiction behavior in the light of neuroscience, focusing on brain regions that support both behavioral addictions and the main modern psychiatric disorders. Based on the basis that the human brain responds in a predictable way to reward, we seek to understand why the excessive use of these platforms simulates symptoms of disorders such as ADHD, GAD and OCD. The proposal is not to pathologize everyday life, but to recognize the brain patterns that lead to diagnostic confusion. Based on the scientific literature and the neurostructural approach of Fabiano de Abreu, we suggest a broader understanding of the impact of continuous digital stimulation on the emotional and cognitive balance of the contemporary individual.

Keywords: digital addiction, neuroplasticity, psychiatric disorders, DWRI , dopamine.

Received: *05 March 2025* **|** ***Revised:*** *10 May 2025* **|** ***Accepted:*** *15 May 2025* **|** ***DOI:*** *10.22399/ijsusat.3*

1. Introduction

We live connected — not only to the world, but also to expectations. Constant likes, notifications, and updates create a reinforcement cycle that changes not only behavior, but also the neural structure of those who consume. Social networks are no longer neutral tools; they have become sensory extensions that stimulate cognition intermittently and intensely. The line between habit and compulsion becomes narrower when immediate pleasure replaces more elaborate processes of self- regulation.

It is in this scenario that the urgency of understanding how the repetitive and impulsive use of these tools' approaches — and sometimes is confused with — symptoms of established mental disorders emerge. The challenge lies in discerning where the adaptive pattern of the digital age ends and where clinical suffering begins. According to Fabiano de Abreu [1], the concept of DWRI — Development of Broad Regions of Intellectual Interference — helps us understand that full intelligence depends on harmony between cognitive, emotional and social networks. When external stimuli are excessive, this integration becomes fragile. Attention becomes fragmented, empathy is reduced, and introspective thinking gives way to impulsive reactions — a typical scenario not only of digital addiction, but also of conditions such as ADHD and OCD.

Thus, this study seeks to shed light on the structural and functional similarities between digital addiction and the mental disorders most commonly confused with it. Not to equate them, but to understand why, in clinical practice, they so often seem to be the same thing.

2. Method

The research was conducted through a non-systematic narrative review, focusing on scientific publications from the last two decades, mostly available in the PubMed, Scopus and Google Scholar databases. Priority was given

to functional neuroimaging (fMRI) studies, theoretical reviews of behavioral psychiatry and contributions by researcher Fabiano de Abreu in the field of integrated intelligence (DWRI).
The choice of a narrative approach is justified by the need to interpret not only technical data, but also their developments within a constantly changing psychosocial reality. The analysis is based on an interdisciplinary perspective that combines neurobiology, cognitive psychology and emerging phenomena of digital culture.

3. Brain Regions And Sub- Regions Involved

3.1 Dorsolateral Prefrontal Cortex (DLPFC)

The executive function of the DLPFC is essential for self-control, decision-making, and emotional regulation. In compulsive social media users, this region is underactive, making it difficult to resist the urge to check devices. According to Abreu [2], the weakening of this area compromises adaptive logic and functional perfectionism present in DWRI brains.

3.2 Nucleus Accumbens (NAc)

Mesolimbic reward circuit, the NAc is activated whenever the brain anticipates pleasure. Digital intermittent reinforcement causes dopaminergic discharge similar to that generated by substances such as nicotine or alcohol [3].

3.3 Anterior Cingulate Cortex (ACC)

The ACC is responsible for detecting errors and internal conflicts. In compulsive users, there is hyperactivity in this region, similar to what is observed in patients with OCD, contributing to compulsive checking of notifications and feeds [4].

3.4 Amygdala

The amygdala, when processing fear and social anxiety, responds to the absence of a response or digital rejection. This hyperactivation can mimic anxiety disorders and be confused with GAD.

4. Clinical Overlays: Digital Addiction X Mental Disorders

The similarity between the behavior of individuals dependent on social networks and clinical symptoms observed in diagnoses of ADHD, OCD and GAD requires attention in clinical and neuropsychological analysis.

4.1 Attention Deficit Hyperactivity Disorder (ADHD)

People who use social media excessively often experience:
• Low tolerance to boredom.
• Mental hyperactivity (incessant scrolling);
• Behavioral impulsivity.
Studies show that digital addiction causes changes in the prefrontal cortex similar to those found in individuals with ADHD [4]. Digital multitasking and the constant fragmentation of attention reduce the ability to focus, simulating the typical picture of ADHD.

4.2 Obsessive-Compulsive Disorder (OCD)

Compulsive users feel an urgent need to check notifications, view stories and update statuses, even if they know there are no new interactions. This compulsion is reinforced by anticipatory anxiety and momentary relief after the act, a behavioral structure very close to the dynamics of OCD.
However, as highlighted by Abreu [2] the difference lies in motivation: while in OCD the compulsion is associated with irrational or magical thinking, in digital addiction the reinforcement is social and dopaminergic.

4.3 Generalized Anxiety Disorder (GAD)

Anxiety associated with FOMO (fear of missing out) is typical in hyperconnected users. This constant anxiety leads to cognitive exhaustion, insomnia, and a decline in performance. The amygdala, when repeatedly activated by this digital stress, contributes to a state of hypervigilance [6].

5. Neurobiological Explanation of Diagnostic Mistakes

's reward system, especially the mesolimbic dopaminergic circuit, has been evolutionarily shaped to ensure survival through the pursuit of pleasure and the avoidance of pain. Social media manipulates this system by offering short, random, rewarding stimuli (such as likes) that produce a rush of dopamine [7].
This excess dopamine, released without real effort or merit, dysregulates self -control systems and creates a feedback loop of compulsion. The prefrontal cortex, in turn, loses synaptic efficiency with chronic use, limiting the inhibition of impulses — as observed by Abreu [1] in studies on DWRI and imbalances in brain functionality.

6. Cognitive And Emotional Impact of Digital Addiction on Individuals with High Cognition

Individuals with high IQs or DWRI profiles, as defined by Abreu, tend to have a high degree of cognitive and emotional sensitivity. This makes them more vulnerable to certain stimuli — including digital ones. Extreme intelligence, when not accompanied by a functional balance between brain subregions, can favor mental overload, excessive introspection, and digital emotional dependence.
It is common to observe in gifted individuals an introspective behavior that, paradoxically, coexists with the need for social acceptance — especially in digital contexts. Social networks, by offering an immediate response to this need, end up becoming a dangerous reinforcement environment. A “like” can mean much more than a simple touch on the screen: it represents, for some brains, the validation of their own momentary existence.
Furthermore, brains with high intellectual potential generally have a more active default mode network (DMN) responsible for processes of introspection, creativity, and self-reference. When this network becomes unbalanced due to excessive use of digital stimuli, feelings of emptiness, existential anxiety, and oscillation between euphoria and apathy arise. In these cases, emotional intelligence suffers not from a lack of capacity, but from excessive exposure to contexts that are not natural to the evolutionary structure of the brain.

7. Clinical And Therapeutic Implications

classic psychiatric disorder and digitally addictive behavior requires qualified listening and an analysis that goes beyond the apparent symptoms. Contemporary clinical practice needs to understand that digital culture has profoundly changed the way individuals connect with the world — and, above all, with themselves.
Hyperconnectivity is not just a symptom; it is often the language with which a deeper malaise is expressed. As Abreu proposes, understanding intelligence as an interdependent phenomenon — involving reason, emotion, socialization and adaptation — forces us to rethink diagnostic models that disregard the impact of the digital environment.
Therapeutic field, it is necessary to develop approaches that involve both digital psychoeducation and mindfulness practices, the recovery of face-to-face bonds and the promotion of emotional self -regulation. More than combating the use of networks, the way forward is to reintegrate the subject into their state of conscious presence.

8. Conclusion

Social media addiction is not just a consequence of technology, but a human response to a hyper stimulating environment that demands far more than the brain is biologically prepared to process. The overlaps with disorders such as ADHD, OCD and GAD are real, but the current context imposes a new way of looking at these symptoms. It is important to consider that this is not just a misconduct, but an adaptation — often dysfunctional — to a chaotic and fragmented reality. The human brain, with all its plasticity and complexity, responds to the stimuli it receives. When these stimuli are shaped by algorithms and instant validations, the risk lies not only in addictive behavior, but in the impoverishment of human experience.
Neuroscientific understanding needs to go hand in hand with an existential reflection: are we using social networks or are we being used by them?

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
- **Acknowledgement:** The authors declare that they have nobody or no-company to acknowledge.
- **Author contributions:** The authors declare that they have equal right on this paper.
- **Funding information:** The authors declare that there is no funding to be acknowledged.
- **Data availability statement:** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

[1] Abreu, F. de. (2023). *DWRI intelligence: Development of broad regions of intellectual interference*. CPAH.
[2] Abreu, F. de. (2023). *What is extreme intelligence*. CPAH.
[3] Montag, C., & Diefenbach, S. (2018). *The digital world and brain reward*. Springer.
[4] Rubia, K., Smith, A. B., Brammer, M. J., Toone, B., & Taylor, E. (2010). Functional connectivity in ADHD and OCD. *NeuroImage, 49*(1), 102–109.
[5] Cubillo, A., Halari, R., Smith, A., Taylor, E., & Rubia, K. (2012). Fronto-striatal underactivation in adult ADHD. *Biological Psychiatry, 71*(8), 634–642.
[6] Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Media screen time and depression in adolescents. *Clinical Psychological Science, 6*(1), 3–17.
[7] Volkow, N. D., Koob, G. F., & McLellan, A. T. (2016). Neurobiologic advances from the brain disease model of addiction. *The New England Journal of Medicine, 374*(4), 363–371.