

How the Use of Phones Affects Teenagers' Moods – A Discussion Based on Motivated Forgetting Theory

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Abstract: Aiming to investigate the effect of mobile phone usage on teenagers' mental state, the author studies the interaction between mobile phone usage and motivated forgetting in the role of shaping adolescents' emotional well-being and how digital engagement influences memory regulation and mental health. Through a theoretical investigation of cognitive neuroscience and behavioral research, the study explores how platforms like TikTok exploit positive reinforcement mechanisms such as rolling the screen and contents that stimulate dopamine secretion to reinforce habits that impair cognitive control processes mediated by the prefrontal cortex (PFC) and hippocampus. Findings reveal that excessive smartphone use correlates positively with anxiety, depression, and sleep disturbances, particularly among adolescent girls, as they face massive emotional fragility due to prolonged social media engagement but negative feedback. Boys, in contrast, exhibit milder psychological impacts, attributed to their preference for gaming over social media.

Keywords: Motivated Forgetting Theory, Teenager Phone Use, Teenage Mood Control

1. Introduction

Motivated forgetting refers to the designed or induced suppression for retrieval of specific memories, driven by multi-faceted aspects including the ones bumped into under cognitive responses, emotional reactions, or contextual encounters. This phenomenon encompasses both directed forgetting, where individuals are explicitly instructed to forget certain information, and motivated forgetting in broader contexts where emotional regulation or the avoidance of cognitive interference are often emphasised in concerned empirical findings [1]. Directed forgetting, according to existing literatures, is defined as a process where participants are cued to either remember or forget specific stimuli [1], revealing that memory performance can be modulated by these instructions. In the context of emotional regulation, motivated forgetting can serve as a mechanism to avoid the retrieval of distressing memories, thereby reducing negative affect [2]. Additionally, motivated forgetting can be influenced by reward anticipation, as demonstrated by studies showing that high reward cues can enhance memory encoding and retrieval processes [3,4]. However, the ability to intentionally forget declines with age, likely due to cognitive control deficits that impair the inhibition of unwanted information [5,6]. Bowen et al. further explore this age-related decline in ability of memorization in the lieu of scenes where reward motivation is included [7]. He has found that while rewards can enhance memory performance, the received rewards or activities counted as so do not necessarily improve intentional forgetting abilities in older adults.

The mechanisms underlying motivated forgetting are complex and multifaceted, involving memory encoding, cognitive control process and retrieval of memory. Cognitive control theories suggest that intentional forgetting requires the active inhibition of unwanted information, a process that relies on executive functions and cognitive resources [8]. However, aging is associated with declines in these cognitive control mechanisms, leading to reduced ability to intentionally forget [5,9]. Neuroimaging studies support this hypothesis, showing reduced engagement of frontal lobe inhibitory control regions in older adults during intentional forgetting tasks [10].

Reward anticipation also plays a significant role in modulating motivated forgetting. High reward cues can enhance memory encoding by engaging the reward network and triggering dopaminergic modulation of hippocampal consolidation processes [11,12]. This enhancement can lead to better memory performance regardless of whether the instruction is to remember or forget [13]. However, this reward-driven enhancement may override the ability to inhibit unwanted information, making intentional forgetting more difficult [13]. In contrast, studies have shown that reward anticipation can also increase semantic processing of stimuli, leading to more elaborate encoding and better memory for high-value information [14,15].

Age-related differences in motivated forgetting are further complicated by the interplay between cognitive control and reward sensitivity. While older adults show preserved sensitivity to rewards in some contexts [2,16], their ability to use this sensitivity to enhance intentional forgetting remains limited. This suggests that the mechanisms underlying motivated forgetting may be more automatic than strategic, particularly in older adults [17]. Additionally, individual differences in executive function and reward responsiveness may also influence how reward motivation impacts memory and forgetting [18].

With the development of mobile phones and social media, people's mental states have driven attention by the scholarly world. Human emotions and states are exposed to the changing nature of the surroundings: frequently, individuals blame the temperature, the time of day, or even a particularly recent meal for causing these shifts. However, have you ever considered that people's daily usage of mobile phones, a technology, can cause emotional shifts in people? Although using a smartphone might initially increase happiness and self-esteem, it also has been linked to negative effects such as increased suicide ideation and appearance-related discontent that is made worse by cyberbullying. Research reflected that females who use smartphones for extended periods may have more negative thoughts. These patterns highlight the need for additional studies and approaches to alleviate the negative impacts of digital technology on young people's mental health.

The article will address how mobile phone use impacts people's moods, notably adolescents and teenagers, and how these feelings are linked to motivated forgetting. This paper will be a theoretical overview by associating the principles of phone usage, including operational principles of specific apps, like TikTok, and the form of information received with different facets of motivated forgetting: Encoding, memorizing, and retrieving.

2. Literature review

The existing studies have inspected the aforementioned questions from the following angles, the existing crisis in teenagers' moods by the use of phones, why people tend to use phones, and how the use of phones affects teenagers' moods.

A growing crisis that seems linked to the widespread use of smartphones and social media is highlighted by the alarming increase in mental stress among teenagers, which went from 24% in 2013 to 39% in 2017 in Ontario [19]. Other disturbing trends include an increase in mental health hospitalizations and a spike in the rates of suicide and self-poisoning. There is a direct link between high levels of digital involvement and poor mental health outcomes in the US, where 89% of teenagers own cell phones, and in Canada, where 20% of teenagers spend more than five hours a day

on social media. In addition, the frequent use of smartphones has been reported to cause a rise in thoughts of self-harm, females especially. Although these devices may provide advantages like communication and resource access, the problems they bring to people are also inevitable. Apparently, social media in smartphones can indeed provide benefits like increased living satisfaction and self-worth, but excessive assumptions of them will lead to serious hazards. Nowadays, to avoid these problems, all kinds of solutions have been created to address them, these include boosting digital literacy, pushing for a sensible screen-time balance, supporting offline activities, and expanding adolescents' ability to access mental health resources and assistance. Fortunately, research findings indicate that by becoming aware of and reducing the negative impacts of social media and smartphones, these solutions have successfully protected young people's mental health. By the way, a descriptive statistical analysis revealed that depression has a positive correlation with the use of phones [20]. Therefore, mobile phone dependency, social anxiety, and depression have been demonstrated to be substantially positively correlated, based on correlation analysis. Addiction to mobile phones significantly improved the possibility of developing depression. Experiment results demonstrate that smartphone addiction was positively correlated with self-expansion and unconscious procrastination while negatively correlated with distraction resistance and attention transfer [21]. At the same time, Mobile phone self-expansion was negatively correlated with distraction resistance and attention transfer but positively correlated with unconscious procrastination. Among them, distraction resistance and attention shift are negatively correlated with unconscious procrastination.

3. Why do people want to use mobile phones

People will intentionally use mobile phones for several reasons, it can be smartphones facilitate communication, access to information and resources by using search engines, and offer opportunities for entertainment and relaxation e.g. boys will tend to play games while girls will be more likely to use social media [22]. Most importantly, motivated forgetting plays a great role in this process, this is because not all memories are equally welcome in awareness. What does "Motivated Forgetting" actually imply? It is equally necessary for a healthy memory system to discard useless information as it is to remember useful information. There are two ways that we can forget things: actively and passively. At the start of exploring memory loss, research on memory loss mainly concentrates on the passive elements that lead to forgetting, such as memory traces disappearing with time, memory interference caused by the accumulation of comparable memories, and memory errors caused by environmental changes. However, with the deepening of research, it is pointed out that some forgetting in human memory is not passive, but there is a strong motivation to forget the unpleasant experience in life, such a forgetting process is called motivated forgetting [23]. However, People limit the time they spend thinking about unpleasant experiences, which begins during encoding, but continues when cues later remind someone of the memory [24]. But forgetting is not just a passive outcome but involves active, goal-directed mechanisms. To know more about the mechanisms of motivated forgetting, we have to know the lateral prefrontal cortex first. Specifically, the role of inhibitory control processes is mediated primarily by the lateral prefrontal cortex (also known as the PFC). The primary role of PFC is to manage the accessibility of unwanted memories, and forgetting and can be used to protect emotional health and cognitive focus. Research has shown that the PFC is not only activated during the coding process, the most important part of the whole process, to enhance attention to relevant information and suppress interference, but it also plays an important role in consciously controlling access to specific memories during the retrieval process, which is considered as the terminal step of the motivated forgetting process. Therefore, the PFC plays an essential role in the process of motivated forgetting by its ability to manage attention and suppress irrelevant information. By the way, another essential part of the brain, which is the hippocampus is considered important for the formation and consolidation of memory. Through the collaboration between the

PFC and the hippocampus, the regulation of memory processes is achieved. Therefore, when people use phones as a way to emphasize suppression, motivated by forgetting intentionally. The PFC will encode and remember this signal, and this will form a habit as the accumulation of the retrieving process at the PFC.

4. How will these affects relate with motivated forgetting

Individuals with smartphone addiction will be tempted by mobile phones, immersed in the use of mobile phones, and have difficulty in self-control to generate the impulse to use mobile phones, so they spend a lot of time on mobile phones, ignore the current tasks, and cause procrastination [23]. Addictions toward apps in the phone like TikTok, because TikTok allows people to record their lives by capturing special moments and producing short-form videos. People find it really entertaining, but it's also turning into a new kind of social media addiction [24].

On the other hand, dependence on mobile phones can trigger negative emotions such as anxiety, and excessive use of mobile phones can also impair cognitive control functions. According to the metacognitive model of procrastination, the impairment of negative emotions and cognitive control also reduces the available metacognitive resources and induces unconscious procrastination. Furthermore, among children and teenagers, there is a positive correlation between smartphone use and sleep disturbance. In particular, extended smartphone use has been negatively associated with sleep duration and sleeping quality, and it will cause a higher possibility of sleep disturbance [1]. Unfortunately, even though a modest rise in the time of smartphone assumption will indeed result in favorable mental health effects like improved mood and social connectivity, these benefits are just fleeting [20]. Gender differences also need to be considered because these differences will directly affect and verify teenagers' activities on their phones, and the activities will affect their moods. It is said that teenage girls and boys engage in different digital media activities, girls spend more time on social media and smartphones, while boys spend more time playing video games [24]. The relationship between the amount of time spent on digital media and psychological well-being varied as well. Girls showed stronger correlations between heavy digital media usage and worse well-being, while boys showed stronger correlations between light digital media use and better well-being. Therefore, adolescent girls tend to receive a worse change in moods than boys during the use of phones.

5. Conclusion

The intersection of mobile phone usage and motivated forgetting theory provides a compelling framework for understanding the complex relationship between adolescents' digital engagement and their emotional well-being. This paper has explored how the common use of smartphones, particularly social media platforms like TikTok, influences teenagers' moods through mechanisms aligned with motivated forgetting—specifically, the encoding and retrieval of memories. The findings reveal that excessive phone use positively correlates with anxiety, depression, and sleep disturbances, exacerbated by impaired cognitive control processes mediated by the prefrontal cortex (PFC) and hippocampus. These brain regions are crucial for conscious forgetting and emotional regulation, and may be damaged by prolonged exposure to digital environments, reducing adolescents' ability to suppress negative memories.

Gender differences further distinguish this relationship: girls may predominantly engage in social media, experiencing a stronger negative mood due to the complexity and variety of information they receive online. On the other hand, boys show milder psychological impact since games took a higher proportion in their phone use. This disparity emphasizes how platform design—such as TikTok's reward-driven, endless scrolling—exploits dopamine-driven reward anticipation, reinforcing habits

that enhanced motivated forgetting. Teens may initially use phones to avoid unpleasant memories (active forgetting), but this strategy often backfires, fostering dependency and cyclical negative moods despite phone use.

Practically, interventions should promote digital literacy, balanced screen time, and offline activities while enhancing access to mental health resources. Theoretically, this analysis highlights the need to integrate cognitive neuroscience with behavioral research to find out how reward systems and memory suppression interact in digital contexts. There are limitations of current studies, such as cross-sectional designs, call for longitudinal and neuroimaging research to track long-term effects and neural correlates but these factors are also potential orientations future study can focus on.

In conclusion, addressing the mental health crisis among adolescents requires two focuses: reducing excessive use of mobile phones and strengthening cognitive strategies for regulating healthy emotions. By utilizing insights from the theory of motivated forgetting, researchers can develop targeted interventions to enable adolescents to use electronic devices such as mobile phones without compromising their mental health. Future research can explore the interrelationship between mobile phone addiction and cognitive control, and develop solutions based on this foundation

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