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Doomscrolling, Social Media, and Adolescent Depression: A Psychological and Neurological Perspective

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Abstract. This study ultimately aims to delineate the potential link between TikTok doomscrolling and behavioral problems amongst adolescent users while taking a psychological approach to analyze the insidious impacts of doomscrolling habits on individuals' neurotic hormone levels. This study examines changes in stress-related hormones such as serotonin and dopamine in relation to doomscrolling behaviors. Furthermore, by bolstering the connection between neurotransmitter changes and behavioral changes analyzed from various research papers, this study aims to reveal a clear anatomical and psychological explanation behind rising behavior problems in young TikTok users. Hence, the study will establish specific guidelines warning young users of potential risks and promote safe social media usage.

Keywords. Behavioral and Social Sciences, Cognitive Psychology, Social Media Addiction, Doomscrolling, Mental Disorders, Depression

Introduction

The widespread use of social media platforms such as TikTok, Instagram, and YouTube has significantly altered how people, particularly teenagers, interact with technology and access information. Features like Instagram Reels, TikTok videos, and YouTube Shorts deliver a constant stream of highly curated and engaging content. While these networks offer entertainment and opportunities for connection, they have also contributed to the rise of problematic behaviors, including "doomscrolling." Doomscrolling refers to the compulsive consumption of negative or distressing content, often for prolonged periods, which has been linked to adverse mental health outcomes [1].

Teenagers, as a particularly vulnerable demographic due to their developmental stage, are at heightened risk of experiencing negative impacts from excessive social media use. While doomscrolling is still a fairly new concept, research has linked doomscrolling to deteriorating physical health and increases in the levels of stress, anxiety, depression, and self-harm among all users. This phenomenon is compounded by the addictive nature of algorithms used by platforms such as TikTok, which continuously supply users with content tailored to their interests, making disengagement difficult.¹ Furthermore, doomscrolling starts to overload individuals' neural networks of information processing with negative news. Indulging in this type of content alters the functions of the brain by sending out repetitive, often exaggerated, detrimental thoughts that heighten anxiety, stress, and depression. This may impact sleeping

patterns, work behavior, and overperformance. Such behavioral patterns are alarming, especially as social media use continues to rise globally, with TikTok alone surpassing two billion users since 2020 [2].

The advent of various social media platforms such as TikTok and Instagram has revolutionized the landscape of online communication and digital technology. There is no doubt that such platforms have completely reshaped the ways of communication; simply with a tap of a finger, sharing life updates with billions of global users on the internet has become possible. Such a trend has become increasingly popular with younger generations, namely Generation Z, or comparably young adolescents born during the late 1990s to the early 2000s [3]. TikTok was able to garner a two billion user base by April 2020. However, the inherently accessible nature of social media platforms along with their popularity has generated a multitude of problems. Amnesty International reported an increase in several TikTok-induced behavioral problems among teens, which include self-harm, depression, anxiety, and anorexia [1]. Moreover, the article criticized the addictive nature of TikTok's so-called "recommendation algorithm," a built-in system that automatically and perpetually supplies users with videos relevant to their interests. Overall, a majority of reported side effects from prolonged TikTok use have been attributed to "doomscrolling," or a user's extensive usage of the social media "videos" feature to intentionally seek out negatively stimulating, or simply put, depressing news and information [4]. As of 2024, the trend of doomscrolling among teens is considered an urgent health issue specifically among adolescents that must be mitigated to promote a safe digital life.

Despite the growing body of evidence pointing to the potential harms of excessive social media use, there is limited understanding of the specific mechanisms linking doomscrolling to mental health outcomes. Understanding the impact of doomscrolling on teenagers is critical for developing strategies to mitigate its risks and promote healthier digital habits. By synthesizing existing research, this study aims to explore the relationship between doomscrolling and adolescent mental health. Specifically, this review investigates whether doomscrolling is associated with increased symptoms of major depressive disorder (MDD) and whether adolescents may be particularly vulnerable due to TikTok's addictive nature.

This study seeks to address this gap by investigating the correlation between scrolling behaviors and depression among teenagers. By analyzing different articles that researched doomscrolling and its effects, this research aims to explore how prolonged exposure to negative content affects emotional regulation and stress-related hormones such as serotonin and dopamine. Additionally, the study will examine broader patterns of scrolling hours and their relationship with depression symptoms.

What is *Doomscrolling*?

Doomscrolling is generally defined as intentionally seeking out and indulging in browsing negative or depressing news on social media for prolonged periods, especially during times of crisis. This term was introduced during the COVID-19 pandemic in early 2020, when social isolation and disrupted social life left individuals feeling vulnerable, causing them to consume negative news daily. Studies have found that the compulsion to doomscroll is motivated by the natural reaction to gain control in an uncontrollable situation. Individuals believe the built-up negative emotions stemming from the surrounding environment will settle down once they gain enough information in response to current events. By being the most accessible source of information, social media provides the quickest and simplest way of obtaining data. However, instead of "solving" the problem, this behavior creates detrimental effects including heightened stress, anxiety, and discomfort, eventually leading to both physical

and mental issues because of the constant exposure to negative content [5]. Given that the algorithm of Instagram and TikTok operates on streaming short videos with various content in just seconds, an average person absorbs about 74 GB of information per day, increasing each year by 5% [6]. That is like watching about 16 movies consistently nonstop. By accessing online platforms, users consume various types of information, leading to a stream of overburdened information overload. Information overload (IO) is the state where there is an imbalance between environmental demands and the available resources to respond to and cope with these demands [7]. The human brain is programmed to receive and filter a sufficient amount of information to ensure the balance between all neural networks. Overconsumption causes increased activity in a neural network in the default mode network (DMN) that disrupts memory processing and emotional regulation, a sign of a compressed gray matter volume [8].

Studies have indicated that doomscrolling is positively associated with social media addiction. Social media has created an interactive source for negative news through the ability to comment and share content, further enhancing engagement with negative news [9]. This behavioural pattern is not a new development. While intensified fear from collective trauma existed before social media, this type of phenomenon did eventually fade away at a relatively fast pace from the public consciousness, unlike doomscrolling. This was due to the limited broadcasts, which meant less repetitive exposure to traumatic events [10]. Long exposure to the videos of Instagram and TikTok provides easy access to overbearing and conflicting content, decreasing time for self-recovery in between exposures. Studies pre-pandemic suggest that on average, individuals use their phone more than 2.5 hours per day, including after waking up and just before going to bed. Since the pandemic, the hours have increased. A study recorded that about 37% of adults developed uncontrolled scrolling tendencies while 70% of young adults (19-39) experienced this [10]. Previous studies have shown that IO and social media addiction can lead to negative outcomes such as psychological stress, exhaustion, anxiety, and a decrease in neural activities in the frontal cortex.⁷ During the pandemic, there was a considerable rise in psychopathological cases regarding depression and anxiety, and studies have indicated a possible link between cases of mental health issues and prolonged social media exposure during the pandemic [11].

The Addiction of Negative News.

Generally, humans are more attentive to negative news and have a stronger bias towards it, developing cognitive bias towards specific information. A cognitive bias is a systematic error in the thought process that is influenced by the interpretation and process of the surrounding environment, altering their decisions and judgement. The psychophysiological reactions from reading negative content are much stronger and more persistent than reading neutral or positive news. A study drawn from 17 countries and 6 continents revealed that participants had higher arousal in heart rate variability and skin conductance levels in response to negative video news compared to positive and neutral news. People were more interested in hearing traumatic stories than absorbing happy endings and heroic stories. This finding was further supported by another research that observed the viewing time, number of fixations, pupil size, and eye movement in different contents. It was demonstrated that people were more interested in negative news by selectively choosing negative stories over positive stories [9].

In addition to already having a high bias, another reason people are attracted to upsetting information is that humans are programmed to anticipate danger and, therefore, need to access all available information regarding the danger [12]. Upon obtaining one piece of information, an individual searches up more news surrounding the bad event, increasing the

number of times negative content is processed in the brain. While it is a survival instinct, many individuals fail to recognize this and instead assume that finding all the answers will make them feel better, causing continuous scrolling and scrolling [13].

By developing this compulsive habit, the various parts of the brain's function are disrupted. The inferior frontal gyrus (IFG) activity is suppressed, and in extreme cases shuts off. The IFG's main function is to filter the bad news when updating beliefs on new information. During its full function, the IFG provides optimistic bias where people assume they can live longer and encounter fewer accidents, therefore tend to be more physically and mentally healthy along with a strong resilience against negative situations. For example, a recent study found that high levels of optimism prevented old people from obsessively searching for medical information [12]. Lower activity in the IFG increases pessimistic thoughts that trigger the survival instinct to search for more damaging information, causing the brain to send out continuous traumatic thoughts that fuel maladaptive behaviors such as anxiety and depression [9].

Anxiety and Doomscrolling

By developing overconsuming negative news in seconds, doomscrolling has been found to be positively correlated to heightened emotion in stress and anxiety. Anxiety is an emotional state of uneasy anticipation during uncertainty, which thrives through the continuous signals of negative emotions like fear and worry. Highly anxious individuals perceive environmental stimuli, like events or other people's comments, as threatening and, therefore, release anxious thoughts in situations where a normal individual would not [5]. Through this high emotion, the information processing alters by selecting only negative appraisals and exaggerating the estimate of vulnerability, which heightens negative feelings such as inadequacy [14]. The combination of social media addiction and the consumption of negative news has a higher probability of disrupting the brain's reward and processing networks which prompts lower levels of self-control that are motivated by anxiety, and produces more anxiety [15]. This can be shown through the cultivation theory developed by George Gerbner during the Mean World Syndrome. Cultivation theory states that through long viewership of the television, the perceptions of reality converts to scenes of television, altering the beliefs and attitude of individuals. This is because the elevated release of dopamine creates unnatural physiological highs and withdrawal symptoms. Excessive cortisol causes structural changes in the hippocampus and impairs memory, which hinders nerve cell connections that support rational choices. In doing so, maladaptive realities are created based on exaggerated threats while users are prevented from progressing offline. 94% of individuals experiencing doomscrolling agreed that rational choice for the real world is absent and 98% admitted to experiencing increased stress, relationship conflicts, sleep disruptions, or work performance, all signs of heightened anxiety [10]. This is further supported by another study that revealed the link between doomscrolling and anxiety by utilizing the Depression Anxiety Stress Scales 21. The results showed a significant positive relationship between neuroticism (personality trait of negative emotions) and doomscrolling and significant negative relationships with conscientiousness, extraversion, and agreeableness [16].

Doomscrolling and Anxiety and Depression

The link between doomscrolling and heightened anxiety suggests a strong association with depressive symptoms. Major depressive disorder (MDD) has emerged as a critical public health issue, particularly among adolescents, as rates of depression have significantly increased

in recent years. Research examining the overlap between anxiety and depression has demonstrated that assessing one condition necessitates evaluating the other, as they frequently co-occur [17]. This relationship is further explained by Clark and Watson's Tripartite Model of anxiety and depression, which delineates their similarities and distinctions.

The Tripartite Model categorizes these disorders into three components. The first, Negative Affect (NA), encompasses distress, irritability, and an overarching sense of unease, which are common to both anxiety and depression. The second, Positive Affect (PA), reflects enthusiasm, energy, and pleasurable engagement; low PA is characteristic of depression. The final component, Physiological Hyperarousal (PH), involves somatic symptoms and autonomic arousal, often associated with panic attacks, which are indicative of anxiety [18]. Although this model has not yet been directly applied to doomscrolling or social media addiction, its framework provides a basis for understanding their psychological impacts.

Furthermore, a study on problematic social media use identified six key behavioral patterns: (1) salience—preoccupation with social media, (2) tolerance—the need for increasing engagement, (3) mood modification—using social media to regulate emotions, (4) relapse—returning to excessive use after attempts to reduce it, (5) withdrawal—experiencing distress when not engaged, and (6) conflict—interpersonal or personal difficulties resulting from use [19]. These behaviors align with the Tripartite Model. Excessive social media use contributes to distress and negative emotions, aligning with NA. The diminished real-life engagement associated with overreliance on social media corresponds to low PA, indicative of depression. Finally, the persistent exposure to notifications and pressure to remain connected leads to heightened physiological arousal and restlessness, characteristic of PH and anxiety. From these examinations, it can be assumed that since doomscrolling is positively correlated with high emotions of distress, reliance on social media, and decreasing social interactions, it falls in all three categories of the Tripartite Model, supporting that depression is prevalent in this compulsive behavior.

Even outside the framework of the Tripartite Model, research supports the association between doomscrolling and depression. Doomscrolling increases exposure to distressing content, often amplifying catastrophic narratives that reinforce negative thinking patterns. Depression is linked to negative memory bias, wherein distressing thoughts are more readily recalled than positive ones, exacerbating emotional distress [20]. In doing so, it is also easier for users with depressive thoughts and symptoms to search for upsetting news online due to the constant presence of negativity. People who start harvesting traumatic emotions from looking at negative information, start withdrawing from society.

Moreover, excessive exposure to negative content can lead to social withdrawal. Individuals who internalize traumatic emotions from distressing media may disengage from social interactions, further contributing to isolation. Sleep disturbances are also a significant consequence of doomscrolling. An analysis led by Sharon Goldman identified disrupted sleep patterns, insomnia, and adverse health effects associated with excessive news consumption.¹³ The combination of isolation, insomnia, and trauma-related nightmares heightens amygdala activity, which, in turn, interacts with the hippocampus, contributing to cardiovascular stress and involuntary recall of distressing memories [10]. The hyperactivity of the amygdala and the negative emotional processing within the hippocampus are key indicators of depression. Among individuals with depression, the amygdala exhibits heightened reactivity to negative stimuli, leading to intrusive thoughts and impaired emotional regulation. Similarly, reduced volume of the hippocampus is found among depressed individuals. The decrease in the hippocampus

suggests problems in emotional behavior and emotional intelligence, making it difficult to build relationships with others [21].

Furthermore, empirical studies have found a strong correlation between doomscrolling and life satisfaction. One study found that doomscrolling, with the presence of psychological distress, is negatively associated with life satisfaction, supporting the Social Media Doomscrolling Scale which has shown exposure to distressing content disrupts cognitive and emotional functioning [16].

Doomscrolling and Adolescents

In comparison with older age groups, adolescents are particularly in danger of mental health effects from social addiction and doomscrolling. A 2023 study by UC San Francisco reported a 68% increase in emotional exhaustion, pessimism, and cynicism post-pandemic among teenagers [10]. It was observed that during this study, the average phone usage was nearly doubled, rising from 3 hours per day to 6 hours.

By 2024, about 90% of teenagers are reported using a form of social media platform, with alarmingly long hours that exceed 5 hours of daily browsing [22]. This high level of engagement increases adolescent exposure to distressing news, raising the likelihood of developing symptoms of anxiety and depression. Research considering age and gender differences has found that younger individuals exhibit a greater preference for negative news compared to older individuals, making them more vulnerable to the harmful psychological effects of doomscrolling. The development of depression among adolescents can lead to a more severe and recurrent trajectory than adult depression, which can form long-term impairments in psychosocial functioning [23].

Furthermore, the National Survey on Drug Use and Health (NSDUH), emphasizes the sudden increase of depression among adolescents, where rates rose from 8.1% in 2009 to 15.8% in 2019.²³ These findings align with research that has found higher levels of stress, anxiety, self-harm, and suicidality among teenagers [24].

While adolescents, in general, are particularly vulnerable to doomscrolling, the extent of these negative effects differs according to gender and racial/ethnic disparities. Depression rates for both boys and girls have increased, but it was found to be higher among girls, indicating a gender gap in depression. This becomes more pronounced in adulthood. Depressive symptoms and mental health issues diverging from doomscrolling are significant in adult groups. Another research, focusing on the gender gap in doomscrolling, discovered that men were more likely to consume news and had a higher arousal in response to negative news. Therefore, men had a greater impact from doomscrolling [9]. In contrast, research from Harvard suggests that women are more vulnerable to doomscrolling due to the constant exposure to sensitive content like gender-related topics [25]. While these findings contradict each other, they indicate additional factors that contribute to the impact of doomscrolling.

Conclusion

The main objective of this research was to examine the relationship between doomscrolling, compulsive behavior from social media addiction, and depression, especially among adolescents. Since the COVID-19 pandemic, the use of social media, such as TikTok and Instagram, has increased. These media platform designs encourage continuous engagement, developing addiction behaviors, and exposing users to vast amounts of information in a short period. The consumption of rapid information has been correlated with affecting neural functioning, contributing to mental health disorders. While information overloading already

contributes to negative effects, excessive exposure to negative content increases distress and negative emotional states.

Previous review of existing literature supports that doomscrolling is associated with increased symptoms of depression. Among doomscrolling individuals, heightened anxiety, depressive symptoms, and lower psychological well-being and life satisfaction were present. The overconsumption of negative content triggers involuntary and repetitive recollections of distressing memories and intrusive thoughts. These thoughts develop behavioral patterns of social withdrawal and isolation, creating a continuous cycle. Additionally, doomscrolling produces higher levels of anxiety amongst users, further prompting increased dopamine release, and reinforcing maladaptive thought patterns.

This study also found that the role of age and gender is significant in determining the extent of doomscrolling's effects. While adolescents are more vulnerable to social media addiction and doomscrolling, this habit's negative effects may vary based on gender and interest. For example, it was found that men were more likely to engage in negative news, therefore exhibiting increased depressive symptoms compared to women. This indicates that while adolescents and young adults are particularly susceptible to excessive media use, doomscrolling behaviors are influenced by personal tendencies and external factors.

Conclusion

While this research establishes a strong correlation between doomscrolling and depression, it fails to find a significant correlation to adolescent depression as various age groups are affected. There are several limitations in this study. Since doomscrolling is still a relatively new phenomenon, the existing research is limited. Therefore, this study lacks a comprehensive analysis of the neurophysiological effects of doomscrolling. In addition, this research does not take external factors, such as childhood trauma, preexisting mental health conditions, and individual personality traits into account.

Therefore, future research should explore the long-term neurological consequences of depression and anxiety from doomscrolling, particularly its impact on dopamine regulation, cognitive processing, and emotional resilience. Additionally, further studies should examine how doomscrolling is across different age groups, genders, and cultural contexts to understand its broader societal implications better. By deepening present and future understandings of this compulsive behavior, people can work on developing effective strategies to foster healthier digital habits from an early age, especially during digital times.

Doomscrolling will continue to be prevalent, especially since the world is heading toward a digital age. Social media users are more vulnerable to psychological risks through the symptoms of anxiety and depression, in addition to maladaptive behaviors such as social withdrawal, insomnia, and emotional distress. These negative effects can disrupt developing brains among adolescents, which may affect them as adults. Therefore, it is crucial to implement preventative strategies to mitigate the harmful effects of both social media addiction and doomscrolling. Many studies have already encouraged guidelines to help alleviate this compulsive behavior, which includes: limiting media exposure in the morning and before going to sleep, engaging with a balanced mix of positive and informative content, and setting screen-time restrictions. These types of guidelines should be taught and shown in educational institutions and on social platforms to remind users to set boundaries. Furthermore, schools should set a time limit on phone usage among teenagers to engage in activities outside of technology. This would decrease the number of hours young individuals spend on social media platforms and encourage a healthier environment. Another way to set boundaries is for the

government to set rules with social media platforms, especially for younger individuals. While it may be controversial, government regulation over social media can help prevent harmful consequences from the media.

As the world develops into a more technological environment, individuals should be more aware of the maladaptive effects of social media and other digital platforms. This would help set boundaries and allow individuals to adapt to the digital age with more positive consequences rather than negative consequences.

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