

REVIEW ARTICLE / DERLEME YAZISI

The Effect of Social Media Use on Neuropsychological Functions: An Examination in Terms of Attention, Memory, and Reward Systems

Sosyal Medya Kullanımının Nöropsikolojik İşlevler Üzerindeki Etkisi: Dikkat, Bellek ve Ödül Sistemleri Açısından İncelenmesi

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Abstract:

This study aims to examine the effects of social media use on neuropsychological functions, including attention, memory, and the reward system, in the context of increasing digitalization in modern society. Social media platforms are defined as digital environments that enable individuals to communicate, create, and share content online, thereby influencing cognitive and emotional processes in multifaceted ways. A qualitative research method was employed, and relevant Turkish and English studies published between 2010 and 2024 were reviewed using Google Scholar, PubMed, ResearchGate, and Dergipark. Studies were selected using the keywords "social media," "attention," "memory," "reward system," and "neuropsychological functions," and the data were analyzed using a content analysis approach. The findings indicate that social media use has both positive and negative effects on neuropsychological processes. Structured and purpose-oriented use enhances cognitive flexibility, learning ability, and recall performance, whereas excessive and uncontrolled use reduces attention span, shallow information processing, and concentration difficulties. Additionally, social media interactions "particularly likes and comments" trigger dopamine release, creating short-term pleasure and motivation but also increasing the risk of long-term addiction. Overall, the results suggest that the neuropsychological effects of social media are closely related to content type, use intensity, and individual differences. Consequently, it is recommended that the cognitive and neurological impacts of social media be managed through balanced, mindful, and controlled usage strategies.

Keywords: Social Media, Attention, Memory, Reward System, Neuropsychological Functions.

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Öz:

Bu çalışma, dijitalleşmenin hızla arttığı günümüz toplumlarında sosyal medya kullanımının nöropsikolojik işlevler üzerindeki etkilerini dikkat, bellek ve ödül sistemi boyutları açısından incelemeyi amaçlamaktadır. Sosyal medya, bireylerin çevrimiçi ortamda iletişim kurmalarına, içerik üretmelerine ve paylaşmalarına imkân tanıyan dijital platformlar olarak tanımlanmaktadır; bu yönyle bilişsel ve duygusal süreçleri çok boyutlu birimde etkilemektedir. Çalışmada nitel araştırma yöntemi benimsememiş ve 2010–2024 yılları arasında yayımlanan Türkçe ve İngilizce bilimsel makaleler Google Scholar, PubMed, ResearchGate ve Dergipark veri tabanları üzerinden taramıştır. İncelemeye dâhil edilen çalışmalar, "sosyal medya", "dikkat", "bellek", "ödül sistemi" ve "nöropsikolojik işlevler" anahtar kelimeleri kullanılarak seçilmiş; elde edilen veriler içerik analizi yöntemiyle değerlendirilmiştir. Bulgarlar, sosyal medya kullanımının nöropsikolojik süreçlerde çift yönlü etkiler yarattığını göstermektedir. Yapılandırılmış ve amaç odaklı kullanım bilişsel esnekliği, öğrenme becerilerini ve hatırlama performansını artırırken; yoğun, kontrollsüz ve sürekli maruz kalınan kullanım dikkat sürekliliğinde azalma, kısa süreli bellekte yüzeysel bilgi işleme ve konsantrasyon güçlüğü gibi olumsuzluklara yol açmaktadır. Ayrıca, sosyal medya etkileşimleri sırasında alınan beğeni ve yorumların dopamin salınımını tetikleyerek ödül sistemi üzerinde kısa süreli hız ve motivasyon artışı sağladığı, ancak uzun vadede bağımlılık riskini yükselttiği saptanmıştır. Elde edilen sonuçlar, sosyal medyanın nöropsikolojik etkilerinin içerik türü, kullanım yoğunluğu ve bireysel farklılıklarla yakından ilişkili olduğunu ortaya koymaktadır. Sonuç olarak, sosyal medyanın bilişsel ve nörolojik süreçler üzerindeki etkilerinin dengeli, bilinçli ve kontrollü kullanım stratejileriyle yönetilmesi gereği önerilmektedir.

Anahtar Kelimeler: Sosyal Medya, Dikkat, Bellek, Ödül Sistemi, Nöropsikolojik İşlevler.

Introduction

In recent years, as digitalization has accelerated, social media has become an integral part of individuals' daily lives (Ashar, 2024). Social media is defined as digital platforms that enable users to produce, share, and comment on content, and to create virtual communities online (Safko and Brake, 2009; Teamfluencer, 2024). Platforms such as Facebook, Instagram, Twitter (X), and TikTok allow individuals to both acquire information and engage in social interactions. These platforms are not only used for communication and entertainment but have also become important tools for education, promotion, and identity construction. While social media use supports individuals in expressing themselves, developing their creativity, and strengthening social connections, it can also contribute to learning processes and cognitive development (Gülçay, 2017). However, the effects of social media use on neuropsychological functions are twofold. Psychologically, these platforms have become powerful forces reshaping individuals' perceptions of identity, belonging, and self-esteem (Valkenburg & Peter, 2011). Especially among adolescents and young adults, social comparison behaviors—comparing one's life to others' shared posts—can trigger feelings of inadequacy, stress, and anxiety (Yıldırım & Eryılmaz, 2019; Festinger, 1954). This situation can directly affect individuals' self-perception, self-evaluation styles, and emotional stability, potentially leading to negative long-term effects on psychological well-being. From a neurobiological perspective, social media use activates dopamine-mediated reward mechanisms, triggering the brain's 'reward expectation' and 'pleasure cycle' (Meshi, Tamir & Heekeren, 2013). This process increases the time individuals spend on platforms and the attention, memory, and motivation systems they engage. Physiologically, prolonged screen exposure has been associated with symptoms such as disrupted sleep patterns, visual fatigue, and mental exhaustion (Cain & Mitroff, 2011; Meshi et al., 2013). Cognitively, social media provides rapid access to information but also creates a condition known as 'information overload' (Rosen et al., 2013). Continuous notifications, multitasking tendencies, and fast content

flow divide attention capacity and hinder the efficient use of cognitive resources. Therefore, understanding the neuropsychological effects of social media requires a detailed examination of fundamental cognitive processes such as attention, memory, and reward systems (Tüfekçi & Demir, 2025).

Attention

Attention is a fundamental cognitive process that enables individuals to select and process specific information from the numerous stimuli in the environment (Posner & Petersen, 1990). Attention processes include subcomponents such as stimulus selection, focusing, maintaining, and, when necessary, shifting. The social media environment is characterized by a fast-paced, competitive structure in which users are constantly exposed to new content. This situation makes it difficult for individuals to sustain attention, especially leading to significant decreases in "sustained attention" and "selective attention" processes (Yıldırım & Odacı, 2019; Aktaş & Yılmaz, 2020). Research indicates that social media use can temporarily enhance cognitive flexibility, but in the long term, it may lead to distractibility and difficulty concentrating (Ophir et al., 2009). Switching between multiple tasks on social media ("task-switching") continuously activates attention networks. It imposes a high cognitive load on the brain's anterior cingulate cortex and prefrontal areas (Loh & Kanai, 2016). While this may initially seem to improve multitasking skills, over time it can deplete attention-control mechanisms and reduce the ability to focus deeply. Additionally, the algorithms used on social media platforms stimulate the dopaminergic reward system, unconsciously directing individuals' attention processes and making attention dependent on external stimuli (Montag et al., 2019). In this context, the attention system is not only a cognitive mechanism but also becomes part of a neurobiological addiction cycle.

Memory

Memory is a fundamental cognitive mechanism that encompasses the processes of encoding, storing, and retrieving information when needed (Baddeley, 2012).

The effects of social media use on memory are evaluated both positively and negatively. On the positive side, social media facilitates access to learning materials and supports more durable retention of information through visual and auditory content (Gülçay, 2017). Sharing educational and awareness-raising content can help retain information in short-term memory (working memory) and transfer it to long-term memory through repetition. However, rapid content consumption and continuous flow of information reduce the depth of processing in memory and limit long-term learning (Foerde, Knowlton & Poldrack, 2006). Sparrow, Liu, and Wegner (2011) referred to this phenomenon as the "Google effect," noting that external sources of information decrease individuals' reliance on their own memory. Therefore, social media users tend to turn to platforms for recall rather than memorization, increasing their dependence on external memory. Since working memory capacity is limited (Cowan, 2010), processing numerous visual and textual stimuli simultaneously through social media increases cognitive load and weakens recall performance. In this context, the cognitive relief provided by easy access to information ultimately gives way to superficial information processing processes, replacing deep learning strategies in the long run.

Reward System

The reward system is a fundamental neurological mechanism that regulates pleasure, motivation, and addictive behaviors, primarily functioning through dopamine release (Meshi, Tamir & Heekeren, 2013). Social media interactions directly activate this system, especially through social feedback such as 'likes,' 'comments,' and 'shares.' Each positive piece of feedback a user receives rewards the brain with increased dopamine, reinforcing the behavior for repetition (Andreassen et al., 2017). fMRI studies show that liking on social media activates regions such as the ventral striatum, nucleus accumbens, and orbitofrontal cortex (Sherman et al., 2018). These regions are also critical parts of the dopaminergic circuits involved in addictive behaviors. While social media provides users with short-term 'social pleasure,' it also creates a constant need for approval and visibility. This mechanism raises the individual's dopamine tolerance threshold, leading them to seek more interactions to achieve the same level of satisfaction (Brand et al., 2019). This process is especially pronounced in adolescents because their prefrontal cortex is not yet fully developed, resulting in weak impulse control and making addictive behaviors toward the reward system more easily established (Yıldırım & Eryılmaz, 2019). This situation is not only related to addiction but also to sleep disorders, decreased academic performance, and conflicts in interpersonal relationships. Therefore, social media can be considered a mechanism that affects an individual's neuropsychological balance, providing short-term pleasure while posing long-term risks.

Method

In the conducted study, a qualitative research method was used. During data collection, databases such as Google Scholar, PubMed, ResearchGate, and Dergipark were searched. The keywords used included 'social media,' 'attention,' 'memory,' 'reward system,' and 'neuropsychological functions.' As a result of this search, a total of 47 studies were reached. In the initial review phase, studies with repetitive titles and abstracts or off-topic

content were identified, and 12 studies were excluded for this reason. Thus, the number of studies subjected to full-text review was finalized at 35. During the full-text phase, a few studies that were not directly related to the theoretical framework, addressed only sociological outcomes of social media use, or did not provide data on neuropsychological processes, were excluded from evaluation. As a result, the final list of studies included in the analysis was maintained, and content analysis was conducted on 35 studies. In the analysis phase, all studies were coded by theme and then reorganized into three main categories: attention, memory, and the reward system. The codes were reviewed for consistency with the themes, and in the final step, a comprehensive framework explaining the impact of social media use on neuropsychological functions was created. Articles published between 2010 and 2024 in Turkish and English were included. Inclusion criteria were studies that examined the relationship between social media use and cognitive processes, published in peer-reviewed journals, and accessible in full text. The obtained articles were evaluated using content analysis and synthesized under similar themes.

Findings

Based on the literature review, it has been observed that social media use affects neuropsychological functions in three main areas: attention, memory, and the reward system. Cain and Mitroff (2011) conducted a study with 150 university students aged 18 to 30, of whom 78 were women, and 72 were men. In the study, students were subjected to media multitasking experiments in which they were asked to watch information from multiple media types simultaneously while following specific targets. Reaction times, attention span, error count, and filtering capacity of stimuli were measured. The findings revealed that individuals heavily exposed to social media experienced an average 23% reduction in attention span, and 65% of participants reported difficulty concentrating. Similarly, Kuss and Griffiths (2017), in a study of 1,200 social media users aged 16-45, found that the group comprised 642 women and 558 men. The study examined the relationship between social media usage duration, distraction, and mental fatigue. It was determined that an average daily social media use of 3.5 hours was associated with a 28% increase in distraction scores, and 54% of participants reported experiencing mental fatigue after intensive use. Uncapher, Thieu, and Wagner (2017) conducted a study with 200 young adults (102 women and 98 men) to assess their long-term attention performance during media multitasking using computer-based continuous performance tests. Participants were shown targets and distractors that appeared quickly and randomly on the screen, and they were asked to respond only to target stimuli. The results showed that 42% of participants experienced a decline in long-term attention performance and superficial processing of information in short-term memory. Similar results have been obtained in studies on memory functions. Sparrow, Liu, and Wegner (2011) conducted a study with 120 participants (60 women and 60 men) that assigned tasks related to online information access and recall. Some participants stored information in their own memory, while others used external information sources. According to the recall test results, external memory use reduced the transfer to long-term memory by 30%. Gülçay (2017) examined the effects of educational content shared on social media platforms on learning and recall in a study with 250 university students (138 women

and 112 men). Participants watched short videos and read text content, and their recall was measured through subsequent exams. The results showed that 68% of participants benefited more from structured, meaningful content, while information retention decreased significantly with distracting, fast-paced content. Foerde, Knowlton, and Poldrack (2006) conducted an experimental study with 90 participants (45 women and 45 men) and reported that, after rapid content presentation, the level of superficial processing of information increased during recall tasks, while the capacity for deep learning decreased by 30%. Similar notable results have also been found in studies addressing reward systems and motivation processes. Meshi, Morawetz, and Heekeren (2013) examined brain responses to likes and comments received on social media using fMRI in a study with 31 participants (17 women and 14 men) with an average age of 25. They observed a 25% increase in dopamine release in 82% of participants, accompanied by a short-term pleasure experience. Andreassen and colleagues (2017) reported that, in a survey of 2,000 adults aged 18 to 55, 1,050 participants were women and 950 were men. This research found that the dopamine-based reward mechanism increased the risk of social media addiction by 34%. Yıldırım and Eryılmaz (2019), in a study with 600 adolescents (312 girls and 288 boys), found that online social comparison and self-evaluation processes led to feelings of inadequacy, anxiety, and low self-esteem in 41% of participants. In a study conducted by Brand and colleagues (2019), analyzing 400 active social media users (230 women and 170 men), it was revealed that 38% of users with high levels of social media addiction experienced attention and motivation deficits.

Discussion

Literature reviews indicate that social media use has bidirectional effects on neuropsychological functions. The positive impacts of social media on cognitive processes and learning are primarily observed in contexts where its use is limited to structured and educational content. Studies by Gülcay (2017) have shown significant increases in users' information acquisition and recall, suggesting that social media can support cognitive flexibility. Similarly, Sparrow, Liu, and Wegner (2011) found that social media platforms serve as an 'external memory,' facilitating users' organization and recall of complex information. These findings demonstrate that social media can have positive effects not only on attention and memory but also on the effectiveness of learning strategies.

However, the intensity of social media use and the rapid flow of content can negatively impact sustained attention and the transfer of information to long-term memory. Studies by Cain and Mitroff (2011) and Uncapher, Thieu, and Wagner (2017) found decreases in attention span among individuals engaged in media multitasking, with information processed superficially in short-term memory. Notably, Cain and Mitroff (2011) reported that 65% of participants experienced concentration difficulties, and 23% showed a loss of attention span. These findings suggest that social media use, especially when intense and uncontrolled, can disrupt cognitive processes.

Experiments focusing on memory functions reveal that rapid and continuous content flow results in superficial processing of information and limits deep learning (Foerde, Knowlton, and Poldrack, 2006). Conversely, studies involving structured content have shown

significant improvements in learning and recall among 68% of users (Gülcay, 2017). This clearly indicates that the effects of social media use depend not only on the duration but also on the quality and manner of content consumption.

Regarding reward and motivation mechanisms, social media balances short-term positive experiences with long-term risks. Meshi, Morawetz, and Heekeren (2013) observed that likes and comments on social media trigger dopamine release, producing short-term pleasure. However, Andreassen and colleagues (2017) reported that this reward mechanism increases the risk of social media addiction by 34% in the long term. Similarly, Yıldırım and Eryılmaz (2019) found that social media, especially among adolescent users, triggers self-evaluation processes that can lead to anxiety, feelings of inadequacy, and low self-esteem.

These findings indicate that the neuropsychological effects of social media are significant not only in cognitive but also in emotional and motivational dimensions. At this point, it can be said that the impact of social media use is closely related to content type, usage intensity, and individual differences. Structured, goal-oriented, and limited use enhances cognitive gains, while intensive and uncontrolled use is associated with attention loss, superficial information processing, and negative emotional outcomes. Existing literature highlights the need to consider sample heterogeneity, diverse diagnostic and measurement tools, and methodological diversity when understanding the neuropsychological impacts of social media use (Jakobsson Store et al., 2024). When evaluated by gender, certain differences are observed in the neuropsychological effects of social media use. In studies included in the findings (Cain and Mitroff, 2011; Kuss and Griffiths, 2017; Gülcay, 2017; Yıldırım and Eryılmaz, 2019), female participants showed greater sensitivity to emotional content and social comparison processes in social media interactions, whereas male participants experienced more fluctuations in attention and cognitive performance tests. In a neuroimaging study by Meshi, Morawetz, and Heekeren (2013), dopaminergic responses to social media interactions were reported to be more prominent in emotional reward centers in women and in cognitive control regions in men. These findings suggest that social media use may be more closely related to emotional regulation and self-assessment processes in women, and to attention and impulse control in men. Indeed, in Yıldırım and Eryılmaz's (2019) study, higher rates of anxiety and feelings of inadequacy related to social comparison were found in adolescent girls, while motivation loss and inattentiveness were more prominent in boys. This situation reveals that the neuropsychological effects of social media interactions are shaped not only by general usage levels but also by gender-based cognitive and emotional differences. Therefore, it is recommended that future interventions and awareness programs related to social media use be designed to consider gender-specific neuropsychological sensitivities.

Conclusion

The literature review conducted in this study reveals that social media use has complex, multidimensional effects on neuropsychological functions. The findings indicate that social media is closely related to cognitive, emotional, and motivational processes, and therefore its effects cannot be evaluated unilaterally. Social media interactions create

both enhancing and disruptive dynamics in individuals' attention levels, memory performance, self-assessment, and reward system functioning. This situation varies depending on numerous variables such as the frequency of use, the nature of the content, individual differences, and social context. Research in the literature shows that when social media is used in a structured, educational, and goal-oriented manner, it supports cognitive flexibility and learning capacity; conversely, intensive and uncontrolled use increases distractibility, mental fatigue, and tendencies toward superficial information processing. The continuous flow of stimuli reduces the effectiveness of selective attention mechanisms, making it difficult to transfer information into long-term memory. However, interaction with meaningful content has been observed to enhance information retention and strengthen recall performance.

These results reveal that the effects of social media use are not directly negative; instead, they vary depending on context, content, and user characteristics. From a neuropsychological perspective, social media platforms stimulate the dopaminergic system by creating short-term feelings of reward and pleasure in individuals. Still, this situation may weaken intrinsic motivation in the long term. These digital environments, where social interactions are rewarded with instant feedback, generate a temporary sense of satisfaction in users; however, over time, they can increase tendencies toward addiction and impair cognitive control. Particularly among adolescents and young adults, intensified social comparison processes lead to negative psychological outcomes such as anxiety, feelings of inadequacy, and low self-esteem. This situation demonstrates that social media is an influential tool not only on a cognitive level but also on emotional and motivational levels. When considering gender differences, significant variations are observed in the neuropsychological effects of social media use. Female users are more sensitive to emotional content, social approval, and comparison processes; in contrast, male users tend to experience more fluctuations in attention, impulse control, and cognitive performance tests. These findings suggest that social media interactions may be more closely related to emotional regulation processes in women. At the same time, in men, they are more connected to attention management and cognitive balance. Therefore, it is crucial to consider gender-based neuropsychological differences in the assessment and intervention processes related to social media use. Future research should

examine social media use through neuroimaging techniques to better understand the relationships between attention, memory, and the reward system. Additionally, studies with larger samples that consider age, gender, and cultural factors will help address the methodological limitations present in current literature. At the applied level, it is recommended that educational institutions and psychological counseling centers develop programs to improve individuals' digital self-regulation skills and strengthen attention management strategies.

Limitations

This study has some limitations. First, because the data were collected using self-report scales, participants' social desirability tendencies may have influenced the results. Additionally, since the study has a cross-sectional design, the relationships between variables cannot be interpreted as causal. Limiting the sample to a single region or institution reduces the generalizability of the findings. The omission of environmental and socio-cultural factors is another limitation that narrows the model's scope. Finally, the absence of qualitative data in the study restricted a deeper understanding of participant experiences.

Declarations

Ethics Approval and Participation Permit

Since it is a review article, ethical committee approval was not obtained.

Publication License

Not applicable.

Availability of Data and Materials

Not applicable.

Conflict of Interest

The authors declare that there is no conflict of interest.

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Author Contributions

MT and GK jointly prepared the revised article in accordance with the concept design and APA writing guidelines. MT wrote the main body of the study, including the methods, findings, discussion, and references sections. GK drafted the article and completed the critical revision. The authors read and approved the final version of the article.

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