Hyperactivity is Hyperpassivity?

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This study examines the cognitive of media consumption, focusing on the contrast between continuous engagement with content (e.g., reading) and fragmented interaction (e.g., social media scrolling). Through a web-based survey, 15 participants completed Cognitive Reflection Tests (CRT) alongside self-assessment questions to evaluate their confidence and reflective abilities. The results revealed that participants who engaged with continuous media retained information more effectively, exhibited greater confidence, and provided richer reflections compared to those consuming fragmented media. These findings support the hypothesis that media consumption hinders reflective thinking. While no significant correlation was found between total screen time and cognitive performance, the continuity of content emerged as a critical factor. Despite the study's limited sample size, the results underscore the importance of exploring how media consumption patterns influence cognitive processes and identifying strategies to encourage more reflective engagement with digital content.

1 Introduction

In the digital age, social media platforms and other forms of digital media have become deeply integrated into everyday life, reshaping how people interact with each other, process information, and perceive themselves. While these platforms offer remarkable opportunities for global connection, creativity, and the sharing of information, they also introduce complex psychological challenges. A key challenges is the phenomenon of excessive media consumption, driven by features like infinite scrolling, algorithmic personalization, and constant stimuli. This relentless engagement, often described as the intensification of hyperactivity, prioritizes instant satisfaction and continuous interaction over deeper, more reflective thought processes [12]. Over time, users become conditioned to react impulsively to stimuli, a behavior that gradually diminishes their capacity for reflective thinking and intentional decision-making. This hyperactive state eventually transitions into what can be called "hyperpassivity," where individuals become passive recipients of stimuli, losing their ability to resist external pressures and impulses. Such behavioral patterns can erode self-awareness and contribute to issues like burnout, self-exploitation, and a decline in critical thinking.

Byung-Chul Han [2010] critiques the modern age's relentless pursuit of productivity and self-optimization, arguing that it leads to exhaustion, self-exploitation, and a paradoxical loss of freedom and autonomy. We interpret his assertion, "hyperactive intensification leads to an abrupt switch into hyperpassivity; now one obeys every impulse or stimulus without resistance. Instead of freedom, it produces new constraints. It is an illusion to believe that being more active means being freer," as indicating how conflicting information found online can disrupt people's belief, even when they know something is untrue. This leads us to the research question: "In what ways, if any, does excessive media

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consumption undermine users' ability to reflect?" Understanding how excessive media consumption impedes reflective thinking is crucial for understanding broader societal well-being.

Our study explored the potential cognitive impacts of excessive media consumption through a custom web survey built on Firebase. The research design involved a strategic three-page platform that guided participants through a consent process, cognitive reflection tests, and qualitative response sections. By incorporating timed and untimed questions, we assessed participants' analytical reasoning, media consumption habits, and self-reflective capabilities. The preliminary findings from a small sample of 15 participants suggested a correlation between frequent media consumption and reduced cognitive reflection. The cognitive reflection tests revealed participants' difficulties in overcoming intuitive but incorrect responses, while the open-ended sections provided insights into individual variations in media processing and critical thinking. Although the study's small sample size limits the generalizability of the results, the initial finding suggests some evidence on the potential link between rapid media engagement and diminished sustained focus. The research points to the importance of conducting more extensive studies to substantiate these early observations and better understand the cognitive implications of modern media consumption patterns.

2 Related work

To position our research within a broader academic context, we conducted a comprehensive review of the existing literature in three critical areas: (1) Prior Studies on Media Use and Cognitive Impacts, (2) Theoretical Framework: The Burnout Society, and (3) Validated Methods for Survey Design and Analysis.

2.1 Media Use and Cognitive Impacts

As highlighted by Chuck [2024], features like infinite scrolling and algorithm-driven feeds promote impulsive consumption rather than deliberate engagement, creating an environment that overwhelms the cognitive capacity of users. Furthermore, media multitasking has been shown to have a negative effect on cognitive abilities, impairing memory retention, critical thinking, and the ability to synthesize information [2, 8, 14]. According to Zhang et al. [2023], the excessive social media use detrimentally affects psychological and subjective well-being by highlighting stress and reducing self-reflection [17]. This is achieved through mechanisms such as information overload and attention fragmentation, which disrupt cognitive processing and the ability to engage in meaningful self-reflection. These findings align with broader trends in the our research, which suggest that overstimulation from media consumption can harm essential cognitive processes necessary for intentional decision-making and personal growth.

Previous research in this area often uses methods like analyzing large-scale datasets or employing neurological techniques such as brain imaging to study cognitive processes. While these approaches offer valuable insights into broad patterns and neural responses, they tend to overlook the real-time behaviors and subjective experiences of individual users. In contrast, our research utilizes an observational study approach, allowing us to closely examine participants' activities on a range of websites while they simultaneously complete a guided survey on paper. This dual-method approach allows us to capture two critical dimensions of user experience:

- `Inner Reflections`: The guided surveys provide insight into participants' introspective thoughts and personal experiences, particularly in relation to burnout and digital fatigue.
- `Real-Time Behavior`: By directly observing participants' online interactions, we gather concrete data on their behavior, including navigation patterns, engagement tendencies, and moments of distraction.

Additionally, while many previous studies focus on specific demographic groups or rely on algorithmic or automated analysis, our research aims to collect data from a diverse range of participants, even though the majority will likely be self-participated. This approach emphasizes individual variability and subjective experience, which are often overlooked in large-scale, database-driven or neurological studies.

2.2 Theoretical Framework: The Burnout Society

Philosopher Byung-Chul Han [2010] offers a critique of modern society, organizing his critique around seven key concepts that illuminate the underlying structures and dynamics of contemporary culture.

- `The Performance Society (Achievement)`: Modern individuals self-exploit by internalizing societal pressures to constantly perform and achieve.
- `The Tryanny Positivity`: A cultural obsession with limitless potential creates unbearable pressure and contributes to burnout.
- `Burnout as a Cultural Pathology`: Disorders like burnout and depression reflect systemic societal dysfunction, not just individual failings.
- `The Destruction of Contemplation`: Society undervalues rest and reflection, prioritizing action and productivity over inner balance.
- `The Overload of Information and Attention Fragmentation`: Digital information excess overwhelms and distracts individuals, leading to disconnection and mental fatigue.
- `The Paradox of Freedom`: The modern ideal of freedom conceals a new form of self-imposed coercion through relentless self-optimization.
- `The Need for a New Paradigm: Vita Contemplativa`: Embracing contemplation and stillness is essential to counteract burnout and restore authentic living.

Han [2010] argues that hyperpassivity- an extreme form of passivity resulting from overwhelming digital stimuli- creates new constraints that pretend to be free, challenging the assumption that being more active equates to greater autonomy [6]. This inspired our initial hypothesis, suggesting that the rapid switching between media stimuli overwhelms cognitive processes in a similar way. Additionally, research into online communities has illuminated how the climate within digital spaces, such as innovation-driven communities, mediates users' motivations and influences their behaviors, particularly in value co-creation [9]. This aligns with Han's assertation that the pressures exerted by digital environments constrain individual autonomy. Insights from our study build on this, emphasizing the need to explore how the structure and norms of digital spaces shape user engagement and, in turn, affect reflective thinking and overall well-being.

2.3 Validated Methods for Survey Design and Analysis

Several empirical studies offers methodological and theoretical insights into the psychological impacts of media consumption. Previous research highlights the utility of employing surveys with validated psychological scales to measure subjective users' subjective experiences [4, 11]. The methodological frameworks employed in these studies inform our own research, providing a robust foundation for assessing how excessive media consumption affects users' reflective capacities in a consistent and reliable manner.

Many humanities and social science communications study introduces the Stimulus-Organism-Response (SOR) framework, which provides a structured model for examining how external stimuli—such as media consumption

patterns—affect internal states, like cognitive overload, and lead to specific outcomes, such as reduced reflection or burnout [1, 7, 10, 15]. This model offers a theoretical lens for organizing our survey questions and interpreting data within a clear cause-and-effect framework. By using the SOR model, our study can more effectively analyze the links between media use, cognitive strain, and the erosion of reflective abilities.

Our study utilizes a variety of validated survey tools and cognitive tests to measure participants' thoughts, behaviors, and cognitive abilities within the context of digital media use. Key instruments include:

- `Cognitive Reflection Test (CRT)`: This test assesses participants' ability to engage in reflective thinking, rather than relying on intuitive or impulsive responses. It is particularly relevant for understanding how excessive media consumption undermines reflective thought [5].
- `Bergen Social Media Addiction Scale (BSMAS)`: A well-established tool for assessing the degree of addiction to social media platforms, which helps quantify participants' reliance on these platforms and assess its potential psychological impacts [16].
- `Flanker Test`: A cognitive assessment that evaluates how external stimuli affect participants' ability to focus and filter out distractions. This test aligns with our focus on the cognitive toll of hyperactive digital engagement [3].
- `Social Media Addiction Scale (SMAS)`: A tool used in previous studies to assess social media addiction and its correlation with burnout, providing a comparative framework for our research [13].

By using these validated instruments, our study ensures the reliability of our data collection and its relevance to existing research, allowing for deeper understanding of the relationship between media consumption and cognitive and emotional well-bing.

3 Method

To address the research questions, a custom web-based platform was developed and utilized to collect data through a self-administered survey [https://cs567-61df7.web.app/]. The website was designed to streamline data collection, ensuring participants could easily navigate the survey. Below is a detailed explanation of the methodological design and the steps taken during the system development. The web-based platform prioritized accessibility, ease of use, and data security. By using a website, participants could access the survey from various devices at their convenience, which not only increased the reach but also contributed to the diversity of the sample. In addition, the simple design of the survey minizmized cognitive load, ensuring participants could focus on providing thoughtful responses rather than being distracted by a complicated interface.

The web-based platform was developed using Firebase, a cloud-based development platform, to ensure scalability, security, and efficient data management. The development process followed these key steps: The interface was designed using HTML, and Firebase was used to implement user authentication and real-time database management. Participant data was securely stored in Firebase's Firestore database as shown in Figure 1, which ensured confidentiality and compliance with data protection regulations. To ensure smooth navigation, sequential navigation logic was included into the platform, preventing participants from skipping or revisiting previous pages. In addition, Additionally, timestamps were recorded for each page using Firebase functions, which helped monitor participant engagement and track the time spent on each section, providing additional data for analysis.

The survey itself consisted of three sequential pages, each designed to achieve specific research objectives:

- `Consent Form and Instruction`: The first page of the website presented participants with a consent form outlined the study's purpose, potential risks, and participants' rights as shown in Figure 2. Participants were required to explicitly provide their consent before proceeding with the survey. This page also included clear instructions for completing the survey to minimize misunderstandings and ensure that participants provided high-quality responses.
- `Cognitive Reflection Questions`: The second page contained a series of cognitive reflection questions designed to evaluate participants' decision-making processes and reflective thinking abilities as shown in Figure 3. To ensure participants were engaged, the survey required them to either read a book or scroll through media for five minutes before answering the first cognitive reflection question. After five minutes, the first question appeared on the screen, and participants had 20 seconds to answer. This process was repeated three times in total.
- `Free Response Questions`: The final page offered an open-ended format, allowing participants to provide detailed responses to questions related to the study topic. This section aimed to capture qualitative insights and nuanced perspectives that might not have emerge from structured questions. This consists of total four parts, Retention, Perceived self-contemplation, Context, Flaws within survey.

4 Evaluation

This section evaluates the methodological design and data collection strategies used to investigate the relationship between excessive media consumption and users' ability to engage in reflective thinking. The approach focuses on the reason behind the survey structure,which included both timed and untimed questions, to capture distinct cognitive and reflective processes. Furthermore, this section discusses the data requirements, analytical strategies, and limitations inherent to the study, along with suggestions for improvement in future research. By doing so, we aim to demonstrate how the methodology aligns with the research objectives and supports the generation of meaningful findings.

4.1 Self Administered Questions

To evaluate participants' cognitive reflection, media consumption behaviors, and their ability to retain and process information,the survey was designed to incorporate a mix of timed and untimed questions. This dual survey method aimed to capture both objective and subjective aspects of cognitive engagement.

The timed questions were desgiend to measure participants' capacity for deliberate, analytical reasoning under time constraints. To achieve this, the cognitive reflection test (CRT) was employed. The CRT assesses individuals' ability to suppress intuitive but incorrect responses in favor of logical, reflective thinking. Participants were presented with the following classic CRT questions:

- 1: A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? (Intuitive Answer: 10 cents, Correct Answers: 10 cents)
- 2: If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? (Intuitive Answer: 100 minutes, Correct Answers: 5 minutes)
- 3: In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? (Intuitive Answers: 24 days, Correct Answers: 47 days)

Fig. 1. Firebase Database Structure

Fig. 2. Survey Question

Fig. 3. Survey Interface Overview

	Parsed Data		
19	Parsed Data		
20		Correct Multiple-	Did you read a b
21	Participant 1	0	scroll
22	Participant 2	2	scroll
23	Participant 3	0	scroll
24	Participant 4	0	scroll
25	Participant 5	0	scroll
26	Participant 6	0	read
27	Participant 7	1	read
28	Participant 8	0	scroll
29	Participant 9	0	read
30	Participant 10	2	read
31	Participant 11	0	scroll
32	Participant 12	3	scroll

Fig. 4. Stored Parsed Data

These questions serve as an objective measure of cognitive reflection. Participants needed to override their initial instinctive responses to arrive at the correct answers, requiring sustained focus and critical reasoning. This component aligns with our hypothesis that excessive media use and frequent switching between content could impair an individual's capacity for prolonged reflective thinking and logical problem-solving.

In addition to the CRT, untimed questions were designed to explore participants' self-assessed behaviors, perceptions, and thought processes related to media use and information retention. These open-ended and rating-scale questions included the following:

- `Media Exposure and Confidence`: articipants were asked to estimate how many posts or pages they viewed in the last 15 minutes and to rate their confidence levels (e.g., very confident, somewhat confident, not confident). They were also tasked with summarizing the content they consumed during this period and reflecting on whether their summary captured sufficient detail.
- `Retention and Contemplation`: Participants rated their confidence in their answers to the CRT questions, providing insight into their self-awareness and perceived cognitive ability during the timed tasks.
- `Media Context and Patterns`: Participants listed the scroll-based media platforms they use most frequently, reported the time spent on such platforms the previous day, and indicated whether this duration was typical or unusual for them.
- `Survey Feedback`: This section invited participants to provide open-ended feedback on the survey itself, including perceived flaws, challenges, or additional insights they felt were important.

This combination of timed and untimed questions provided both quantitative data (e.g., CRT performance) and qualitative insights (e.g., self-assessment of media habits). These approaches created a comprehensive framework for evaluating how media consumption affects cognitive reflective abilities.

4.2 Data

For this study,data was collected from 15 participants. While this sample size represents a modest starting point, it offers preliminary insights into the research question. The concept of thematic saturation—the point at which additional responses no longer yield new themes or patterns—was used as a guiding principle in evaluating the sufficiency of the data. While thematic saturation is typically observed in qualitative research, it is a useful metric in this case for determining whether the collected data adequately reflects the diversity of participants' experiences and perspectives.

Although the sample size is relatively small, it was regarded as sufficient for this study's exploratory objectives. Due to the limited time for data collection, the survey was kept open for as long as possible to maximize participation. The findings from the dataset of 15 participants provided meaningful insights, partially validating the hypothesis and supporting the overall research objectivew.

It is important to note that the small sample size may limit the generalizability of the findings. A larger sample would not only enhance the reliability of the results but also allow for a more nuanced understanding of the factors influencing cognitive reflection and media consumption. In future studies, conducting a formal analysis would help determine the ideal number of participants needed to achieve statistical significance. Larger samples would allow for more precise estimates of effect sizes and ensure greater robustness of the conclusions.

Despite these limitations, the data collected in this study offer clear initial evidence that aligns with the research hypothesis. The results underscore expected patterns of cognitive and reflective engagement and provide a solid foundation for future research. Moving forward, expanding the sample size and increasing the diversity of participants would be essential for confirming these findings and producing more comprehensive, statistically significant results.

5   Results

The data reveals a significant difference in how individuals engage with and reflect on media, depending on whether they consume it through reading or scrolling. Below, we explore several key findings that highlight these distinctions:
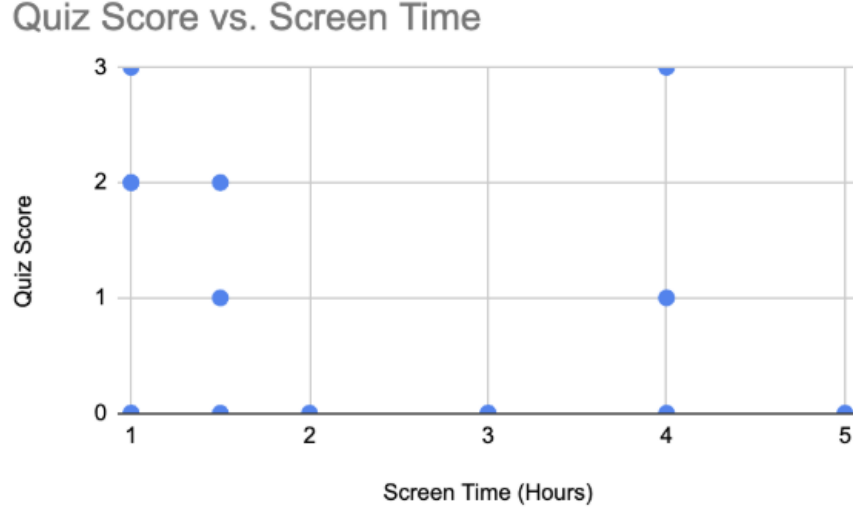

Fig. 5. Quiz Score vs. Screen Time.

- `Activity vs Quiz Score`: Readers consistently achieved higher scores (score of 1.2) on the timed cognitive reflection quiz compared to scrollers (score of 0.6). This pattern suggests that reading longer, more continuous pieces of media fosters deeper contemplation and sustained concentration. In contrast, scrollers, who often consume shorter, fragmented pieces of content, appear to struggle with maintaining the focus necessary for thoughtful reflection. These results support the hypothesis that the type of media consumed has a meaningful impact on an individual's capacity to retain information and reflect critically.
- `Activity vs Quiz Confidence Score`: Readers also demonstrated greater confidence in their quiz responses, with an average confidence score of 4.2 (out of 5), compared to 2.7 (out of 5) for scrollers. This finding implies that reading, which often involves more contextually rich and detailed content, equips individuals with a clearer understanding of the material. Conversely, scrollers, who engage with brief and frequently disjointed media, may find it more challenging to develop a coherent understanding of the content, resulting in lower confidence when reflecting on or recalling information.
- `Average Summary Length`: When asked to summarize the content they had consumed, readers provided longer and more detailed responses compared to scrollers. Readers provide average 150 characters while scrollers give 111.7. This observation aligns with the hypothesis that engaging with continuous narratives or in-depth media encourages individuals to retain and process information more comprehensively. In contrast, scrollers, whose media consumption is characterized by fragmented and transient content, tend to produce shorter and less detailed summaries, reflecting a reduced ability to retain substantial information.
- `Screen Time vs Quiz Score`: There was no clear correlation between the total screen time and quiz scores as shown in Figure 5. This finding indicates that the quantity of time spent consuming media is not the primary

factor influencing an individual's ability to reflect or retain information. Instead, it is the nature and type of media consumed—such as reading versus scrolling—that has a more pronounced effect on cognitive outcomes.

- **Responses for Summary:** The qualitative analysis of participants' summaries further highlighted differences between readers and scrollers. Readers' responses were more detailed and consistent, often reflecting a deeper understanding and analytical engagement with the material. For instance, one reader's summary delved into the nuances of a dialogue within the text, providing evidence of critical thinking and reflection. In contrast, scrollers frequently offered surface-level reflections, such as "watched some funny memes" or brief mentions of video content, which lacked depth and analytical rigor.

- **Responses for Summarizing Information:** Participants expressed varying degrees of confidence in their ability to summarize the media they consumed. Scrollers, in particular, acknowledged the limitations of their summaries, often attributing these shortcomings to the fragmented and ephemeral nature of the content they engaged with. For example, some scrollers noted difficulties in capturing sufficient detail from videos or posts due to their brevity or lack of context. Readers, by contrast, were able to summarize more effectively, often providing nuanced and detailed reflections. This suggests that the continuity and complexity of reading materials facilitate better retention and enable individuals to produce more comprehensive summaries.

In summary, the analysis underscores the impact of media consumption methods on cognitive processes. Reading, with its inherently continuous and detailed nature, promotes higher levels of reflection, retention, and comprehension. On the other hand, scrolling—characterized by brief, fragmented, and often less engaging content—appears to hinder sustained focus and critical reflection. These findings emphasize the crucial role that the format and structure of media play in shaping an individual's ability to process, reflect upon, and recall information. Future studies could further explore how these differences influence long-term cognitive development and behavior.

6 Discussion and Conclusion

The results of this study suggest that there is a significant difference in how individuals engage with and reflect upon media, based on the type of content they consume. Readers, who typically engage with longer, continuous forms of media, outperformed scrollers in key areas such as quiz scores, confidence, and the ability to provide detailed summaries. Scrollers, by contrast, primarily engaged with fragmented and fast-paced media, such as social media posts, which seemed to limit their ability to retain information and reflect deeply. These results provide strong support for the hypothesis that the rapid switching inherent in scrolling behaviors can overwhelm cognitive processing, reducing one's ability to retain and thoughtfully reflect on the material.

Overall, the results largely align our initial expectations. We anticipated that readers, due to the cognitive demands and engagement required for sustained reading, would outperform scrollers in areas such as information retention and confidence. The data confirmed this, with readers achieving higher scores on the timed quiz and expressing greater confidence in their answers. However, one unexpected finding was the lack of a clear correlation between screen time and quiz scores. Initially, we hypothesized that more screen time would equate to better performance, assuming that increased exposure to media might enhance information retention. This assumption was not supported by the data, possibly due to the varying quality and depth of content consumed during screen time—a factor that was not explicitly controlled for in the study.

If this project were to be continued, several improvements could be implemented to refine the methodology and enhance the reliability of the results. A key limitation of this study was the small sample size, which led to higher

variability in the data and limited the precision of our conclusions. Collecting a larger dataset would reduce standard deviations and improve the statistical power of the analysis, enabling more robust and generalizable findings. Additionally, feedback from participants highlighted several areas for improvement in the survey design. For instance, participants suggested adding clearer instructions at the beginning of the timed quiz to reduce confusion. They also recommended extending the time limits for the quiz, as some felt the current limits restricted their ability to fully engage with the questions. Moreover, reflection questions could be broken down into smaller, more focused sub-questions, ensuring that participants address each aspect thoroughly. Addressing these issues would improve the overall quality of the data collected, providing deeper insights into the effects of media consumption on cognitive processes. Future iterations of this research could also expand the scope to examine other variables, such as the impact of interruptions on concentration and reflection. For example, studying the influence of digital notifications or multitasking behaviors on information retention and cognitive engagement could provide a more comprehensive understanding of how modern media environments shape cognitive outcomes. Furthermore, developing more targeted survey questions designed to probe specific cognitive processes, such as critical thinking or memory recall, would enhance the study's ability to identify nuanced patterns of behavior.

This study raises several important ethical considerations. First, voluntary participation and the right to withdraw were emphasized throughout the study. Participants were informed that they could withdraw at any point without facing any penalties. Privacy concerns were also addressed by ensuring that all responses were anonymized, protecting participants' identities and personal data. While the study posed minimal risks to participants, we did acknowledge that some might experience mild psychological burden or frustration when answering challenging questions. To mitigate this, participants were informed that they could skip questions if they felt uncomfortable. Lastly, participant support and resources were provided, ensuring that any concerns raised during the study were addressed in advance, with appropriate support offered to participants if needed.

This study was conducted with careful attention to ethical standards to ensure the well-being and autonomy of participants. Voluntary participation was emphasized throughout the study, with all participants informed of their right to withdraw at any time without facing any penalties. Additionally, privacy concerns were addressed by anonymizing all survey responses to protect participants' identities and personal data. While the risks associated with this study were minimal, we recognized the potential for mild psychological discomfort or frustration when participants faced challenging questions. To mitigate this, participants were explicitly informed that they could skip any questions they found uncomfortable or burdensome. Furthermore, support resources were made available to participants, ensuring that any concerns raised during the study were addressed promptly and appropriately.

In terms of future exploration, this study open the door to numerous opportunities for future exploration. For instance, investigating the effects of interruptions—such as notifications, advertisements, or the need to multitask—on cognitive processes like concentration, reflection, and retention could offer valuable insights into the challenges of modern media consumption. Additionally, examining the long-term cognitive impacts of different media consumption habits, such as habitual scrolling versus sustained reading, could provide a more comprehensive understanding of their implications for learning and memory. These findings also raise important questions about the design of digital platforms and their impact on cognitive well-being. Platforms that prioritize fragmented, scroll-based content may not be conducive to effective learning or meaningful reflection. By continuing this line of research, we aim to inform changes that encourage more thoughtful and deliberate media consumption, ultimately contributing to improved cognitive performance and well-being in the digital age.

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