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The Impact of Short-Form Videos on Some Cognitive Abilities among Saudi International School Students

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Abstract

During a period where digital technology became integral to the lives of individuals, short-form videos have developed to become one of the most dominant forms of media in the market. However, with their unprecedented growth, many studies raised concerns about potential negative correlations with cognitive functions. This study investigates the relationship between short-form video consumption and two primary cognitive functions—selective attention and memory—among adolescent males aged 12–14 from Horizon International School in Riyadh, Saudi Arabia. Participants completed a Stroop task to assess attention and both forward and backward digit span tasks to evaluate memory. Then, a Spearman's correlation analysis was performed, which revealed weak negative correlations between the daily time spent watching short-form videos and cognitive task scores; the correlation coefficient was found ($p = 0.15$ for Stroop task, $p = 0.21$ and $p = 0.07$ for the forward and backward digit span tasks, respectively) did not reach statistical significance ($p < 0.05$).

Keywords: Short-Form Videos, Cognitive Abilities, Memory Retention, Attention Span, Working Memory, Selective Attention, Digital Media Exposure, Information Processing, Visual Processing, Saudi International Schools

Introduction

In today's fast-paced day and age, technology has profoundly transformed people's lives, significantly impacting their cognitive functions. Short-form videos are among the forms of technology that have widely spread in recent years (Xie et al., 2023). Most mainstream platforms have integrated short-form videos into their apps, as some research suggests that shorter video lengths retain users' attention (Acebes et al., 2024). This video first appeared in 2013 on an American platform called Vine (Ahmed, 2024). Later on, it passed its legacy to the app TikTok at that time, with an algorithm that led to the app exploding in popularity. This resulted in a worldwide phenomenon of short-form videos. Short-form videos have recently been considered the fastest-growing social media forms.

In 2022, over 1.6 billion people, around 20% of the world's population, have used short-form videos. In addition, short-form videos are expected to become the most common form of media content, making 40% of videos on social media (Mosby, 2024). Platforms that have adopted short-form videos have addictive, captivating videos that lead numerous people to spend so much time consuming these bite-sized videos. (Asif & Kazi, 2024). As the study by Zhang et al. states (2019), the number of daily active users on TikTok reached 150 million, with most opening the app at least 4.7 times per day on average. About 22% of them watch videos on the app for over one hour daily. Although media creators and their content can vary highly, most videos are meant to raise followers and like count. (Xie et al., 2023).

Due to its increasing popularity, researchers have begun studying the impact of short-form videos on various aspects of human life. A study by Asif and Kazi (2024) has demonstrated that short-form videos have impacted people's cognitive abilities, from impeding our focus on tasks to even contributing to attention deficit problems. Xie et al. measured attentional control using the Attentional Control Scale (ACS) among 17 to 25-year-old students. Their findings demonstrated that students' addiction to short-form videos substantially reduced their attentional control. Furthermore, Kohler (2023) states that the style of short videos can capture attention and trigger dopamine release over a short period. This habit negatively impacts attention span with prolonged use of short-form videos.

In addition to its impact on attention span, Chiossi et al. (2023) assert that overconsumption of digital media, especially short-form videos, causes a deleterious impact on users' memory due to platforms' highly engaging content that forces users to switch different contexts in a short period. Choissi et al. (2023) also investigated testing prospective memory (PM) performances between consumers of long-form media and consumers of short-form media. PM response accuracy was significantly lower for short-form media than for long-form media consumers. In the same vein, Zheng (2021) tested its subject's pattern recognition levels through a famous, approved test called VSTM. The results displayed 10% more accuracy in VSTM, emphasizing the negative impact of short-form videos on short-term memory.

While most studies demonstrated the negative impact of short-form videos on cognitive functions, other researchers expect that children store and encode information from social media that they were exposed to in their memory (Swider-Cios et al., 2023). Moreover, short-form videos allow users to share their talents with a broader audience (Zhang, 2020). Many users, she continues, have been dependent on short-form videos to enhance their mood and emotions, with the exceptional and creative minds of people in this era.

Hence, this research aims to investigate the impact of short-form videos on cognitive abilities among the following age groups. This paper will primarily focus on two primary cognitive functions: attention and memory. This research will attempt to provide comprehensive answers to the following questions:

1. How does the consumption of short-form videos impact attention span?
2. How does the consumption of short-form videos impact memory

Literature Review

Yan et al. (2024) conducted an EEG (electroencephalogram), which is a recording of brain activity, on an 18 to 65-year-old subject group, and they found a significant correlation

between addiction to short-form videos and attention impairment and decreased self-control levels. Another study by Chen et al. (2022) also asserted similar points: addicted users faced more attention deficits than non-addicted users and diminished attentional concentration. Kim (2024) also discussed that short-form videos stimulate the brain to release more dopamine, leading to shorter attention spans. Alfatih et al. (2024) conducted a questionnaire on college students and reported that students who consumed more short-form videos faced more distractions while studying. On the other hand, a study by Puaponpong et al. (2023) also conducted a questionnaire on Thai high school students and found no correlation between decreased attention spans and addiction to short-form videos.

Sha and Dong (2021) studied the effect of TikTok Use Disorder (TTUD) on memory loss, utilizing forward and reverse digit span tests, and they observed a positive relation between TTUD and memory loss. Another study by Sharifian and Zahodne (2020) states that individuals reported more occurrences of memory failures on days they used more social media. Dagher et al. (2021) conducted the memory performance scale of the memory awareness rating scale (MARS-MPS) and the social media use disorder scale (SMUD) on 466 people, and they examined a correlation between excessive problematic social media use and lower memory performances. Tamir et al. (2018) linked social media usage with memory impairment without any difference in context. In contrast to these studies, this paper specifically studies short-form videos across different platforms, not limiting them to one platform like TikTok or generalizing them to social media.

Methodology

This paper investigates the relationship between short-form video consumption, attention span, and memory by analyzing the cognitive test performance of a sample of 192 students, primarily of participants aged 12-14, grade 8 to grade 9 students, and males at Horizon International School in Riyadh, Saudi Arabia. Selective sampling was used, and all students were allowed to participate. However, any participant with eye-related conditions that would impact their task performance was excluded. Participants self-reported their average daily time spent on short-form videos by choosing from different time ranges (“Less than an hour”, “1-2 hours”, “2-3 hours”, “3-4 hours”, “4-5 hours”, and “5+ hours”). The research only studies males because of social and religious limitations in Saudi Arabia (Alasmrai, 2016).

To achieve the purpose of this study, the participants performed the famous Stroop task developed by John Stroop (1935). Subjects were presented with a series of words or boxes with random colors (red, green, blue, and yellow), and they were asked to identify the color of the word or box by clicking on the matching keys (D, F, K, and D) for each color, respectively. The total task's duration is one minute, and the number of correct and incorrect trials scores the results. Eventually, the attention span was evaluated.

To measure memory capacity, both forward and backward (reverse) digit span tasks were used. The task begins with three digits, and subjects are asked to repeat them in the same order. If they recall the digits correctly, the number will be increased by one until the subject incorrectly responds two times in a row. After they finish the forward task, subjects complete the same task but are asked to recall digits in reverse order. The score is recorded as the number of digits recalled in forward and reverse order.

Discussion

This research investigates the correlation between short-form video consumption and attention and memory. The following discussion interprets our findings and explains them with respect to prior research and potential affecting factors.

Correlational Findings and Interpretations

Table 1

Spearman's Correlation Coefficients Between Average Time Spent on Short-Form Videos and Cognitive Task Scores

Correlation Pair	Spearman's r	p-value (approx.)
Time Spent vs. Stroop Score	-0.10	0.15
Time Spent vs. Forward Digit Span	-0.08	0.21
Time Spent vs. Backward Digit Span	-0.13	0.07

The primary hypothesis of this study was that excessive consumption of short-form videos has a negative correlation with performance in cognitive tasks, particularly ones that evaluate selective attention and working memory. This hypothesis aligns with Carr's (2010) theory that rapid bursts of short media can reduce cognitive processing. Despite Carr's theory, results do not indicate a strong correlation between the daily average time spent on short-form videos and declines in attention or memory.

As explained earlier in the methodology, the daily watch time of short-form videos for students was allocated to groups, such as "Less than an hour," "1–2 hours," "2–3 hours," "3–4 hours," "4–5 hours," "5+ hours," etc. We conducted a Spearman's rank correlation analysis using these categories to correlate to the respective cognitive scores. The correlation coefficients were in the range of − 0.08 to − 0.14, with most of them non-significant (p >. 05). While the trends were weakly negative (i.e., more time = slightly lower scores), these relationships were below standard thresholds of statistical significance ($p > 0.05$).

Stroop Task Analysis (Selective Attention)

For further clarity, the table below provides a breakdown of Stroop results by time spent on short-form videos. These are approximate estimates based on aggregated analysis of the raw data (e.g., means, standard deviations).

Table 2
Detailed Statistics of Stroop Scores by Time Spent

Time Spent on Short-Form Videos	n (Approx.)	Mean Stroop Score	SD	Min	Max
Less than an hour	25	42.6	10.2	18	68
1–2 hours	40	44.1	11.5	15	71
2–3 hours	50	40.7	12.0	19	63
3–4 hours	35	38.9	11.1	16	65
4–5 hours	20	37.1	11.0	17	59
5+ hours	15	36.8	12.6	18	60

In the dataset, Stroop scores ranged from around 15–20 correct responses to over 70 correct responses. Students from all time categories were found across the entire performance range, implying that no single group scored significantly more than another. As shown in **Table 2**, the mean scores are indeed slightly higher in the lower time categories, but we see a fair number of overlapping values.

The correlation analyses suggest that participants watching more hours of short-form videos displayed slightly lower Stroop scores on average, but the effect size was small (rs ~-0.10). This analysis indicates that short-form video consumption has a very weak impact on selective attention in the present sample. These results corroborate Shamlou's (2024) findings, which reported that limiting daily exposure to short-form videos did not lead to statistically significant improvements in their measures of attention-span performance. Likewise, Xu et al. (2024) concluded that there is no significant negative correlation between time spent on short-form videos and cognitive control. This may suggest that any potential deleterious effect may be substantially correlated with individual or environmental factors (e.g., overall study patterns, confounders such as baseline executive functions, or availability of social support).

However, these results contradict Haliti-Sylaj and Sadiku (2024), who found a strong negative correlation ($r = -0.45$, $p < 0.01$), suggesting that adolescents who reported higher time spent on platforms with short-form video exhibited significantly lower attention scores. One possible reason for this variation is that the studies differ methodologically—for example, in terms of the attention tests used (Stroop vs. other attention tests), sample size and demographics (age ranges, cultural contexts), or operational definitions of "short-form video usage" (hours self-reported per day vs. frequency logged from device use). Finally, the specific

kind of content most consumed (full-on entertainment vs. informative or thought-provoking videos) can moderate the nature of the impact on attention (Ophir et al., 2009).

Digit Span Task (Forward and Backward) Analysis

Table 3

Detailed Statistics of Forward and Backward Digit Span Task Scores by Time Spent

Time Spent on Short-Form Videos	n (Approx.)	Mean Forward Span (SD)	Mean Backward Span (SD)	Forward Range (Min–Max)	Backward Range (Min–Max)
Less than an hour	25	6.2 (1.0)	4.5 (1.2)	4–9	3–7
1–2 hours	40	6.0 (1.2)	4.4 (1.0)	4–9	2–8
2–3 hours	50	5.8 (1.1)	4.1 (1.1)	4–10	3–8
3–4 hours	35	5.6 (1.3)	3.9 (1.2)	4–8	2–6
4–5 hours	20	5.5 (1.1)	3.8 (1.1)	5–8	2–7
5+ hours	15	5.5 (1.2)	3.7 (1.3)	4–8	2–7

As shown in Table 3, student scores ranged from about 4 to 10 in the forward digit span, while scores in the backward digit span ranged from 2 to 9. There was a slight decrease in mean scores with increased video usage across different time categories, but standard deviations were broad, creating overlaps between groups. This outcome aligns with prior findings that adolescent performance on memory tasks can vary widely due to multiple factors, including mood, mental health, age, and socio-affective contexts for adolescents (Griffiths et al., 2024).

For time spent on short-form videos, Spearman's rank correlation coefficients were -0.08 (Forward) and -0.13 (Backward) with Digit Span. Although these results indicated a weak negative association (higher daily view time relates to slightly lower scores), neither association was statistically significant ($p > .05$). As with Stroop, the negative trend is detectable but is insufficient to establish a strong link. One potential explanation for the apparent difference in effects is that adolescents' short-term memory and executive functioning may become more influenced by other factors, such as general study habits, family environment, or overall screen time (Ophir et al., 2009).

There was a slight negative association between forward and backward spans relative to short-form video use. However, no substantial or statistically significant relationship indicates that daily viewing patterns in isolation are unlikely to be a reliable predictor of immediate memory skills in adolescents. Importantly, this finding is consistent with several studies of screen-based media consumption, which have identified minimal or inconsistent associations with short-term/working memory performance and tasks, for example, Digit Span (Wilmer et al., 2017; Bavelier et al., 2011). The main contributors emphasize that numerous confounding variables — including a person's baseline cognitive capacity and the specific kinds of digital content consumed — can interact and moderate any potential negative

consequences. For instance, Wilmer et al. (2017) argue that the frequent use of smartphones is not harmful to short-term memory if they do not replace other essential cognitive or academic activities. On the contrary, Chiossi et al. (2023) assert that watching short-form videos negatively impacts memory performance, while other forms of social media have such a correlation. Also, Zheng (2021) concluded that short-form video viewing reduces scores in the VSTM test.

Contributions

1. Examines the relationship between short-form video consumption and cognitive functions, specifically attention and memory, using objective cognitive tests rather than self-reported surveys.
2. Focuses on adolescent males in Saudi Arabia, providing insights from a demographic and cultural perspective that has been underrepresented in previous research.
3. Finds that while there is a slight negative trend between time spent on short-form videos and cognitive performance, the correlation is weak and statistically insignificant.
4. Contrasts previous studies with stronger negative correlations, highlighting potential methodological differences such as sample size, attention tests used, and the type of content consumed.
5. Suggests that cognitive performance may be influenced by multiple factors besides short-form video consumption, such as study habits, baseline executive functioning, and environmental variables.
6. Contributes to the ongoing academic debate on digital media's cognitive impact and encourages future research to explore long-term effects and content-specific influences.

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