



IMPACT OF WATCHING TIKTOK ON MEMORY AND ATTENTION IN ADOLESCENTS

Social Science

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ABSTRACT

Due to the recent rise in popularity of short-form media, especially amongst adolescents, there is little research about its possible effects and implications. This experiment aims to explore the impact of watching TikTok, in comparison to reading, on the attention capability and memory capacity of adolescent participants. In this experiment, participants watched TikTok or read a book for 7 minutes and were then required to complete sub-tasks from The Addenbrooke's Cognitive Examination Version 3 (ACE-III) focused on assessing attention and memory. Ten participants (8 female and 2 male), aged between 15 and 18 years old, and who were all fluent in English, completed the assessments. Participants had lower scores on the memory tasks after exposure to the TikTok condition, but scores remained the same on attention tasks in both conditions. We found that participants expressed more difficulty answering questions and required more time to think of their answer after being exposed to the TikTok condition. This study found that watching TikTok can have a detrimental effect on the memory and attention of adolescent participants. Participants typically scored lower on the subtasks from the ACE-III examination after the TikTok condition than the reading condition and expressed more difficulty in answering questions during the TikTok condition. They required more time to think and were less sure of their answers. Further research should be carried out with larger sample size to determine the long-term effects of short-form media and test these conditions with more participants to obtain more accurate results.

KEYWORDS

Adolescent, TikTok, short-form media, attention, memory

INTRODUCTION

Short-Form Media

In recent years, TikTok and other short-form media platforms have become increasingly popular around the world (Dayrus, 2002). With the average United Kingdom (UK) teenager spending 1 hour and 54 minutes on TikTok daily (Bossen & Kottasz, 2020), it is becoming an increasing concern how all this time-consuming fast-paced, high gratification media is affecting adolescents. Studies have looked at the psychological effect of consuming such media, indicating that increased depression, anxiety and psychological distress are seen in adolescents who are active users of social media (Keles, 2020). However, what is yet unexplored is the effect of specifically short-form media on adolescents' short term and long-term attention and memory. Short form media such as TikTok, Instagram reels, and YouTube Shorts are all unique in some ways but have some common features. All of them show shorter videos, usually between 15 seconds and 1 minute in length, although it is also possible to make longer or shorter videos. They all have the option for viewers to interact with the videos by liking, sharing, or commenting on the videos, and by reading other viewers' comments. Finally, all the short-form media platforms have an algorithm which caters the videos to the preferences of the individual viewer based on their interactions with videos.

Attention And Memory

Attention is defined as the notice taken of someone or something. Memory is the faculty by which the mind stores and remembers information. Attention and memory are crucial cognitive functions in everyday life. Attention and memory are specifically vital in school as attention allows teenagers to focus on different tasks and information while memory allows for its long-term and short-term retention.

The Addenbrooke's Cognitive Examination Version 3 (ACE-III) is a test that covers all cognitive domains (Beishon, 2019). It is generally used as a diagnostic tool for dementia and cognitive impairment. It requires participants to perform simple tasks relating to attention, memory, language, and visuospatial abilities. Here, the examination is being used on young cognitively able adolescents so it is expected that they should be able to perform the tasks. Rather than focusing on the overall scores, the results will look more closely for difficulty participants had in completing the tasks.

Importance Of Attention And Memory In Adolescence

Attention and memory are important for human functioning at all ages. They are especially used by adolescents worldwide due to the rigorous demands of school and examinations. Since 95% of teenagers use social media (Office of the Surgeon General (2023)), which often consists of short form media, it is important to consider how short form media consumption affects teenagers' attention and memory. As social media and especially short-form media become more popular, effects

on memory and attention will be more widespread, affecting the population overall. In recent years, attention spans have decreased (Mark (2023)). Although this decrease is not solely a result of increased short-form media consumption, considering how this change in media consumption affects the population overall is vital as amendments to current education and working systems may be necessary.

Aim

This experiment aims to explore the impact of watching TikTok, in comparison to reading on the attention capability and memory capacity of adolescent participants.

Hypotheses

We hypothesize that watching TikTok will have a negative impact on memory capacity and reduce accuracy in recall tasks

We hypothesize that participants will make more errors on tasks and be slower at completing tasks after watching TikTok than in the reading condition

We hypothesize that there will be a significant difference in participants' accuracy in tasks and speed completion in the TikTok versus the reading condition

Objectives

Using the subtasks from the Addenbrooke's Cognitive Exam III, we will evaluate the impact of watching TikTok, compared to reading, on attention and memory in adolescent participants.

This experiment used the ACE cognitive subtasks to test adolescent participants' attention and short-term memory after consuming short-form media compared to reading a book. The objective is to compare participants' performance in similar tasks after the two different stimuli and explore any differences in the results of the task.

METHOD

Participants

Initially, participants were recruited with the proximity sampling method. The researcher invited them directly to participate due to their age group and use of social media. Participants were then recruited using a snowball sampling method, with current participants recommending the study to others.

Participants were recruited based on several inclusion criteria: age, ideally between 14 and 19 years old to target adolescents; fluent in English, and of either gender, aiming to have a few representatives of both genders. A total of 10 participants were recruited.

A sample size of 10 participants was deemed appropriate for this study as its aim was to gain initial insights on the effects of short-form media on adolescent's attention spans rather than to generalize results to a larger population. The findings of this experiment serve as a starting point for future research on a larger scale, aiming to further explore the short-form media and all its effects.

Stimuli

In both conditions participants were exposed to the stimuli (either short-form videos or reading material for seven minutes.

In the first condition, participants were given seven minutes of precompiled TikTok to watch. The videos were meant to replicate a general For You Page and used popular videos with trending sounds and well-known creators. The short-form videos used in this experiment were TikTok that were precompiled. This was done to keep the stimulus the same between participants because the For You Page is tailored to each viewer's individual content preferences. Therefore, the type of videos viewed by different participants may be different and elicit different responses.

In the second round of testing, all participants were given the same book to read. The book was "The Christmas Wish" by Lindsey Kelk. This novel was chosen as the language was not very challenging for the participants and it was meant to simulate a novel they would read recreationally. The language of the novel was not particularly complex and would be easily comprehensible to participants regardless of their reading abilities. Participants were instructed to start reading as much of the novel as possible in the given time.

ACE-III Assessment

The ACE test has been adapted for this experiment to focus only on questions relevant to attention and memory. Items focusing on fluency, language and visuospatial abilities were excluded as they were not relevant to the focus of this study. This study included four tasks from the ACE, two assessing memory and two focused on attention. The first task required participants to remember 3 words and repeat them back to the researcher at the end of the assessment, then the second task required participants to memorise and recall an address. The attention tasks required participants to spell words backwards and then to countdown from 100 in increments of seven.

As the ACE test is generally used for patients suspected of having dementia or other cognitive impairments, it was expected that participants should be able to perform the tasks successfully as they are cognitively healthy young adults. Therefore, the analysis of the tasks focused more on the difficulty participants may have in completing the tasks and the time it took them to self-correct their answers or think about the questions rather than overall accuracy.

Analysis Plan

The results will be explored using descriptive statistics to compare the mean scores for each task, per stimuli condition and across each participant. Percentages of the total scores available will be used for comparative purposes as each task has a different total score available. The TikTok and reading condition will be compared across participants and for each of the stimuli.

RESULTS

Overview Of Participants

The participants of this experiment were all adolescents between 15 and 18 years old who were between 8th grade and 12th grade. There were 10 participants, 8 females and 2 males, who were all fluent in English. A full overview of study participants is available in Table 1.

Table – 1 Overview Of Study Participants

Participant ID number	Age	Grade	Gender	Average daily short-form media usage (minutes)
1	14	8	Female	50
2	16	9	Male	70
3	18	12	Female	154
4	15	8	Female	216
5	17	8	Female	87
6	16	9	Male	226
7	15	8	Female	88
8	15	8	Female	58

9	15	9	Female	260
10	16	10	female	90

Scores On The ACE Per Condition

Participants completed a total of 4 tasks, with 2 focusing on memory and 2 on attention. Each task had different scoring methods, so the percentage of questions answered correctly is provided to enable comparison across the tasks and conditions. All participants were exposed to both stimuli for 7 minutes and completed all attention and memory tasks in a repeated measures study design. For a full overview of scores in each stimulus condition and for each task please see Table 2.

Differences In Scores Across Conditionsart

We found that participants had a lower score on the memory tasks when in the Tik Tok condition (mean 93% and 53%), than in comparison to when they completed these same tasks after the reading condition (mean = 97% and 81%). There was a large improvement in performance in Memory task 2 as the mean percentage of questions answered correctly increased from 53% to 81%.

We found that the mean performance in both attention tasks remained the same after participants were exposed to Tik Tok and reading conditions (mean = 88% and 90%). There was an overall mean improvement in performance in the complete test of 2.1 points or 12%.

Task Errors

Most errors by participants occurred in Memory task 2: address, with many participants expressing difficulty in this task as the address format in the ACE-III is British and not aligned with how their country formats addresses. However, participants performed better after the reading condition than after Tik Tok (2 points or a 28% improvement), possibly as all participants completed the reading task second and learned the format.

However, we expected all participants to get full marks on each test, as the ACE-III is generally used to aid in diagnosing cognitive impairments, but they did not. We think this may be due to lack of attention to the stimuli. Some participants expressed that they were not engaged by the book and were therefore likely less focused. Furthermore, the TikTok videos were pre-compiled, to ensure consistency in the stimuli, therefore making them less engaging to participants.

We found that participants expressed more difficulty answering questions after being exposed to the Tik Tok condition. Overall, participants required more time to think and answer the questions in the Tik Tok condition, expressing difficulty and seeming less sure of their responses than after the reading condition.

DISCUSSION

The key finding of this experiment was that short-form content can have an impact on short-term memory and attention in adolescents. The study found that participants scored on average 12% higher on the adapted ACE test after reading a book than watching TikTok. There was also a significant increase (28%) in the participants' abilities to remember an address after the reading condition compared to the TikTok condition. In general, most participants' scores remained the same or improved after they completed the reading condition. This indicates that watching short-form content has a detrimental impact on adolescents' attention and memory. Furthermore, participants were slower and had more difficulty in answering questions after the TikTok stimulus than the reading stimulus. Although they may have answered the questions correctly, the researcher noticed that they did so with more difficulty. This could also be indicative of the detrimental effect of TikTok on attention in adolescents showing that it could decrease attention span due to its short-form nature, however further research would be necessary to draw accurate conclusions.

Impact Of Stimuli On Attention

One key issue with measuring attention is that the stimuli can have an impact upon the level of engagement from participants. In the current study, participants reported that they were disinterested in the stimuli and as a result this impacted their ability to focus on the assessment questions. This then resulted in lower scores on attention-based tasks, because of disinterest rather than indicative of attention-deficits.

Attention is a variable and complex concept to measure, with participants' subject to distraction and impaired focus, and stimuli

which are not holding their attention can be problematic. Measuring attention using question-based tasks can be subjective in nature as participants' engagement with the questions may also affect attention, in addition to the stimuli. One way to improve the objectivity of attention assessment is to include eye-tracking measures, offering quantifiable insights into the amount of time and focus participants give to a particular stimulus (Simmonds, (2020)).

Impact Of Assessment In English

Another key issue showcased in this study is the Anglo Centricity of the testing materials. In this study, the questions taken from the ACE-III test were aimed at British participants, giving addresses in a format commonly used in Britain.

This is a feature common in many other cognitive tests such as the Montreal Cognitive Assessment (MoCA), another English cognitive test like the ACE-III (Harrison (2020)). This may impact the accuracy of scores in the current study as the participants who scored 70% on this task were participants for whom English is their second language. Even though all participants are fluent in English, they each speak two or more languages, and the cultural aspects of these tests, such as the formatting of an address or exposure to multiple similar addresses, may have a significant impact on the accuracy of their scores. These limitations of the evaluations may have influenced the participants' accuracy rather than issues with their memory, although it is unclear if this will have an impact on the conclusions that can be drawn from this study.

Strengths And Limitations

A key strength of this study is the use of repeated measures to ensure participants completed both the TikTok and reading condition. Attention and memory are often variable across individuals so including the same participants for both conditions reduced the potential impact of individual differences on the study findings. The sample used for the study was also representative of the core user group of TikTok (Bossen & Kottasz, 2020), adding to the ecological validity of the study by ensuring the findings are applicable to those using short form media regularly.

However, a limitation of this study is the lack of ecological validity in how the short-form media was presented to participants. To ensure consistent exposure for each participant a pre-compiled seven-minute video of TikTok, precompiling the videos also limits the stimuli's ecological validity because TikTok and other short-form video services are much more interactive. They offer the possibility of reading and reacting to comments relating to each video as well as interacting with different creators. The real fashion in which viewers use the apps is not as linear as simply watching the videos on their For You Page.

A second strength is the use of standardized measures of cognition through sub-tasks from the widely validated ACE-III. The use of tasks from an existing assessment tool enables us to compare the scores to other study samples in the future and ensures that cognition was measured in a standardized way using tasks that have been found to be both reliable and valid (Hodges, 2017).

A second limitation of this study is that due to its exploratory nature a small sample size was used. A smaller sample size was used to explore if any initial effect of TikTok versus reading was found on the memory and attention of adolescents, before considering increasing the sample size for future research.

Limitation of the study. However, precompiling the videos also limits the stimuli because TikTok and other short-form video services are much more interactive. They offer the possibility of reading and reacting to comments relating to each video as well as interacting with different creators. The real fashion in which viewers use the apps is not as linear as simply watching the videos on their For You Page.

Future Research

This experiment eventually gives rise to future research, specifically on the long-term effect of short-form media on teenage audiences. This experiment only tested the effect of short-form media in a short time period- immediately before and after consuming the media. However, it would be relevant to consider in future work how the use of short-form media affects teenagers longitudinally, and whether the amount of time regularly spent watching these short videos also has an impact on participants' attention and memory.

A smaller sample size was used for this study to investigate if any initial effect could be found, as the results indicate a potential effect, we recommend that future research is conducted with a larger sample size. Increasing the number of participants will enable us to explore if this effect is more widespread and the generalisability of our initial findings to the wider population.

One of the limitations of this study could be addressed in future research through opting for live viewing of Tik Toks rather than pre-recorded short-form videos. This would enable participants to engage with the videos in a more ecologically valid manner, with the opportunity to select their own viewing and use the comments feature. Future research can then explore how self-section of short-form videos affects attention and memory in a way that is more closely aligned with people's actual use of the app.

CONCLUSION

Using an adapted version of the Addenbrooke's Cognitive Examination Version 3 test, this study investigated the short-term effects of consuming short-form content on adolescents aged 14-18. It found that most of the errors in the test were in the address condition where participants expressed more difficulty answering questions after being exposed to the TikTok condition. Participants generally required more time to think and answer the questions in the TikTok condition and were less sure of their responses than in the reading condition.

These findings show through various subtasks focusing on attention and memory, that short-form content can have a detrimental effect on the attention and memory of adolescents. This brings into question the long-term effect of watching short-form media on attention and memory. There should be further studies on a larger scale with a larger sample size to reliably determine the effects of short-form content on attention and memory. Future experiments should also use different stimuli and make the TikTok condition more realistic and interactive.

Table – 2 Scores On Memory And Attention Tasks For Each Condition

Participant	Memory Task 1: 3 Words Total score = 3 (% correct)		Memory Task 2: Address Total Score = 7 (% correct)		Attention Task 3: Maths Total score = 5 (% correct)		Attention Task 4: Words backwards Total score = 2 (% correct)		Total Score = 17 (% correct)	
	Tik Tok	Reading	Tik Tok	Reading	TikTok	Reading	TikTok	Reading	TikTok	Reading
1	2 (66)	3 (100)	4 (57)	6 (86)	5 (100)	5 (100)	2 (100)	2 (100)	13 (76)	16 (94)
2	3 (100)	3 (100)	3 (43)	6 (86)	5 (100)	4 (80)	2 (100)	1 (50)	13 (76)	14 (82)
3	3 (100)	3 (100)	3 (43)	7 (100)	5 (100)	5 (100)	1 (50)	2 (100)	12 (71)	17 (100)
4	3 (100)	3 (100)	3 (43)	7 (100)	3 (60)	5 (100)	2 (100)	1 (50)	11 (65)	16 (94)
5	2 (66)	3 (100)	5 (71)	2 (29)	3 (60)	4 (80)	2 (100)	2 (100)	12 (71)	11 (65)
6	3 (100)	2 (66)	2 (29)	5 (71)	5 (100)	5 (100)	2 (100)	2 (100)	12 (71)	14 (82)
7	3 (100)	3 (100)	3 (43)	7 (100)	4 (80)	2 (40)	2 (100)	2 (100)	12 (71)	14 (82)
8	3 (100)	3 (100)	7 (100)	7 (100)	5 (100)	5 (100)	2 (100)	2 (100)	17 (100)	17 (100)
9	3 (100)	3 (100)	6 (86)	6 (100)	4 (80)	4 (80)	2 (100)	2 (100)	15 (88)	15 (88)
10	3 (100)	3 (100)	1 (14)	4 (57)	5 (100)	5 (100)	1 (50)	2 (100)	10 (59)	14 (82)
Mean	2.8 (93)	2.9 (97)	3.7 (53)	5.7 (81)	4.4 (88)	4.4 (88)	1.8 (90)	1.8 (90)	12.7 (75)	14.8 (87)

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