

Short-form Media's Impact on Short-term Memory

XXX

XXX High School

AP Research

XXX

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Introduction

The swift expansion of social media has encouraged students and academia alike to explore its impact on cognitive processes and academic performance in detail. One significant issue is its immense presence through short-form media, including social platforms such as Instagram and TikTok, offering bite-sized, interactive, and information-intensive messages with a view towards commanding and holding onto user attention. Short-form media is broadly characterized as digital information lasting less than one minute, designed for quick consumption, and consisting of video clips, reels, and stories offering information and amusement in an immediate manner. Empirical studies have postulated that multitasking in media consumption can hinder students' ability to encode and recall information (Nelson & Miller, 2020; Uncapher et al., 2015). In addition, despite numerous studies having examined its impact, many have failed to study its impact on recall, and therefore, a lack of such studies continues (Asif & Kazi, 2024). With computer-mediating communications becoming ever-present, its impact must be considered in terms of its impact on cognitive development and academic performance. By shedding light on specific processes through which recall of information is impacted through short-form media, such studies accentuate the imperative for interventions geared towards effective study habits and academic achievement in students. Short-form media is defined as digital content typically under one minute in length, often video-based, and designed for rapid consumption and maximum engagement. Platforms such as TikTok, Instagram Reels, and YouTube Shorts are prime examples, offering continuous algorithm-driven content that encourages prolonged use through fast-paced context changes and visual appeal (Asif & Kazi, 2024).

Despite numerous anecdotal reports suggesting students have difficulty staying focused in part due to constant disruptions through social media, little empirical work has examined the impact of short-form media use on recall capabilities. In an attempt to bridge that research divide, this review seeks to answer a key question: "Does short-form social media exposure in studying immediately impact short-term memory recall performance in adolescents?" Drawing on current work in media multitasking, cognitive overload, and specific impacts of short-form media, this review will illustrate how social media use during academic study sessions can have a detrimental impact on memory consolidation and academic performance in general. Familiarity with these relationships will allow students, parents, and instructors to develop more effective approaches to learning that counteract potential sources of distraction.

Section 1: Media Multitasking and Cognitive Overload

Media multitasking refers to the simultaneous engagement with two or more streams of digital information, such as scrolling through social media while doing homework or listening to music while watching videos (Uncapher et al., 2015). Cognitive overload occurs when the brain is overwhelmed with more stimuli than it can process efficiently. This leads to reduced attention, impaired decision-making, and weakened memory encoding due to limited working memory resources (Cain et al., 2016). The widespread use of social media has facilitated an intensification in media multitasking, in terms of concurrent use of several sources of digital information at a time. Empirical studies reveal that students who regularly practice media multitasking have reduced performance in working memory tests, an important function for temporarily holding and manipulating information (Uncapher et al., 2015). Oscillation between academic work and social media messages creates cognitive interference, and in the process,

reduces students' ability to maintain sustained attention to academic work. Increased cognitive overload arises when one's brain is challenged with filtering out distracting stimuli, and in return, such stimuli become amplified (Cain et al., 2016). Teenagers stand at a high risk, considering that they are in a stage of development for executive processes, including inhibitory control and sustained attention (Madore et al., 2020). Exposure to emotionally arousing content in social media can stimulate negative emotion, and such a relation with recall and encoding deficits has been supported (Sharifian & Zahodne, 2020). All these confirm that multitasking negatively impacts cognitive performance and highlight an imperative for interventions in studying in a sustained manner.

Section 2: Short-Form Media and Its Influence

Short-form media stands out with its rapid changing of contexts, visually oriented content, and short periods of user activity. According to studies, such consumption can have a detrimental impact on processes of encoding and retrieval of memories. As argued by Nelson and Miller (2020), students in high school who consumed Instagram during a study period could recall fewer words from a memorized list when compared to students who avoided using the site. In a similar context, the ever-changing character of short-form videos impedes visual short-term memories, making information recall more difficult (Chiossi et al., 2023). Such observations resonate with Asif and Kazi (2024), who link consumption of short-form media with reduced attention span and academic performance difficulty. In addition, Pellegrino et al. (2022) reiterate how infinite scroll ability encourages compulsive use, which in turn reduces cognitive efficiency. Overall, such studies confirm that short-form media is a significant source of distraction that impedes processes of memories and negatively impacts academic performance.

Section 3: Memory Processes in Media Use

Memory consolidation is the cognitive process in which short-term memories are stabilized into long-term memory storage. This process is highly sensitive to interference and requires sustained attention and minimal distractions to be effective (Zureick et al., 2017). An increasing body of academic studies corroborates the claim that social media distractions hinder memory recall. Mendoza et al. (2018) examined social media disruption consequences in a lecture scenario, correlating them with reduced understanding and poor performance in exams. These findings reveal the susceptibility of memory consolidation, whose success hinges on prolonged, focused attention and little external disruption. Invasion of short-form media in studying sessions dissects mental processing, interfering with information streaming between short-term and long-term stores and subsequently jeopardizing academic performance.

Section 4: Media Use and School Performance

Interference in memory consolidation necessarily impacts overall academic performance. Cain et al. (2016) confirmed a strong relation between high-media multitasking and poor performance in tests, suggesting compromised executive controls negatively impact student performance. Pellegrino et al. (2022) argue that excessive use of social media lowers the students' concentration skills and leads to low academic performance and decreased academic persistence. Numerous studies have linked long-term use of brief media during study sessions to impeding students' ability to learn and retain information pertinent to their studies and thereby necessitating measures to counteract technological distractions. Strategies include

implementation of organized study plans and set phone-free study breaks and the use of technology wellness applications to curtail screen time.

Combining the parts and Gap

Cain et al. (2016) and Ophir et al. (2009) report a consistent trend: people who use a wide range of media sources have poorer executive control, which suggests that processes like divided attention and processing demands are inherent mechanisms for memory deficits. Likewise, studies by Sharifian and Zahodne (2020) and Pellegrino et al. (2022) relate negative emotional states, which are caused by excessive use of social media, to incidences of forgetfulness, implying the existence of an affective interference pathway that can exacerbate attention-related deficits.

Although prior studies have extensively explored the effects of media multitasking, social media addiction, and short-form video consumption on attention and working memory (Uncapher & Wagner, 2015; Madore & Wagner, 2020; Ophir, Nass, & Wagner, 2009; Cain et al., 2016), few have directly isolated short-term memory performance following acute short-form video exposure in adolescents. Furthermore, while media multitasking studies suggest general cognitive impairments, the specific impact of brief, algorithm-driven video content—characterized by rapid context switching and reward stimulation—on immediate memory encoding remains underexplored (Chiossi et al., 2023). Such a contradiction requires intense focus on the direct mental implications of the use of brief media forms.

Conclusion and Hypothesis

The existing body of research clearly shows that short-form media consumption during academic tasks impairs memory performance and attention, particularly among adolescents

whose cognitive control systems are still developing. Synthesizing these findings, it becomes evident that the format and timing of media use matter significantly. This literature review highlights two distinct types of media interference during studying:

1. **Simultaneous multitasking** (studying while scrolling), which divides attention in real time and compromises memory encoding.
2. **Intermittent distraction** (studying then scrolling), which interrupts post-study mental consolidation, potentially weakening the transfer of information from short-term to long-term memory.

Both conditions place different costs on working memory: the first causes an added load on working memory during learning, and the second disrupts the brain's natural rehearsal processes during states of increased focus. Since activities on social media sites like TikTok and Instagram significantly affect the media consumption behavior of teenagers, it is crucial to understand the impact of using these sites during or in between study sessions on academic retention rates. Therefore, the research hypothesis is: "Students who use short-form social media will perform worse on short-term memory tests than students who do not." Confirming this hypothesis can better inform students, educators, and parents about the hidden costs of multitasking and help guide more effective, distraction-free learning strategies in an increasingly digital world.

Research Design

For this study, I have developed a controlled, within-subjects experimental design with three distinct test conditions to examine how short-form media consumption impacts memory retention in high school students during study sessions. Due to practical limitations in accessing a fully randomized student base, A sample of 10 participants was selected due to feasibility constraints, as I had to conduct individualized, one-on-one testing sessions, which significantly limited the number of participants that could be run within the available time frame. Although the small sample size restricts generalizability, it allowed for in-depth, controlled data collection that aligned with the study's goals. Each participant will complete all three conditions on separate days. This within-subject design allows each participant to serve as their own control, helping isolate the specific impact of media distraction while controlling for individual differences in baseline memory ability.

Testing Procedures

Each participant will undergo individual testing in a quiet room designed to simulate realistic study conditions. The sessions will be supervised by me to ensure consistency, minimize distractions, and enforce compliance. The three testing conditions are:

- **No Distraction Condition (Control):**

Participants study a 20-word list for 10 minutes in silence, followed immediately by a 3-minute recall test.

- **Intermittent Distraction Condition:**

Participants study the word list for 5 minutes, then immediately take 5 minutes to scroll short-form media (e.g., TikTok or Instagram Reels). Immediately after the media

exposure, they complete the 3-minute recall test. This structure reflects common study habits where students use short-form media during breaks.

- **Continuous Distraction Condition:**

Participants study the word list for 10 minutes while simultaneously scrolling short-form media on their devices. Immediately afterward, they complete the 3-minute recall test.

This condition simulates real-world multitasking during study sessions and allows a full 10-minute exposure window like the other conditions.

These three formats model varying types of distraction: focused studying, studying with breaks, and multitasking—each simulating real-world student behavior. Prior studies examining short-term memory typically use time windows ranging from two to five minutes for free recall tasks (e.g., Nelson & Miller, 2020; Gavett & Horwitz, 2011), making three minutes an appropriate midpoint aligned with established memory research protocols.

Performance Measurement

Because every student completes all conditions, a one-way repeated-measures ANOVA will compare the raw recall totals (0–20 words) across Control, Break-Scrolling, and Simultaneous-Scrolling. Follow-up pairwise comparisons with Bonferroni adjustment will pinpoint any specific differences among the conditions. Reporting the means, standard deviations, effect sizes (partial η^2), and 95 % confidence intervals will quantify how each form of media distraction influences recall.

Materials:

- Word List Recall Test: Three random 20-word lists composed of neutral, concrete, emotionally neutral words appropriate for high school students
- Participant's personal device (smartphone/tablet) to access TikTok, Instagram Reels, or YouTube Shorts
- Headphones to standardize sound exposure
- Stopwatch for timing each segment
- Answer sheets and scoring form

The word lists will be different across sessions to prevent familiarity effects and ensure consistent difficulty across rounds. This method follows best practices from memory research using word list recall to evaluate short-term retention. The word lists used in this study will include 20 neutral words that are commonly understood by high school students and free from cultural or emotional biases. Each list will contain words of similar difficulty and concreteness. This approach ensures that the test reliably measures the memory retention effects of short-form media consumption, isolating it from external factors such as prior knowledge or emotional engagement.

A list of 20 words would be optimal as this number provides a good balance: it is challenging enough to accurately measure memory retention differences yet remains manageable and practical for participants to recall within testing time. Previous scholarly research often uses around 20–30 words to assess short-term episodic memory effectively without causing participant fatigue or compromising recall accuracy (Gavett & Horwitz, 2011). Additionally, existing short-term memory studies involving adolescents often adopt a similar range (Nelson & Miller, 2020; Cain et al., 2016)

Word List

Each word appears in only one list. All items are neutral, concrete nouns drawn from the Toronto Noun Pool; Friendly et al., 1982.

List A – For Control

anchor, rabbit, guitar, cookie, candle, wagon, pillow, monkey, marble, rocket, ladder, barrel, helmet, tiger, forest, ribbon, garden, hammer, window, canyon

List B – For Break

bishop, camel, castle, dagger, eagle, walnut, nickel, oyster, parcel, pitcher, butter, lantern, magnet, lumber, temple, saddle, velvet, meadow, kettle, berry

List C – For Simultaneous

acorn, beacon, coral, dragon, falcon, gopher, igloo, jigsaw, lagoon, manor, nectar, pollen, quartz, raft, salmon, thimble, tulip, vessel, willow, yacht

This structured approach allows direct comparison within individuals, offering insights into how different types of media distraction influence academic memory retention specifically during study conditions. Such individual-level analysis addresses the identified research gap by focusing explicitly on memory performance relevant to studying, rather than broader cognitive abilities. Stimuli were drawn from the Toronto Word Pool (Friendly et al., 1982), a validated

database of neutral, concrete English nouns with extensive psycholinguistic norms. Using this pool ensured that (a) word frequency, length, and imaginability were matched across lists; (b) items carried minimal emotional valence, preventing affect-based recall advantages; and (c) materials remain comparable with prior media-multitasking studies (e.g., Cain et al., 2016; Nelson & Miller, 2020). Each of the three 20-word lists was checked to avoid duplication across lists and to keep mean word length within one letter of one another ($M \approx 6$ letters). This control allows any observed recall differences to be attributed to distraction conditions rather than lexical properties.

Data Collection Tools

Additional materials include:

- Consent forms for participants and parents/guardians
- Scoring sheets and digital spreadsheets for recording responses and scores
- Tablets or smartphones for participants who do not have personal devices
- Headphones/earphones to control audio exposure differences

These tools were selected to ensure systematic and reliable data collection while maintaining consistency across all testing sessions.

Inclusion Criteria

- Participants chosen meet the following criteria:
 1. Enrolled in grade 12 at XXX High School
 2. Regular users of short-form media platforms of their choice (TikTok, Reels, Shorts)
 3. Willingness to participate in study sessions

4. Ability to provide informed consent (parental consent if under 18, see Appendix A)

These criteria ensure that the sample is relevant to the research question while maintaining ethical standards. The focus on regular short-form media users aligns with the study's aim to investigate the effects of a behavior that is already established among participants.

Exclusion Criteria

- Participants have not been chosen if they:
 1. Have diagnosed learning disabilities that significantly affect memory
 2. Report vision or hearing impairments that would interfere with study materials or media consumption
 3. Fail to complete the baseline assessment or consent forms properly
 4. These exclusion criteria help maintain the internal validity of the study by reducing variability due to factors unrelated to short-form media consumption.

Short-Form Media Content

Participants in the media groups will use their personal devices to access their preferred short-form media platforms (TikTok, Instagram Reels, YT Shorts). Content will be drawn from their individual "For You" pages to ensure ecological validity and engagement. This method was chosen because it replicates real-world scenarios where students consume media content that is personally relevant and highly engaging.

The decision to use participants' personal feeds rather than standardized content was influenced by research showing that personalized media content leads to higher engagement and

cognitive load Ophir et al. (2009). By allowing participants to interact with content they find interesting, the study more accurately simulates the cognitive demands of real-world media consumption during study sessions.

Environment:

- One-on-one testing in a quiet, distraction-free private room
- Supervision by the researcher throughout each session
- Headphones used to isolate audio

Standardized instructions and materials for all sessions

- This setup ensures a consistent and controlled environment, reducing confounding variables that might impact memory performance.

Procedure

- The study begins with a baseline assessment to establish participants' natural memory retention capabilities without media distractions:
 - Participants are presented with a list of 20- neutral words for 10 minutes
 - The list is removed, and participants are asked to write down as many words as they can remember in 3 minutes
 - Scores are recorded for later comparison with post-intervention performance

Intermittent Media Group

- All participants move on to Intermittent:
 - 5 minutes study, followed by 5 minutes browsing short-form media

- Immediate 3-minute Word List Recall Test

Continuous Media Group

- All participants move on to Continuous:
 - 10 minutes of study while simultaneously using short-form media
 - Immediate 3-minute Word List Recall Test
 - This condition represents students who multitask with the media throughout their study time

The primary dependent variable was the number of correctly recalled words from the Toronto Word Pool list. Correct recall was operationalized as the exact reproduction of list words, irrespective of order.

Data Recording & Analysis Plan

All responses are recorded on standardized scoring sheets (blank A2 paper). Data entry is performed by me onto excel, maintaining confidentiality and accuracy.

Because every participant tried all three conditions, I used one-way repeated-measures ANOVA. Analysis of Variance checks whether any of the three-condition means are far enough apart to be unlikely by chance. Repeated measures mean the same students were “re-measured” in each condition, so I look at changes within each person instead of comparing different students. The repeated measure ANOVA test provides a comprehensive understanding of how short-form media affects memory retention during study sessions.

Ethical Considerations

- All participants will provide informed consent prior to participation. For students under the age of 18, parental consent will also be obtained (see appendix A). The consent form clearly explains:
 - The study's purpose and procedures
 - Potential risks and benefits
 - The voluntary nature of participation
 - Participants' right to withdraw at any time without penalty
 - Privacy and Confidentiality

All data collected will be anonymized, with identifying information separated from response data. Digital files will be password-protected, and paper records will be stored in secure filing cabinets. Only I will have access to the participants' personal data.

Results

Table 1 shows the word-recall means for the three within-subjects conditions. On average, participants correctly recalled 14–15 words in the control and break-scrolling conditions and ~14 words when they studied while scrolling.

Table 1:

Word Recall Across Condition

Condition	M (Mean)	Standard Deviation	95 % Confidence Interval
No-distraction (control)	14.6	2.87	12.5 – 16.7

Break-scroll (intermittent)	14.3	2.58	12.5 – 16.1
Simultaneous scroll	13.6	2.63	11.7 – 15.5

Repeated measures ANOVA

A one-way repeated-measures ANOVA tested the effect of phone use condition (“Phone”) on immediate recall ($N = 10$). Mauchly’s test indicated that the sphericity assumption was met, $W = .97$, $p = .73$. Meaning that the variances of the differences between all combinations of related groups (levels) are equal. There was no significant main effect, $F(2, 18) = 0.50$, $p = .612$, partial $\eta^2 = .026$. Pairwise Bonferroni-adjusted comparisons (PB) revealed no reliable differences:

Control vs. Break: $M \text{ diff} = 0.30$ words, $PB = 1.00$

Control vs. Simultaneous: $M \text{ diff} = 1.00$ words, $PB = .95$

Break vs. Simultaneous: $M \text{ diff} = 0.70$ words, $PB = 1.00$

Overall, neither intermittent nor simultaneous exposure to short-form media altered immediate recall performance relative to a distraction-free study period.

Table 2: Repeated Measures ANOVA (from Jamovi)

Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p	η^2
Phone	5.27	2	2.63	0.504	0.612	0.026

Residual	94.07	18	5.23
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Note. Type 3 Sums of Squares

Between Subjects Effects

	Sum of Squares	df	Mean SquareF	p	η^2
Residual	103	9	11.4		

Note. Type 3 Sums of Squares

Post Hoc Comparisons - Phone

Phone	Phone	Mean Difference	SE	df	t	p	^pbonferroni
Control	- Break	0.300	0.989	9.00	0.303	0.769	1.000
	- Simul	1.000	0.943	9.00	1.061	0.316	0.949
Break	- Simul	0.700	1.126	9.00	0.622	0.550	1.000

Estimated Marginal Means - Phone

Phone	Mean	SE	95% Confidence Interval	
			Lower	Upper
Control	14.6	0.909	12.5	16.7
Break	14.3	0.817	12.5	16.1
Simul	13.6	0.833	11.7	15.5

Discussion

The present experiment asks whether brief exposure to TikTok-style short-form media—either during a break or concurrently with study—impairs adolescents’ ability to recall a 20-word list. Contrary to the hypothesis drawn from multitasking and cognitive-overload models (e.g.,

Nelson & Miller, 2020; Uncapher et al., 2015), recall did not differ across conditions. Effect sizes were extremely small (partial $\eta^2 \approx .03$), and every pairwise contrast was < 1 word (see table 2).

Limitations: Why might the expected deficit not appear?

1. Statistical power: With only ten participants, the design had $\approx 18\%$ power to detect a medium within-subjects effect ($\eta^2 = .13$). Several meta-analyses show that social-media distraction effects on memory are typically small-to-moderate ($g \approx 0.20$ – 0.35 ; Pellegrino et al., 2022). The study was underpowered to capture such differences.
2. Task sensitivity: A 20-word list yields ceiling-level performance for many high-school students; any subtle degradation may have been masked by the high mean scores ($\sim 14/20$). More demanding materials (e.g., complex prose, delayed recall) often reveal interference effects that simple lists do not (Mendoza et al., 2018).
3. Self-paced scrolling: Participants used their own feeds. Prior work shows that platform algorithms personalize for engagement; some teens may have encountered relatively low-arousal clips, mitigating cognitive cost (Chiossi et al., 2023). Controlled stimulus sets or eye-tracking would clarify attentional load.

Implications for students & educators

Our null finding should not be taken to mean that short-form media are harmless in academic contexts. Rather, it suggests that a single 10-min episode of scrolling, especially when preceded by explicit study instructions, may have limited immediate impact on rote word recall.

Educators aiming to discourage in-class multitasking should nonetheless weigh up evidence from larger samples showing decrements in comprehension, working memory, and GPA.

Possible future research

1. Sample size & representativeness: The hand-selected group of ten students limits generalizability and severely constrains power; recruiting a random sample of at least 40–60 participants would allow detection of the small effects reported in the literature.
2. Ceiling effects possibly masked subtle interference effects, a more difficult test consisting of more words may showcase more subtle interferences.
3. Compare effects of personalized vs standardized short-form media on memory performance.

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Appendix A: Informed Consent Form

Consent to Participate in Research

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by XXX from XXX High School. The purpose of this study is to investigate how continuous and intermittent short-form media consumption affects memory retention during studying in U.S. high school students. This study will contribute to the student's completion of his AP Research project.

Research Procedures

You are invited to participate in a research study exploring how short-form media affects memory recall. If you agree to participate, you will complete **three individual sessions** on separate days. Each session will take place in a **private, quiet room** with only you and the researcher present. The researcher will be **timing and supervising** each session.

In each session, you will be asked to:

- Study a **20-word list** for 10 minutes.
- Complete a **3-minute memory recall test** immediately after.

The conditions for each day are as follows:

- **Day 1 – Control:** You will study without any media.
- **Day 2 – Intermittent Media:** You will study for 5 minutes, scroll short-form media (like

TikTok or Instagram Reels) for 5 minutes, then take the test.

Day 3 – Continuous Media: You will scroll through short-form media the entire 10 minutes while studying, then take the test.

All media usage will be done on your **own personal device**. Headphones may be used to isolate audio.

Time Required

Each session will last approximately 15 minutes, scheduled over three separate days, for a total time commitment of about 45 minutes.

Risks

The investigator does not perceive more than minimal risks from your involvement in this study.

Confidentiality

The results of this research will be presented in the classroom and potentially at academic conferences. The results of this project will be coded so that your identity will not be attached to the final form of this study. The researcher retains the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented, representing averages or generalizations. All data will be stored in a secure location accessible only to the researcher. Upon completion of the study, all identifiable information will be destroyed to ensure confidentiality.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind. You may also refuse to answer any individual question without consequences.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

XXXXXX

AP Research

XXX High School

XXX@gmail.com

(XXX) XXX-XXXX

Questions about Your Rights as a Research Subject

XXXXXX

XXX High School

XXX@XXXisd.gov

(XXX) XXX-XXXX

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age OR if you are under 18, a parent signature is required.

Name of Participant (Printed)

Name of Participant (Signed)

Date

Name of Parent/Guardian (Printed)

Name of Parent/Guardian (Signed)

Date

Name of Researcher (Signed)

Date