



## **The Influence of Social Media on the Cognitive Abilities of Generation Z**

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### **Abstract**

The rise of short-form content on platforms like TikTok, Instagram Reels, and YouTube Shorts has transformed how Generation Z consumes information, raising questions about its impact on core cognitive abilities such as attention and memory. This study explores the short-term cognitive effects of consuming such content through a 12-week experiment involving participants aged 13–25. Each participant completed a series of cognitive tasks, focused on memory, attention span, and problem-solving, both before and after 30-minute sessions of short-form content consumption. Statistical analyses confirmed significant decreases in performance across all tasks following content exposure, with stronger effects observed among those who spent more time on social media. While the study is limited in sample size and duration, the findings provide early evidence that even brief periods of social media use may negatively affect cognitive functioning in Gen Z. These results emphasize the need for digital mindfulness and open the door to further research on the long-term implications of short-form content on youth cognitive development.

### **Introduction**

The average teenager's time on social media platforms (around five hours per day (DeAngelis 2024)) has led to intrigue surrounding how social media affects our cognitive abilities. Cognitive abilities are the mental skills used to process information and solve problems. These platforms have become increasingly popular as they offer quick bursts of entertainment and knowledge with short-form videos that are around one minute in duration. Additionally, they're meant to keep users engaged through rapid content delivery, and provide significantly more dopamine than other forms of content, keeping viewers hooked. As an increasing number of teens spend time watching short-form content, understanding how this might affect our cognitive abilities becomes more significant. Cognitive abilities indirectly aid us constantly in our daily lives, helping our brains function properly and remember important things. Two important cognitive abilities are memory (how we store and recall information) and attention (how we focus on specific things). A study like this is essential, especially now, because the average screen time for an individual was very likely to go up after the pandemic. This research paper examined existing social media and cognition studies and presented our methodology for investigating these effects. It also effectively discussed how our findings could help students develop healthier digital habits, guide parents in setting appropriate boundaries, and assist educators in adapting their teaching strategies to an increasingly digital world.



## Literature Review

This section analyzed existing research on short-form social media content and its effects on adolescents' cognitive abilities, particularly memory and attention. Recent studies showed a significant increase in short-form video consumption among Gen Z. According to a Pew Research Center report (Vogels, 2022), 67% of teens use TikTok, and 16% say they use it almost constantly. Since so many teens are using social media, specifically short-form content, it is essential to examine its effects. Researchers found that frequent consumption of short-form content led to decreased attention spans. A study by Smith et al. (2021) tracking 200 individuals over six months saw that Gen Z who regularly watched short-form videos (defined as content under 60 seconds) had a 30% reduction in ability to focus on sustained academic tasks compared to the control group, who did not use as much social media. These findings aligned with García-Manglano et al. (2024) longitudinal study of 500 adolescents, which found that heavy users of short-form video platforms scored significantly lower on standardized tests of sustained attention and working memory, with scores averaging 20% below their peers who reported minimal platform use. Additionally, an extensive analysis by Aslan and Polat (2024) studied the effects of social media on problem-solving skills. This revealed how spending over four hours on social media and having a middle-level social media addiction led to loneliness and overall dissatisfaction with life. While existing studies suggest a potential link between short-form content consumption and cognitive abilities, it's essential to examine the immediate effects of viewing such content on Gen Z so that they can be aware of how their unhealthy digital habits affect their brains.

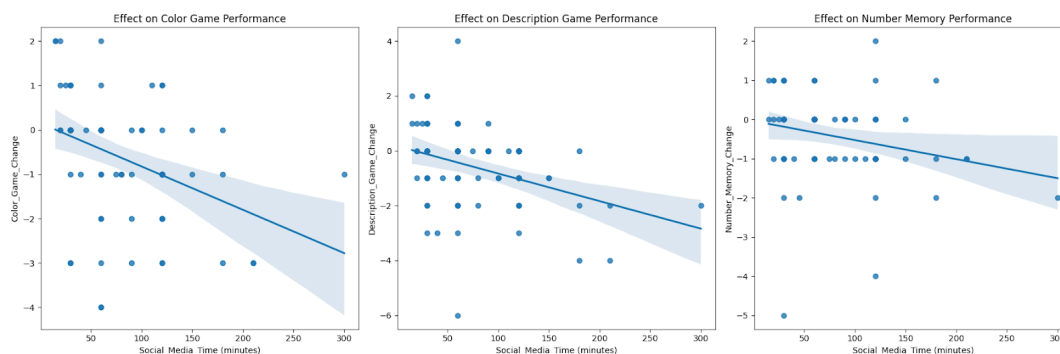
## Methodology

This section outlines the research design and methods I used to investigate how viewing short-form social media content affects the younger generation's cognitive abilities, particularly memory and attention. The study has 12 participants, ranging from ages 13-25. They were recruited online through public forums. I obtained permission from parents and student assent before including them in the study. Participants' data were kept confidential, and they could withdraw from the study at any time without consequences. For the study, I had three games. The first game is the Color Game. It evaluated attention span by making players decide if the name of the color on a card matches the color of the second card. This game takes the least amount of time, ranging from 30 to 60 seconds, depending on the person, and is scored based on how many matches you correctly identify. The second game, Description Game, had players guess an object based on a detailed description, which tested problem-solving skills. While this game will take around two to three minutes, it tests your critical thinking skill, which is a core cognitive ability that we constantly use. Scoring is dependent on how many objects you can guess. The final game, Number Memory, assessed memory retention skills by displaying numbers on the screen and having players write down the numbers they saw. This game will only last for around a minute, and your score is equivalent to the amount of numbers you can accurately remember. Participants played these three games and recorded their scores in a Google Form before and after watching short-form content for at least 30 minutes (eg, TikTok, Instagram, YouTube Shorts, Snapchat, etc.). They did this every time they filled out the Google Form, which was around 12 times throughout the study. Before I officially sent the form to fill out scores from the games, I sent out an introductory form that told us more about their social media habits. I made a process for calculating overall changes in scores. I only used a quantitative approach for data collection by having multiple participants submit their scores so that I could

see trends in the data and pinpoint primary effects. I decided to use AI for these games since it allowed a more customized experience for players while providing variety. AI is incorporated into the back end of the game, and helps examine information faster by automating tasks and implementing natural language processing. AI also assists in creating a friendly UI for players by making the front end more aesthetically pleasing and simple. For these reasons, it's used in all of the games. I first operated paired t-tests to process the data to compare the before and after scores for each cognitive test (Color Game, Description Game, and Number Memory Game). The paired t-test helps determine if the difference between the before and after scores is statistically significant, meaning the change is likely real and not due to random chance. After that, I used a linear regression analysis to examine whether the amount of time spent on social media predicted changes in cognitive performance. This test shows if there is a relationship between social media time and score changes, and how strong that relationship is. For both tests, I used a significance level of 0.05, which means that results with p-values less than 0.05 were considered statistically significant. A p-value tells us the probability that our results could have happened by chance—smaller p-values mean more reliable results. Unfortunately, this study has some limitations, which I'll review more thoroughly in the discussion section. The limitations I'll mention here are that because this is only a 12-week study, our experiment may not capture the long-term effects of social media use on cognitive abilities. Also, some participants may forget to fill in the weekly check-in form.

## Results

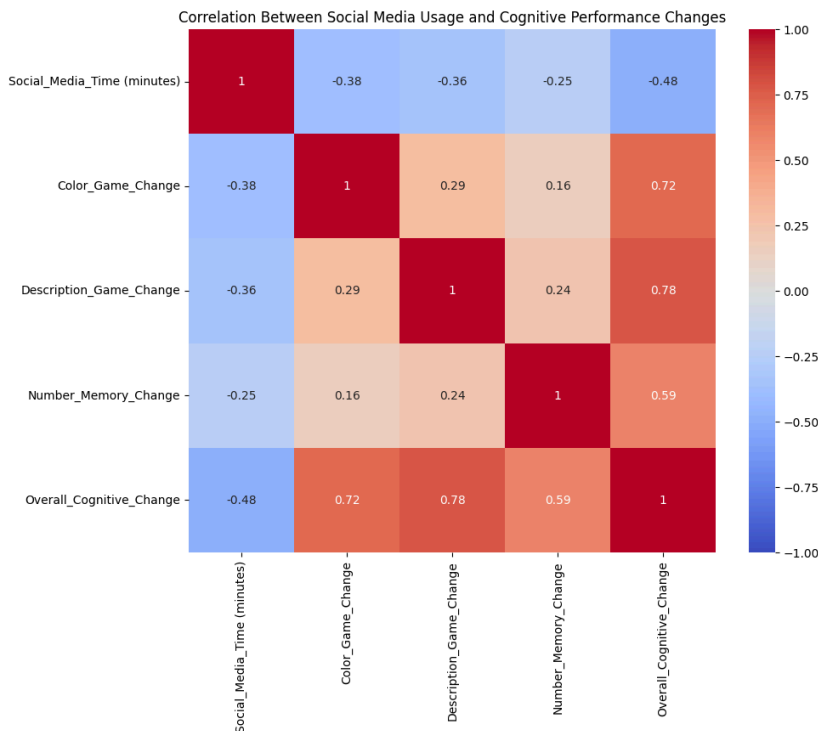
This study measured how social media affects Gen Z's brain performance using the three different games I discussed in the methodology section. Also, as mentioned in the introduction, all participant data is kept anonymous, and every minor has a signed parental consent form. After using social media, participants showed lower scores on all three games compared to their scores before using social media, as shown on the graph.



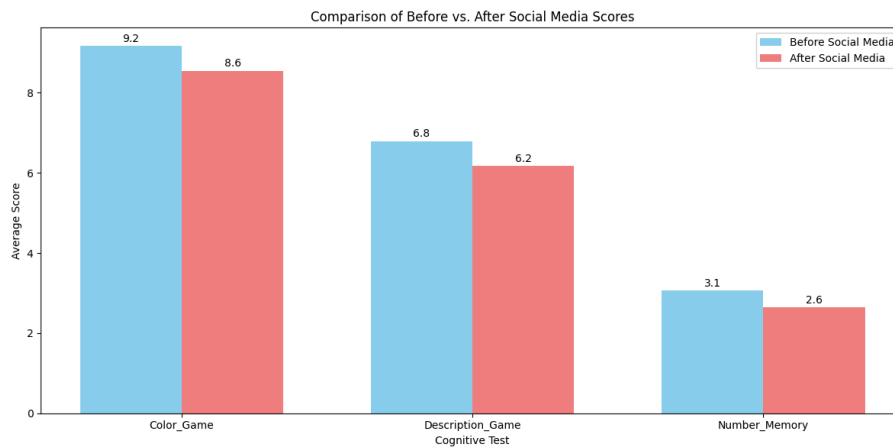
These charts show that the more time people spend on social media, the more their brain test scores drop. As we can see, the lines on all of the graphs have a negative slope. That means longer social media time leads to a bigger drop in scores. Paired t-tests revealed significant differences between pre- and post-social media scores on all three cognitive measures. For the Color Game, the analysis showed a significant change ( $t=3.8880$ ,  $p=0.0002$ ). This means there's less than a 0.02% chance that these results happened randomly. Similar significant changes were found in the Description Game ( $t=3.5700$ ,  $p=0.0006$ ) and Number Memory ( $t=3.5144$ ,  $p=0.0007$ ).

To understand if the amount of time spent on social media predicted the size of these effects, I performed linear regression analyses. These tests revealed that for each additional minute of social media use:

- Color Game performance decreased by 0.0098 points out of 10 (coefficient=-0.0098,  $p=0.001$ ).
- Description Game performance decreased by 0.0101 points out of 10 (coefficient=-0.0101,  $p=0.001$ ).
- Number Memory Game performance decreased by 0.0082 out of 10 points (coefficient=-0.0082,  $p<0.001$ )
- Overall cognitive performance (average of all three tests) decreased by approximately 0.0094 points out of 10



This correlation matrix heatmap visualizes the correlation coefficients between variables, here showing the relationship between social media usage (in minutes) and various cognitive performance changes (Color Game, Description Game, Number Memory, Overall Cognitive). The blue squares mean that as social media time increases, brain game scores decrease. The darker the blue, the stronger this effect is. The negative coefficients indicate that as social media time increased, cognitive performance decreased. These relationships were statistically significant for the Color Game and overall cognitive performance, while the relationship for the Description Game was marginally significant.



This chart demonstrates how participants' brain test scores went down after using short-form content. This is noticeable because the red bars (after social media) are shorter than the blue bars (before social media). The study also found that time spent on social media was related to changes in game performance. Color Game scores decreased by about 0.01 points for each minute spent on social media. This relationship was statistically significant ( $p=0.001$ ), meaning it's very unlikely to be due to chance. Similar patterns were found for the Description Game and Number Memory, where scores also decreased as social media time increased.

The statistical tests show that just a few minutes on social media can measurably affect a teenager's ability to focus and process information. These results suggest that using social media negatively affects Gen Z's attention, memory, and thinking abilities and that spending more time on social media leads to bigger decreases in brain performance.

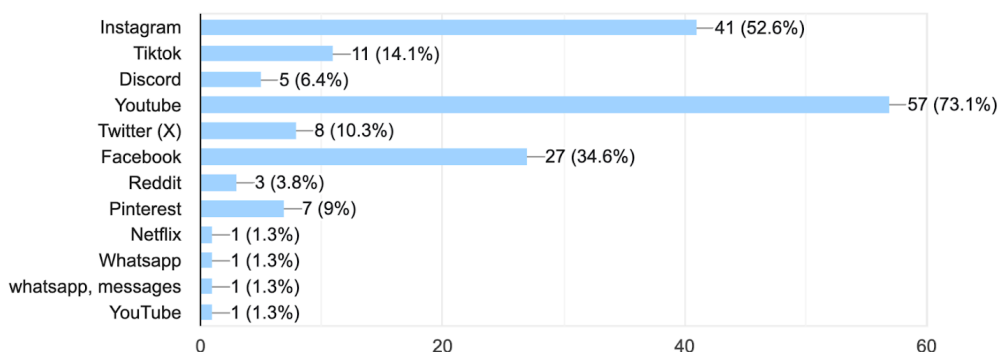
## Discussion

While a study can be fully planned out, some drawbacks can potentially compromise the research. Our data suggest that even 30 minutes of short-form content can measurably reduce attention scores in the short term. These limitations provide important context for interpreting the results and suggest opportunities for future research. The first major obstacle encountered was participant consistency. While numerous participants maintained regular engagement with the study protocol, variations in participation rates and commitment levels affected data completeness. Although partial participation still yielded valuable data, the reduced sample size for some measurements may have impacted the statistical power of certain findings. The 12-week duration of the study represents another important limitation. While this timeframe allows researchers to view short-term effects on cognitive abilities, it cannot fully capture the potential long-term impacts of short-form content consumption. Future longitudinal studies extending over several months or years are extremely advantageous if one wants to understand the permanent effects on teenage cognitive development. A final significant constraint is self-reported bias and false data. The reliance on participant-reported scores introduces the possibility of response bias, particularly regarding performance metrics. Participants can increase their scores on their end due to social desirability bias or performance anxiety, potentially affecting the validity of the collected data. Future studies might benefit from automated score collection or additional verification methods to enhance data reliability.

## Implications For Different Platforms

What social media platforms did you use today?

78 responses



According to the data on the chart above, YouTube was the most used platform in the study, with over 73% of participants using it. Additionally, Instagram and Facebook were also widely used, with 52.6% and 34.6% of people using them, respectively. YouTube typically has longer-form videos, and Pew Research Center (2024) mentions that it's the most popular social media site in America. It also has a section called YouTube Shorts, which has short-form content. Another widely used social media site is Facebook, the most popular site worldwide, which has over 2.9 billion users around the globe, as Schaeffer (2024) notes. It's mainly used to spread information and connect with others. You can watch short-form content, join group discussions, and communicate with people around the world. A final platform I'll mention is Instagram, which is becoming more prevalent with teens, with 47% using it daily, according to Pew Research Center (2024). It consists of Instagram Reels, which is a variety of short-form content, and Instagram stories, where you can simply put your thoughts in a bubble for everyone to see. You can also post your own Reels and pictures on Instagram and chat with your friends on the platform. I'm mentioning all of these platforms because knowing how popular a specific site is can also reveal its influence on the next generation, because it indicates that it will be a bigger factor in the depreciation of cognitive abilities. They relate to this study's findings because they are the main sources of short-form content and would therefore be considered the biggest factors of cognitive ability depreciation. However, despite these limitations, the study preserves its ability to provide valuable introductory insights into the relationship between short-form content and teenage cognitive abilities while highlighting important considerations for future research in this area.



## Conclusion

Social media has taken a large step ever since the creation of Six Degrees in 1997. As short-form content progresses, it is crucial to comprehend how our growing environment impacts social media users. This study is vital in the sense of understanding how our current habits will affect us in the future. After extensive research, I learned which platforms are used the most daily and how they impact our cognitive abilities with a few months' worth of data. Because of this study, others can see how their screen time reflects their brain's ability to work effectively. As the future generation grows and utilizes short-form content more and more, their cognitive abilities will slowly be diminished. Although social media may have benefits, the potential downsides deserve careful attention, and the drawbacks sometimes overshadow the positives. Ultimately, this research serves as a foundational step toward understanding the long-term cognitive implications of digital media consumption, emphasizing the urgency of further longitudinal studies in this evolving field.

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