

To What Extent Does Social Media Usage Impact the Ability to Delay Gratification and Attention Span of Teenagers in Mumbai?

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ABSTRACT: *The aim of the study is to investigate how social media usage affects the ability of Mumbai teenagers to delay gratification and their attention span. The research predicts that participants with high social media usage will show lower scores on delayed gratification compared to those with low social media usage. In addition, the performance of participants on the Stroop task will differ between those with low and high social media usage. The study uses a combination of meta-analysis and primary data collection, where 41 students from JBCN International School were sampled. The results indicate that high social media usage is associated with a reduced ability to delay gratification, which supports previous studies. The results also show that there is a correlation between the time taken to complete a task and the willingness to defer rewards for greater benefits in the future.*

KEY WORDS: delayed gratification, social media usage, stroop task, correlation

INTRODUCTION

Delayed Gratification

Delayed gratification is the ability to resist and so resist an impulse in order to obtain an immediately available reward in the goal of earning a more valuable compensation later. Another definition of it is a type of self-control (Ding et al., 2021). It is a crucial ability that may be developed in kids by testing their gratification delay durations with marshmallows, for example (Mischel, Ebbesen and Zeiss, 1972). Studies that build upon Prof. Mischel's Stanford Marshmallow experiment demonstrates a beneficial relationship between toddlers' ability to postpone gratification and its effects on later-life variables such as SAT scores, positive functioning, and BMI.

The Cognitive Assessment Personality(CAPS) Theory proposed by Mischel and Shoda states that an individual's behaviour is dependent on situational factors and the cognitive traits of a person on the growth of personality. Studies show that children's ability to delay gratification is mainly

reliant on their ability to pay attention. (1989; Rodriguez, Mischel, & Shoda; Eigsti et al., 2006). The limbic system, also referred to as the "hot" system, becomes active in response to a reward, causing an impulse to seek pleasure. People who possess the ability to utilise their prefrontal cortex, or "cool" system, have more success with delays (Metcalf & Mischel, 1999). Attention Training has been found to improve inhibition, cognitive flexibility, and transfer effects to other areas of executive functions. The impact on kids' capacity to delay pleasure, which is especially significant since it indicates long-term psychological, cognitive, and health consequences, has not been examined in previous research in terms of cognitive factors such as the ability to inhibit environmental interferences.

Social Media

Social media is a term that refers to “the sites and online tools that improve interactions between users by providing them with the opportunities to exchange information, ideas, and interests” (Swar and Hameed, 2017, p. 141). This technology helps people all over the world to connect and share their ideas and thoughts, hence establishing effective communication and incentives to gain heaps of information. According to Leong et al. (2019); Kemp (2020) The use of social media has grown substantially in recent years. Individuals use social media for a range of activities, including information research, communication, and entertainment purposes. Notably, teens and young people are using social media, texting, playing games online, and networking sites for longer periods of time (Twenge and Campbell, 2019). It is well known that using social media can impact teenagers, either by helping or worsening their psychological wellbeing.

Rational

Social media's effects on emotional and social components have been widely investigated however the research on the cognitive impacts of social media specifically are yet not well understood (Lara & Bokoch, 2021). Adolescent years are crucial for cognitive development where one can argue that the future styles of thinking become concrete, and therefore understanding the impact of an activity namely social media use, in which teenagers are engaged in more and more is an important relationship to investigate. Attention span and the ability to delay gratification could be considered as key components of current and future personal and academic success and it is therefore deemed crucial to investigate whether the usage of social media has an adverse influence on these abilities.

For this research, it was decided to use primary data supported by secondary research through an extensive analysis of literature reviews, both of which together would aid me in answering the research question. Also as ample test tools exist for research on gratification and attention and my sample included teenagers respect to which I had access to my fellow high school students, gave me enough confidence that I could go ahead with conducting primary research to answer the research question

Research Question

To what extent does social media usage impact the ability to delay gratification and attention span of teenagers in Mumbai?

Research Aims and Hypotheses

The research aims to examine a relationship between the impact of social media on delayed gratification and attention. The research question leads to the following hypotheses:

H1- There will be a difference in the delayed gratification scores between participants in the 'low' social media usage condition as compared to the participants in the high social media usage conditions.

H2- There will be a difference in the performance on the Stroop task between participants in the 'low' social media usage condition as compared to the participants in the high social media usage conditions.

H3- There is a positive correlation between the delayed gratification scores of the participants and their performance on the Stroop task .

All these statements will be tested using primary and secondary research through an extensive review of previous literature.

LITERATURE REVIEW

Social media and delayed gratification

Meade, T. L. (2012). *I want it now: Do new media affect ability to delay gratification?* The University of Alabama.

This dissertation explored the relationship between the different factors that were associated with the ability of people to delay gratification: self-control, impulsiveness, time orientation and delay of gratification throughout the different stages of development and whether or not media usage affected or had a temporal relation with any of the variables. Participants belonging to different age groups were divided into two groups based on their access to instant gratification media (high, low) They were given surveys with different situations (to measure gratification of media) and scales that tested them on the variables. With a Pearson's correlation review, it was proved that the variables were highly correlated when looking at the results of participants with high instant gratification of media. This study was helpful through its proposed models since it gave a good idea about the correlation and cause-effect relations between different variables associated with the delay of gratification.

Tom, Thalia & Lawrence, Amanda & Choe, Daniel. (2017). Gratification Stratification: Amount of Screen Time is Associated with Children's Delay of Gratification.

The study investigated the link between screen time and self-control in young children, focusing on the ability to delay gratification. It predicted that there is a negative correlation between a

children's weekly average screen usage and their performance on delay-of-gratification tasks. The research drew attention to the possible harm that interactive screen media may do to young children's development of self-control, which can influence adult life paths and exacerbate social stratification. In a pilot study that examined mobile media use among 28 preschoolers and their caregivers, Children were given three self-control exercises that tested their ability to delay gratification. Caregivers provided questionnaires, and the selected tasks created a composite delay-of-gratification score. It was discovered that 53.33% of the 15 children had significantly lower scores on activities involving delayed gratification. The correlation between age and Dinky Toy scores was shown to be more positive. The study discovered that children who used mobile media had reduced delay-of-gratification skills, implying a link between mobile media use and this ability; however further research is required to examine the effects of mobile media use in a larger and a more gender-balanced sample. The issue of gender imbalance in the sample from this article was taken into account while obtaining and testing the sample from my study.

Social media and attention

Lara, R. S., & Bokoch, R. (2021). Cognitive functioning and social media: Has technology changed us?. *Acta psychologica, 221*, 103429.

This study examined the impact of social media on cognition and ability of working memory, using a sample of 70 participants to examine their social media usage (high, medium, low) using questionnaires. The ability to inhibit irrelevant information was measured by the Stroop Task and the participants were given 10 cents USD after completing the questionnaires. The results showed that there was no significant relation between social media usage and the ability to inhibit information. The limitations of the study include lack of generalizability to a US population since the participants were from Nigeria. Another factor is the cultural differences in the use of social media, hence compromising its reliability and validity. However, It was more practical to utilise the Stroop task, a valid and reliable measure of divided attention, alongside questionnaires that asked about social media usage to split the individuals into different social media usage levels.

Barton, B. A., Adams, K. S., Browne, B. L., & Arrastia-Chisholm, M. C. (2021). The effects of social media usage on attention, motivation, and academic performance. *Active Learning in Higher Education, 22(1)*, 11-22.

This study examined undergraduate and graduate students at a public university in the Southeast of the US to see how social media usage (MTUAS) and academic success (GPA) correlated with one another. Convenience sampling was used to choose the participants, and confidentiality and privacy were maintained. To adjust for order effects, a poll was conducted using the online survey tool Qualtrics, and questions were dispersed in a counterbalanced manner. The researchers used moderated multiple regression analysis to evaluate the relation between social media activity and GPA. Usage of social media was used as the variable that predicted the outcome, and GPA was

used as the outcome variable. The researchers looked into the fundamental assumptions of linear regression and found no crossovers. Results indicated that while attention does influence GPA, it has minimal impact on the correlation between social media use and GPA. Less social media use is generally associated with higher GPAs. Whatever their ability to manage their time, students who use social media more frequently tend to have worse GPAs. It was simpler to understand and hypothesise that delayed gratification and the cognitive component of split attention were the two variables that were connected thanks to Barton's research, which used social media usage and an additional variable of GPA to be correlated.

Delayed Gratification and attention

Luerssen, A., Gyurak, A., Ayduk, O., Wendelken, C., & Bunge, S. A. (2015). Delay of gratification in childhood linked to cortical interactions with the nucleus accumbens. *Social cognitive and affective neuroscience*, *10*(12), 1769–1776.

This study used neurobiology to examine differences in the capacity of kids for delaying gratification (DG). During DG tasks, the researchers assessed the level of connectivity between brain areas supporting approach behaviour and those supporting self discipline. According to the Hot-Cool Structure, the ability to postpone gratification is affected by the interaction of two functioning systems: the 'hot system,' related to stimuli management, and the 'cool system,' linked with self-control. The study used functional connectivity analysis on fMRI data to evaluate the interactions between the hypothesised hot- and cool systems and their relationship to DG ability. The study analysed the ability of 38 children aged 7-9 years to delay gratification using fMRI and obtain functional connectivity data of high quality. It was discovered that, when a child sought to defer gratification in the MRI scanner, the functional connection between their hot and cool systems was less the more hot-focused the child was on the behavioural DG task. Although not statistically significant, the relationship between total delay duration and hot focus was theoretically predicted.

Murray, J., Scott, H., Connolly, C., & Wells, A. (2018). The attention training technique improves children's ability to delay gratification: A controlled comparison with progressive relaxation. *Behaviour research and therapy*, *104*, 1-6.

This research examines whether using the Wells Attention Training Technique (ATT) can enhance early children's capacity to postpone pleasure, which is a predictor of later-life outcomes related to psychological, cognitive, health, and academic domains. The study comprised 101 kids between the ages of five and six randomly assigned to receive ATT, Progressive Muscle Relaxation (PMR), or no interventions. Results showed that ATT significantly improved delay of gratification and verbal inhibition, indicating its effectiveness. Research indicates that implementing the Attention Delay Technique (ATT) for a brief period of time in the classroom may help children become more adept at delaying gratification. The ATT's automated design makes it easy to integrate with

the current curriculum. The ATT may lead to better results in later life in addition to helping kids learn to postpone gratification. According to the S-REF model, ATT may operate through a shared set of underlying mechanisms, such as attention flexibility, that contribute to psychological sensitivity and delay of gratification. To further ascertain the impacts of ATT, these domains should be operationalized and measured in future studies. It needs to be clarified, nonetheless, if ATT has long-term consequences or if the gains in postponement of satisfaction are transferable to other contexts. In the future, research should include additional testing to assess resilience or executive functioning.

Impact of social media

Yang, Z. (2023). Why Adolescents Are Addicted to Social Media. *Journal of Education, Impact of Social Media Humanities and Social Sciences*, 8, 1430-1436

This literature review examined the implications of an addiction to social media on teenagers, specifically TikTok, and its effects on their academic and psychological well-being. It aimed to identify effective addiction treatment options and preventive measures. The review used peer-reviewed articles from various sources from ProQuest to PubMed to explore the factors causing addiction. It concluded that watching short videos on social media can be addictive, particularly for adolescents dealing with academic, family, or mental health issues. The immediate gratification releases dopamine, and TikTok's advanced algorithms make it difficult to stop scrolling. It was also found that overcoming social media addiction could help with other online addictions. Techniques based on underlying causes, such as traumatic childhood events and strong family ties, can help decrease addiction levels. Prevention methods like notifications, time restrictions, and self-monitoring can also help. This makes the review applicable and useful in real life since schools and parents can use social media as a learning tool to encourage participation and academic success. However, mental health problems like anxiety, depression, or stress should be considered to help adolescents stop using social media as a placebo.

Ostic, D., Qalati, S. A., Barbosa, B., Shah, S. M. M., Galvan Vela, E., Herzallah, A. M., & Liu, F. (2021). Effects of social media use on psychological well-being: a mediated model. *Frontiers in Psychology*, 12, 678766.

This investigation analysed the effects of social media on psychological wellness in Mexico, involving 940 users. Results showed that social media indirectly positively affects psychological well-being, primarily due to bonding and bridging social capital. The study also found strong relationships between social media use, addiction, social capital, social isolation, smartphone addiction, and phubbing. The findings also revealed a significant indirect effect of social media on psychological well-being. The study also found that university students' social isolation due to the pandemic negatively affects their well-being, highlighting the need for more accurate information on social media usage. The study suggests that social media usage is linked to both strong and weak

ties, which are crucial for building social capital. Bridging capital has the most significant impact on psychological well-being, emphasising wider social horizons and inclusion. However, the study's limitations, such as convenience sampling and being conducted in Mexico, suggest future research should use cross-cultural methods and replicate the study with users from other countries. Convenience sampling utilised in relation to social media in the study by Ostic.D(2021) being effective was used to avail the sample consisting of adolescents in this study.

RESEARCH METHODOLOGY

This study uses a combination of meta-analysis and primary data collection. The articles used were found with the aid of Google Scholar and ResearchGate. The keywords “social media’s impact on delayed gratification”, “social media’s effect on attention” and “delayed gratification and attention” were input into both of these search engines, including Chrome to obtain relevant information which was then used to answer the research question.

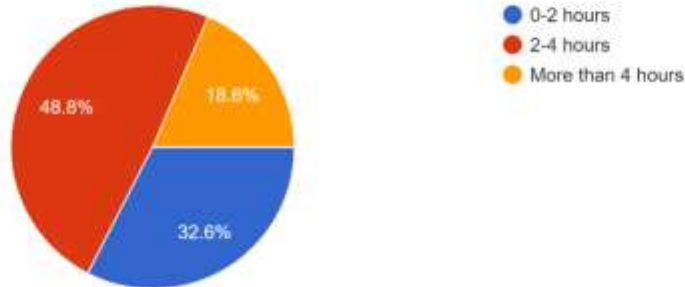
B) Primary research

To test the first two hypotheses, a small experiment was conducted where a population of 41 students, aged between 16- 18 years old from JBCN International School were sampled using opportunity sampling, given the ease of availability of the sample. Another reason to choose the sample is due to the fact that students are regarded to be the most suitable sample for studies in an online context, particularly when it involves social media (Oghazi et al., 2018; Shi et al., 2018) The original sample consisted of 43 students responding to the Google form, however, only the data of the remaining 41 students were considered (M=19, F=22).

Delayed gratification as measured by the DGI-10

All the students were told to fill out a Google form that had questions from the DGI-10 to calculate their delaying gratification scores. The DGI-10 is a short-10-item version of the DGI-35 with 5 domains spread across 35 items used to test the individual differences in the tendency to delay an immediate impulse for a greater reward in the future. An additional question asked was regarding their screen time on social media apps and the responses to the question were then used to categorise the sample into three conditions: the “Low” group (n=14) with an average screen time between 0-2 hours, ‘Medium’ group (n=20) with 2-4 hours and the “High” group(n=7) with more than 4 hours spent on social media.

On average, how long do you spend on social media?
43 responses



Appendix A: The distribution of the sample

All questions pertaining to the DGI-10 were asked in the form of a Likert scale where participants had to rate statements relating to the 5 domains to measure delayed gratification, ranging from 1 (strongly agree) to 5 (strongly disagree) on the scale. The scores from the DGI-10 inventory were inputted and the final scores of all participants were calculated, using negative scoring where needed.

The Stroop task

The Stroop Color and Word Test (SCWT) is a commonly used neuropsychological test that evaluates a person's ability to suppress cognitive interference. This interference happens when processing one stimulus feature makes it difficult to process another stimulus attribute at the same time (Stroop, 1935). This phenomenon is called the Stroop Effect.

The participants in all 3 conditions were presented with 40 words of colour names typed in one of 10 different text colours (Orange, black, brown, pink, gray, green, purple, blue, yellow, and red). They were asked to read the text colour that the word was typed in colours from left to right, reading the colours vertically hence completing all 5 columns.

Red	Yellow	Blue	Green	Black
Pink	Orange	Brown	Gray	Purple
Green	Gray	Black	Blue	Yellow
Gray	Brown	Pink	Orange	Blue
Yellow	Red	Green	Black	Gray
Black	Brown	Purple	Orange	Pink
Purple	Black	Yellow	Red	Green
Orange	Pink	Brown	Gray	Purple

Appendix B: Image used for the Stroop test

The test was conducted in the presence of the mentor/secondary observer who recorded the time, in seconds for the participants to read the text colour of the words presented. The number of mistakes was recorded and any repetition in comments made by all of the participants was also noted.

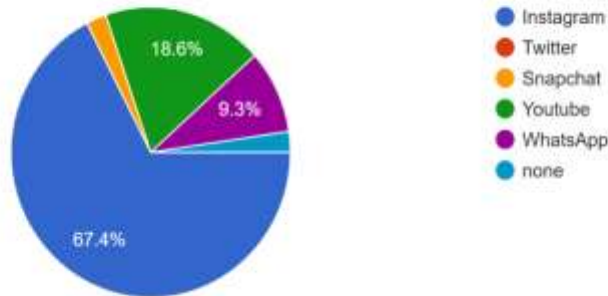
RESULTS

Delayed Gratification

According to the survey's findings, Instagram was the most popular social networking application with around 67.4% of people using the application. This is illustrated by the pie chart in Appendix C

Which one of these social media apps do you most frequently use?

43 responses



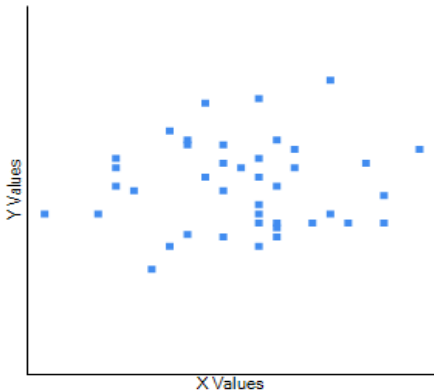
Appendix C: Pie chart of the different social media applications used

The DGI Scores of the participants were also calculated by following the instructions in the guide for DGI-10. Out of the 40 scores calculated, people in the ‘Low’ condition (n=14) had an average score of 37.57142857, the ‘medium’ condition (n=20) had an average score of 35.52380952 and the ‘high’ condition (n=7) had an average score of 34.71428571. The DGI-10 scores indicate that a higher score is associated with a higher ability to delay gratification. From the results it is seen that people in the “low” condition of social media usage had the highest score on average, people in the “medium” condition had a slightly lower score and the scores decreased further in the “high” condition. This shows that high social media usage is linked with a lessened ability to delay gratification hence supporting the findings of previous review articles.

Stroop task

The time taken for all participants (in seconds), was as follows: The ‘Low’ group (n=14) took an average of 41.57142857 seconds, the ‘medium’ group (n=20) took 40.625 seconds and the ‘high’ group (n=7) took 41.85714286 seconds to complete the Stroop Task. The statements in the first and second hypotheses were tested with the aid of a T-test which is a statistical technique used to determine differences between two means that may/may not be linked. Randomly chosen samples from the two groups or categories are used in the testing. To test for any differences between the DGI scores and the attention in the ‘low’ and ‘medium’ conditions, 14 scores of the participants for their ability to delay gratification were chosen from the latter group, using a random number generator. The 14 randomly chosen scores were then inputted along with the 14 scores from the ‘low’ social media usage condition and tested for any differences. The Pearson correlation coefficient calculator was utilised to test hypothesis H3 to check for a correlation between the

time(in seconds) taken to complete the task and the DGI scores of the same participants as measured using the DGI-10.



Appendix D: Correlation graph

Hypothesis 1

There was no significant difference in the performance of the Stroop task between the high/medium social media use group $t(14) = -.28, p = .38$ and the low social media use group at a significance level of 0.5. Therefore the hypothesis that there will be a difference in the performance on the Stroop task between participants in the 'low' social media usage condition as compared to the participants in the high social media usage conditions is rejected.

Hypothesis 2

There was no significant difference in the delayed gratification scores between the high/medium social media use group $t(14) = 1.25, p = .11$ and the group with less social media use at a significance level of 0.5. And therefore the hypothesis that there will be a difference in the delayed gratification scores between participants in the 'low' social media usage condition as compared to the participants in the high social media usage conditions is rejected.

Hypothesis 3

DGI scores and the time taken to complete the Stroop task were found to be weakly positively correlated $r(39) = .06, p = .696028$. As a result, the hypothesis that there is a positive link between the participants' delayed gratification scores and their performance on the Stroop task, is accepted

DISCUSSION

This study did not find a significant negative impact of high social media use on attentional abilities. These results support the findings by Lara, and Bokoch, (2021) who also did not find

any negative impact of the over use of social media use on attentional ability to inhibit cognitive interference and neither on working memory. This is also a valid comparison as in their study Lara, and Bokoch, (2021) too used the Stroop task as a tool of measurement of the dependent variable. Additionally, it was also found that there was an association between high social media usage and reduced ability to delay gratification . This supports prior correlational work which suggested a link between average screen time and scores on delaying-gratification tasks of children, but did not explore this relationship (Tom et.al , 2017). However, when testing for a significance in the negative effect between differing levels of social media usage on the ability of the deferral of immediate rewards, This study did not find a significance between the delayed gratification scores of people in the different IV's for the same, hence contradicting the findings of prior reviews that did find significance of the relationship between different conditions of social media usage in varied and much larger samples (Meade, T. L. , 2012).

Interestingly, These results failed to validate the findings of several previous research where high social media usage was linked to the preference of receiving instant over gradual rewards (Schulz van Endert & Mohr, 2020). A fascinating argument to be made here is also about the direction of causality if any, where it could indeed be the inherent pre-existing ability within individuals to delay gratification which allows them to refrain from getting hooked to social media platforms. (Ribeiro, J. F., & Peeters, D, 2021). These findings invalidate the results from this study since it affects the reliability of the results.

Finally, there are both beneficial and harmful effects of social media use on youth generally. However, because excessive social media use is linked to a decreased capacity for delaying gratification and, as a result, to addictive tendencies that result in a shorter attention span, the study took into account the negative effects of social media consumption. This idea that excessive social media use has a detrimental impact on cognitive and mental health aspects is supported by Yang, Z (2023). The idea that social media has a favourable impact on impulse control and cognitive interference inhibition is supported by the fact that treatments may be implemented to make the most of social media. However, the story does not end here. Although there isn't much evidence to back up this claim, it is an intriguing aspect to consider when analysing how, for example, heavy social media use may enhance people's capacity to postpone gratification.

Reflection

This research has enabled me to explore in depth about the concept of delayed gratification and its significance in shaping behaviour of people throughout their lives. By using a sample consisting of adolescents for my primary research, It was easier to understand the effects of varying social media usages on their ability to delay immediate rewards, given that teenagers are the primary users of social media apps.

As I expanded my theoretical knowledge, I discovered that social media usage does not necessarily only have negative impacts on the cognitive functioning of teenagers later in life, In fact there is evidence showing that social media usage increases social engagement in older people, improving their cognitive functioning Quinn K. (2017).

While conducting the experiment, I acquired the necessary skills and knowledge to conduct a structured and systematic investigation using the Stroop task and questionnaire. This process involved various steps such as, defining the research question, gathering the sample, conducting the experiment, analysing the results obtained, and drawing meaningful conclusions from them. Learning how to conduct research was essential for my academic and personal understanding as it helped me understand and contribute to the findings of previous research. It was especially interesting to use tasks like the Stroop task which were also used by other researchers thus making a contribution to the testing of reliability of theoretical assertions in psychology.

Strengths and Limitations

The major portion of the literature evaluation, both quantitative and qualitative, were of samples with a wide range of ages between participants, indicating a lack in the data available on the impact of social media on both delayed gratification and attention in adolescents. However, because this paper focuses on teenagers, the data gathered was restricted to adolescents aged 16 to 18.

The sample of 40 students in the 11th and 12th grades was gender-balanced, but when divided into varying levels of social media usage via questionnaire, there was an uneven distribution between the 'Medium' and 'High' groups, compromising the reliability of the findings. Furthermore, it is important to note that the sample size (n=40) used was small when attempting to make the sample representative of a city population, and because all of the participants were from the same school, confounding variables such as socio-economic status were not considered, potentially reducing the generalizability of the findings.

When conducting the Stroop task, the participants were briefed on the guidelines and instructions, as well as given a mock task with 8 words, to ensure that there was no confusion while participating in the actual task, thus controlling the condition on which all participants were experimented on and increasing the validity. Moreover, when the questionnaire was presented to the participants, informed consent was obtained and confidentiality was maintained because the participants had been assured that their data would not be disclosed to or shared with anyone else. This means that ethical guidelines of informed consent, and confidentiality were followed.

Finally, the experiment was carried out under the observation of a mentor and a student observer, who likewise documented the duration it took students to finish the Stroop task and overtly

observed the participants' behavior. Because the risk of bias from one researcher is eliminated, the inter-observer reliability of the Stroop task results improves, making it a strength.

CONCLUSION

To a great extent, growing use of social media has a negative impact on the ability of teenagers in Mumbai to delay gratification and their ability to inhibit cognitive interference. This study expands prior research by demonstrating that higher levels of social media usage are linked with a decreased capacity to wait for satisfaction; consequently, teenagers with decreased capability to postpone gratification have a more difficult time inhibiting cognitive interference, i.e. a shorter attention span. It also demonstrates a link between the time it takes to perform a task and the deferral of rewards in exchange for better recompense in the future.

The ability to postpone pleasure can be influenced by several factors, including the types of social media, reward valuation, and cognitive control. On the other hand, high social media usage can lead to a decrease in attention span. This can be indirectly addressed through multitasking in attention, as measured by the Stroop task. However, a recent extensive review of relevant literature by Schulz van Endert, T., and Mohr, P. N. C. (2020) found that the connection between using social media and delaying satisfaction could not be explained by the given confounding variables, as media usage and delay of gratification are negatively correlated

This shows the relationship between the three variables, where to some extent changes in attention span can be explained through social media usage, however more research is needed to test this aspect of the findings further.

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