Journal of Information Technology Education: Research

An Official Publication of the Informing Science Institute
InformingScience.org

JITEResearch.org

Volume 24, 2025

DEPLETION SENSITIVITY PARTIALLY MEDIATED THE RELATIONSHIP BETWEEN SOCIAL MEDIA ADDICTION AND ACADEMIC PRODUCTIVITY

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ABSTRACT

Aim/Purpose	The aim of this paper is to evaluate whether the use of social media by college students is linked with diminished academic productivity, and if so, why?
Background	In prior research, social media use was inversely related to academic productivity. We replicated that effect and tested whether depletion sensitivity, delay discounting, and delay of gratification mediated the relationship.
Methodology	College students (n=315) participated in an online survey, which included two measures of social media use, measures of three potential mediators (depletion sensitivity, delay discounting, and delay of gratification), and four measures of academic productivity.
Contribution	This study aimed to produce a more comprehensive understanding of the inverse relationship between social media use and academic productivity by testing potential mechanisms by which habitual social media is linked with diminished academic productivity.

Accepting Editor Aaron M. Glassman | Received: November 8, 2024 | Revised: March 14, 2025 | Accepted: April 26, 2025.

Cite as: Haweny, K., Sodeika, E. I., Monaco, S. B., Botknecht, M., & Heesacker, M. (2025). Depletion sensitivity partially mediated the relationship between social media addiction and academic productivity. *Journal of Information Technology Education: Research, 24,* Article 14. https://doi.org/10.28945/5501

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Findings	In a series of multivariate multiple regression analyses, overall social media consumption significantly predicted overall academic productivity, mostly because social media addiction was inversely related to self-reported productivity scores, and this was a large effect (partial $\eta 2$=.134). Depletion sensitivity and, to a smaller degree, academic delay of gratification partially mediated that effect.
Recommendations for Practitioners	If replicated and confirmed with experiments, these findings could guide practitioners to focus on depletion sensitivity to reduce the adverse impact of social media use on academic performance.
Recommendations for Researchers	These findings suggest that researchers should study the effects of potential mediating variables to understand the relationship between social media use and academic performance.
Impact on Society	If replicated, our results can guide students, advisors, and instructors about the adverse impact of addictive social media use and about the role that depletion sensitivity plays in this process. These findings can be applied to mitigate the harmful impact of habitual social media use on collegiate academic performance.
Future Research	Because depletion sensitivity only partially mediated this relationship, future studies might test other possible mediators, including the time available for academic work, procrastination, psychological distress, and sustained attention. Future research should also establish cause-and-effect relationships among these variables.

Keywords	academic productivity, delay discounting, delay of gratification, depletion sensitivity, self-control, social media addiction

INTRODUCTION

NATURE OF THE PROBLEM

In recent years, social media has become a prevalent feature in most individuals' daily lives. As of 2021, the number of active social media users grew to 4.2 billion individuals, encompassing an astonishing 53.6% of the global population (Mahalingham et al., 2023). Among this population, it has been found that social media is most popular among 18-29-year-olds, a group that uses a variety of social networking sites such as Snapchat, Instagram, and X (Dumford et al., 2022). As the use of social media among this age group continues to rise, a need for research on its impact has evolved. One such sphere of research centers on the effect of social media use on academic performance. When used for academic purposes, social networking platforms can be a useful tool to enhance collaboration amongst peers and foster communication between students and instructors (Al-Adwan et al., 2020).

However, social media can have detrimental effects on its user population, particularly with regard to the development of social media addiction. We do not view social media addiction as belonging to a unique category of addictive behaviors. Instead, we consider social media addiction to be in the same category as other addictive behaviors like habitual television use or gambling. Addictive behavior is a repetitive habit pattern that increases the risk of associated medical or social problems; these patterns are typically characterized by immediate gratification coupled with delayed, harmful consequences (Marlatt et al., 1988). Social media addiction specifically refers to a continued engagement in social media platforms that disrupts an individual's functioning in aspects such as interpersonal relations, work or study performance, and physical health (Cheng et al., 2022). Previous research has indicated that the more time one spends on social media, the worse academic performance is; one study found

that each additional hour of phone usage per day lowered current term GPA by 0.152 points and significantly reduced other self-reported measures of academic productivity (Sapci et al., 2021). The amount of time devoted to using social media comes at the expense of time spent devoted to academic activities, and using social media *during* academic activities increases the amount of time it takes to complete tasks while reducing how much information students retain (Al-Menayes, 2015; Flanigan & Babchuk, 2015).

Review of the Literature

Previous studies on the relationship between social media addiction and academic performance have reliably demonstrated the negative impacts social media can have on academic performance in general. However, the existing literature has not attempted to explain *how* social media use harms academic productivity. Our study examined three potential mediating variables related to self-control: the delay of gratification, delay discounting, and sensitivity to ego depletion. These variables may help illuminate the cognitive and behavioral mechanisms by which social media use decreases academic productivity. Importantly, these constructs are not specific to social media addiction; many other behavioral addictions, such as television addiction and other forms of over-consumption, have the ability to impact delay discounting and delay of gratification. However, the immediacy and connectedness of social media may exacerbate these effects.

Self-control has been shown to be crucial for academic success (Bembenutty & Karabenick, 2004). As such, evaluating the influence of social media addiction on self-control may reveal why it is particularly detrimental to academic performance. Self-control refers to the ability to down-regulate undesirable behaviors, thoughts, and emotions, especially when facing temptations, which supports the achievement of long-term goals (Duckworth, 2011). An important behavioral facet of self-control is the ability to delay gratification, which refers to resisting an impulse to take a reward that is immediately available with the intent of obtaining a higher-value reward in the future (Conti, 2024). The nature of social media allows users to access social, emotional, and entertainment-related rewards instantaneously. Predictably, as the amount of time spent on social media increases, teenagers' ability to delay gratification decreases (Sriram, 2023). Those who check social media habitually have more difficulty controlling their social media use when attempting to achieve more important goals than others (Du et al., 2019).

One's general ability to delay gratification can be assessed through the use of delay discounting tasks, which involve hypothetical choice scenarios typically regarding monetary rewards. Delay discounting measures how individuals devalue rewards as the waiting time for their receipt increases (Reynolds et al., 2002). The extent to which one devalues a delayed reward differs among individuals depending on how impulsive they are. Impulsive individuals discount delays more steeply, meaning they tend to prefer smaller rewards that are available more immediately over larger, more temporally distant rewards (Odum et al., 2020). Due to the immediacy of social reinforcers available through social media, habitual use can increase impulsive behavior, especially in response to cues like notifications (Wegmann et al., 2020). Therefore, individuals who use social media habitually may discount valuable yet temporally remote rewards more steeply.

Specifically evaluating one's *academic* delay of gratification can illuminate how well a student exercises self-control when choosing between non-academic and academic tasks. Academic delay of gratification refers to students' choice to pursue important, temporally remote academic rewards over immediately available opportunities that satisfy impulses. College students higher in academic delay of gratification reported more frequent use of cognitive learning strategies like elaboration and organization, as well as resource management strategies like the regulation of time and study environment; the use of such strategies enhances academic success (Bembenutty & Karabenick, 1998). The importance of self-control for completing academic tasks makes the concept of *academic* delay of gratification especially relevant for research exploring what mediates the relationship between social media use and academic performance.

Along with its negative association with users' ability to delay gratification, social media has also been associated with ego depletion, which is a psychological self-control deficit. Ego depletion occurs when acts requiring effortful self-control negatively impact performance on subsequent demanding tasks (Borgonovi & Biecek, 2016). Self-control is an exhaustible resource, and the rate at which it becomes depleted differs among individuals. This individual difference is known as depletion sensitivity. Individuals high in depletion sensitivity experience ego depletion more dramatically, meaning they have more trouble engaging in repeated acts of self-control (Salmon et al., 2014). Because entertainment media requires little cognitive effort and is hedonically rewarding (Reinecke et al., 2014), ego-depleted individuals are often drawn to using it as a means of rest or recovery (Hartmann, 2012). However, consuming media while in an ego-depleted state can lead to feelings of guilt for mindless consumption, which can diminish its effectiveness as a means of psychological recovery (Reinecke et al., 2014). Thus, ego-depleted individuals who use social media for recovery may emerge feeling even more depleted than they felt initially. Psychological endurance and the ability to maintain motivation are crucial to academic success (Borgonovi & Biecek, 2016); thus, individuals in an ego-depleted state are likely to experience decrements in academic performance.

We found no published studies documenting whether the demonstrated negative impacts of social media on delay of gratification, delay discounting, and depletion sensitivity lead to deficits in academic performance. However, based on research we have just reviewed, we predict that these variables will play a mediating role.

The Current Study

This study examines whether delay of gratification, delay discounting, and depletion sensitivity mediate the previously demonstrated negative correlation between social media addiction and academic productivity. (Mediators are variables through which predictor variables influence criterion variables.) By identifying variables that may influence or explain the negative correlation between social media addiction and academic productivity, we can gather a comprehensive understanding of this prevalent issue faced by college students (see Figure 1).

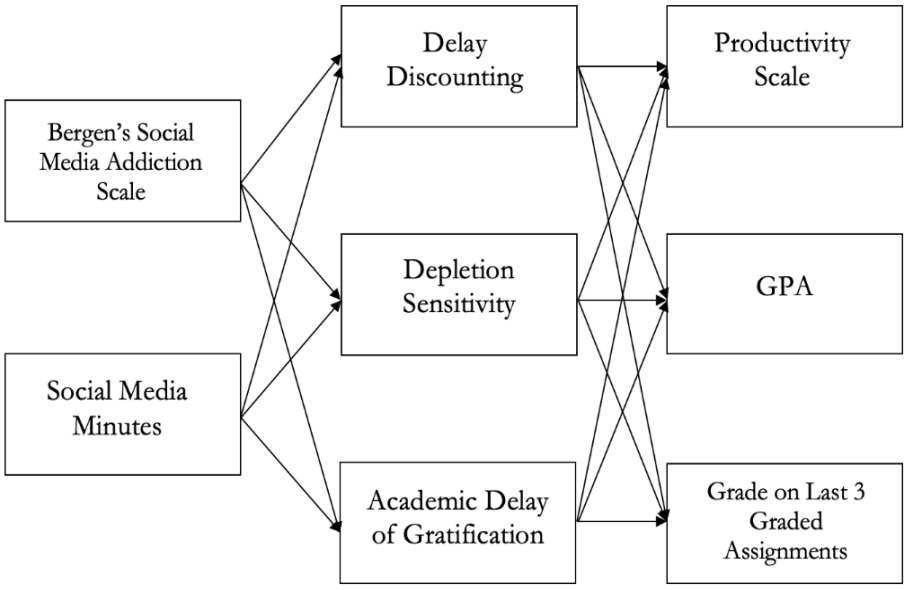

Figure 1. Multivariate multiple regression with predictor variables predicting criterion variables

METHODS

PARTICIPANTS

Participants were students in undergraduate psychology classes (n = 315) at a large public university. Most participants (n = 235) identified as female, 43 identified as male, 3 identified as genderqueer, 1 identified as a transgender woman, and 1 identified as a transgender man. Regarding race, 193 participants identified as white, 58 as Asian, 11 as Black or African American, 69 as Hispanic/Latin American, 8 as Arab, 1 as Native American, 1 as Pacific Islander American, and 10 as biracial or other. Regarding age, 218 participants reported being between the ages of 18 and 20, 48 between the ages of 21 and 24, 14 older than 24, and 1 did not respond. Regarding marital status, 262 participants reported they were never married, 1 widowed, 2 divorced, 1 separated, 11 married, and 4 preferred not to say. Regarding year in college, there were 76 self-reported freshmen, 66 sophomores, 71 juniors, and 65 seniors. Participants' self-perceived social class averaged 6.5 (1.7) with a range from 1 (lowest social class) to 10 (highest social class).

PROCEDURES

Participants signed up for the study through SONA, an online research participation tool, and received a Qualtrics survey link. After giving consent, participants were prompted to complete a survey consisting of 54 questions, which included measures of social media addiction, social media use, delay of gratification, depletion sensitivity, delay discounting, and objective and subjective indicators of productivity, and several demographic questions.

MEASURES

Social media addiction

Participants' self-reported level of addiction to social media was measured using the Bergen Social Media Addiction Scale. This scale measures social media addiction through six core items: salience, tolerance, mood modification, loss of control, withdrawal, and conflict (Cheng et al., 2022). The participants were asked to complete the questions while focusing on their experiences within the last week/month regarding their social media usage. The questions are on a 5-point Likert scale ranging from very rarely (1) to very often (7). A sample item is, "You feel an urge to use social media more and more." The measure is scored by totaling the points from each question, with no reverse scoring. The higher the score, the greater the addiction to social media. The measure had a Cronbach alpha of .88 (Andreassen et al., 2016). The scale was adapted from the Bergen Facebook Addiction Scale (BFAS), which was found to have good validity when tested with other measures of Facebook addiction (Andreassen et al., 2012). Convergent validity was satisfactory for the Bergen Social Media Addiction Scale, which replaces each instance of the word "Facebook" with "social media" (Shin, 2022). This sample produced a Cronbach's alpha of .86 for this measure.

Social media use

Participants' use of social media was measured through self-reported screen time. Participants were instructed to go into settings on their smartphones and navigate to the screen time page, where they would find and report screen time for the apps TikTok, X, and Instagram. Screen time measures were summed to produce an overall measure of screen time.

Ego depletion

Sensitivity to ego depletion was measured with the Depletion Sensitivity Scale. The participants were asked to complete the questions while focusing on their experiences within the last week/month regarding their academic work, rather than outside work. The 11-question measure is on a 5-point Likert scale ranging from totally disagree (1) to totally agree (7). A sample item is, "I get mentally fatigued easily." The measure is scored by totaling the points from each question, with no reverse scoring. A high score indicates that the subject has high depletion sensitivity. The measure was found to

have a Cronbach's alpha of .92 (Salmon et al., 2014). Further tests of the scale's convergent and discriminatory validity deemed both to be satisfactory (Salmon et al., 2014). This sample produced a Cronbach's alpha of .88 for this measure.

Delay discounting

Delay discounting was measured with a one-item delay discounting task from a 2010 study on delay discounting and academic performance by Freeney and O'Connell (2010). Participants were asked, "How long are you willing to wait for a raffle prize if the monetary amount increases with time?" They were instructed to select one of seven options, ranging from "Wait one day, earn $100," to "Wait one year, earn $200," with incremental increases in both delay time and dollar amount. Higher scores indicate shallower delay discounting, or lower impulsivity, and have been shown to predict better academic outcomes (Freeney & O'Connell, 2010).

Academic delay of gratification

The delay in gratification was measured using the Academic Delay of Gratification Scale. Participants were instructed to read each question and select the choice they were most likely to make. The measure consists of 10 questions, each with two choices. Sample items include, "Miss several classes to accept an invitation for a very interesting trip" and "Delay going on a trip until the course is over." We simplified the rating scale used by Abd-El-Fattah and Al-Nabhani (2012) by having participants choose either "A" or "B" rather than ranking their probability of selecting each choice. The measure is scored by tallying each question and reverse-scoring some items. Higher scores indicate more delay of gratification. The authors reported an acceptable Cronbach's alpha of .87 (Abd-El-Fattah & Al-Nabhani, 2012). This sample produced a Cronbach's alpha of .64 for this measure.

Self-perceived productivity

Participants' self-reported current level of productivity was measured using the Brief Instrument to Assess Workers' Productivity During a Work Day, which we will refer to as the self-reported productivity measure. Participants were asked to complete the questions while focusing on their productivity within the last two hours. The 10-question measure is on a 5-point Likert scale ranging from not at all (1) to totally (5). A sample item is, "How difficult has it been to get work done in the last two hours?" The measure is scored by totaling the points from each question, with no reverse scoring. A high score indicates that the subject feels they have high current work productivity levels. The measure was found to have a Cronbach's alpha of .91 (Menezes & Xavier, 2018). The convergent validity of this instrument was found to be satisfactory (r^2=0.86) (Menezes & Xavier, 2018). This sample produced a Cronbach's alpha of .86 for this measure.

Objective productivity measures

Academic productivity was also measured by asking participants to report their current grade point average, as well as how many assignments they failed to turn in the past month. They were also asked to report the last three grades they received on assignments for which completion does not guarantee full credit.

RESULTS

PRELIMINARY DATA ANALYSIS

Only continuous variables with untransformed or transformed skewness and kurtosis values in the range of |2| were included in the analyses. GPA and grades on the last three assignments underwent exponential transformation to achieve acceptable skewness and kurtosis values. Reported minutes using Instagram underwent Winsorizing and square root transformation to achieve acceptable skewness and kurtosis values. Winsorizing means changing the value of outlier scores to the value of the

nearest non-outlying score, rather than removing the data. Reported minutes using X were also Winsorized. The measure of late or missed assignments was dropped from the analysis because no transformation produced acceptable skewness and kurtosis values.

A missing completely at random (MCAR) test conducted on the variables included in the analyses showed nonrandom missingness. Therefore, all analyses were conducted on the original data set and five imputations of the dataset, all with very similar outcomes to those produced by the original data set (all analyses are available on Open Science Framework).

Predictors of Outcome Measures

Measures of social media use significantly predicted academic productivity, as hypothesized. This effect was driven by social media addiction, Pillai's Trace $F(3, 214) = 12.29$, $p < .001$, $\eta 2p = .15$, a large effect (small = 0.01, medium = 0.06, large = 0.14) (see Figure 2). Pillai's trace is one of several commonly used statistics for assessing multivariate statistical significance.

The overall social media addiction effect was primarily driven by its prediction of the self-reported productivity measure, $F(1, 216) = 32.19$, $p < .001$, $\eta 2p = .13$, nearly a large effect. It was also driven to a smaller degree by its prediction of grades on the last three assignments, $F(1, 216) = 5.90$, $p < .016$, $\eta 2p = .027$, a small effect. GPA was not significantly predicted by social media addiction, $F(1, 216) = 0.001$, $p = .98$, $\eta 2p = .00$. Social media minutes was a nonsignificant predictor of the three academic productivity variables, Pillai's Trace $F(3, 214) = 1.23$, $p = .299$. Social media minutes also did not significantly predict any of the three academic variables individually, and all $\eta 2p$ values were .012 or smaller, indicating small to very small effects.

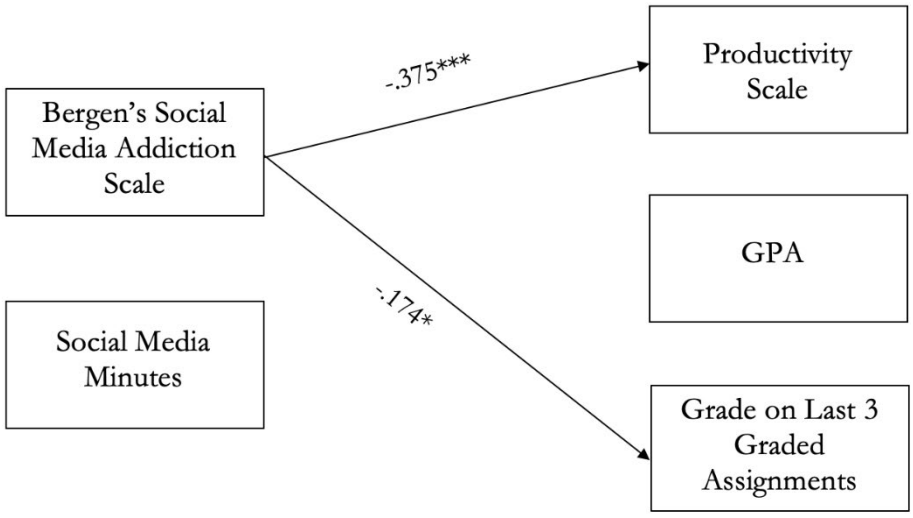

Figure 2. Multivariate multiple regression with predictor variables predicting criterion variables, including only significant relationships and beta weights

Predictors to Hypothesized Mediators

Measures of social media use significantly predicted the hypothesized mediators. This effect was driven by social media addiction, Pillai's Trace $F(3, 221) = 12.07$, $p < .001$, $\eta 2p = .14$, a large effect (0.01 = a small effect, 0.06 = a medium-sized effect, 0.14 = a large effect). The overall social media addiction effect was primarily driven by its prediction of depletion sensitivity, $F(1, 223) = 29.37$, $p < .001$, $\eta 2p = .12$, nearly a large effect (see Figure 3). It was also driven to a smaller degree by its prediction of academic delay of gratification, $F(1, 223) = 8.53$, $p = .004$, $\eta 2p = .037$, a small to medium effect. Delay discounting was not significantly predicted by social media addiction, $F(1, 223) = 1.78$, $p = .183$, $\eta 2p = .008$, a very small effect. Social media minutes were a nonsignificant predictor of the three hypothesized mediator variables, Pillai's Trace $F(3, 221) = 0.30$, $p = .82$. Social media minutes

also did not significantly predict any of the three academic variables individually (all *p*'s > .43 and all *η2p* values < .004, indicating very small effects.

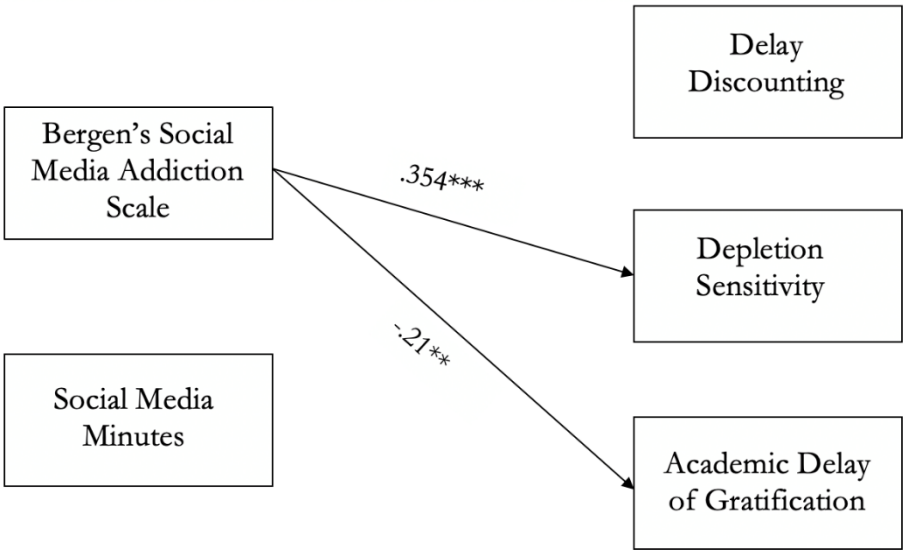

Figure 3. Multivariate multiple regression with predictor variables predicting hypothesized mediating variables, including only significant relationships and beta weights

Hypothesized Mediators to Outcome Variables

Hypothesized mediators significantly predicted academic outcomes, as hypothesized. The model, which included all hypothesized mediators, predicted self-reported productivity scale scores especially well, $F(3, 248) = 16.97$, $p < .001$, $\eta 2p = .170$, a large effect (small = 0.01, medium = 0.06, large = 0.14), model $R^2 = .17$, adjusted $R^2 = .16$. In contrast, the hypothesized mediators model failed to significantly predict either GPA, $F(3, 248) = 2.08$, $p = .104$, $\eta 2p = .025$ (a small effect), model $R^2 = .025$, adjusted $R^2 = .013$ or grades on participants' last three assignments, $F(3, 248) = 1.84$, $p = .138$, $\eta 2p = .022$ (also a small effect), model $R^2 = .022$, adjusted $R^2 = .01$. The significant prediction of academic outcomes (again, primarily self-reported productivity measure scores) was driven by the hypothesized mediator depletion sensitivity, Pillai's Trace $F(3, 246) = 14.96$, $p < .001$, $\eta 2p = .154$ (a large effect) (see Figure 4). The other two hypothesized mediators did not significantly predict the outcome measures: Academic delay of gratification Pillai's Trace $F(3, 246) = 2.46$, $p = .063$, $\eta 2p = .029$ (a small effect); Delay discounting Pillai's Trace $F(3, 246) = 0.52$, $p = .665$, $\eta 2p = .006$ (a very small effect).

Predictors to Outcome Measures, with Mediator Effect Statistically Controlled

The final question is whether hypothesized mediators fully or partially mediated the relationship between predictors and outcomes. As reported earlier, only two paths between predictors and outcomes were statistically significant. The strongest predictive path is from social media addiction to the scale measuring perceived academic productivity, $\beta = -.375$, $p < .001$ (see Figure 5). The second significant path was from social media addiction to self-reported grades on the last three assignments, $\beta = -.174$, $p < .05$. No other paths between predictors and outcomes reached or approached statistical significance. With the hypothesized mediators statistically controlled, the addiction-productivity scale path dropped from $\beta = -.375$, $p < .001$, to $\beta = -.254$, $p < .001$. So, the variance accounted for dropped from 14.1% to 6.5%, indicating a partial but substantial mediating effect. The addiction-last three assignments path dropped from $\beta = -.174$, $p < .05$ to $\beta = -.166$, $p < .05$. So, the variance accounted for dropped from 3.0% to 2.8%, indicating a small mediating effect. In sum, the predictor-

outcome relationship was partially mediated. In one case, there was a substantial mediating effect, and in the other, only a small effect of the mediating variables.

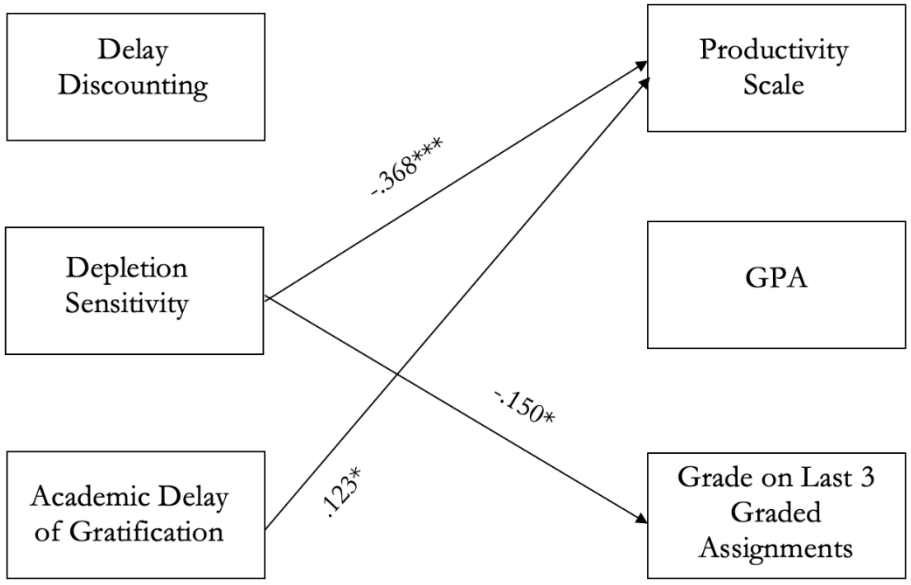

Figure 4. Multivariate multiple regression with hypothesized mediating variables predicting criterion variables, including only significant relationships and beta weights

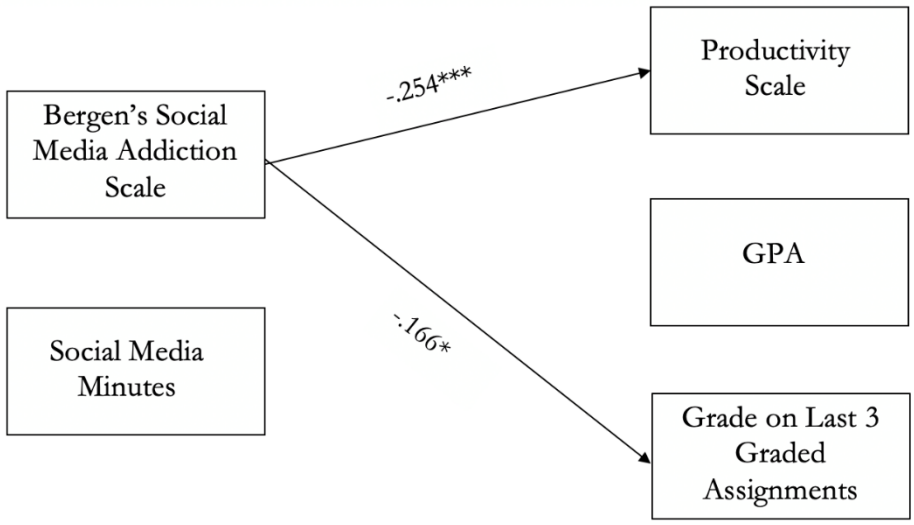

Figure 5. Multivariate multiple regression with predictor variables predicting criterion variables, controlling for hypothesized mediators, including only significant relationships and beta weights

DISCUSSION

Social media addiction strongly predicted self-reported productivity among collegians. When combined, social media addiction scores and self-reports of screen time negatively correlated with self-reported productivity. However, screen time by itself did not predict any of the three academic

productivity measures. Social media addiction and screen time also predicted our other measure of academic productivity, participants' last three graded assignments, to a lesser degree.

Depletion sensitivity had a substantial but incomplete mediating effect on the relationship between social media addiction and the productivity scale. The overlap between social media addiction and the productivity scale dropped to less than half when the mediators were statistically controlled for and most of that mediational effect came from depletion sensitivity. The role of depletion sensitivity in this study can be explained by the ego depletion effect. As explained earlier, ego depletion occurs when acts requiring effortful self-control negatively impact performance on subsequent demanding tasks (Borgonovi & Biecek, 2016). Individuals with higher depletion sensitivity experience ego depletion more dramatically, thereby diminishing self-control. Addictive social media use may limit one's ability to practice self-control, leading to reduced productivity. The other two hypothesized mediators did not have mediating effects on the relationship between social media use and academic productivity. To measure delay discounting, we used a one-item measure whose reliability is unknown and which may not be especially reliable. This possible lack of reliability may have produced that nonsignificant effect. The delay discounting measure also focused on financial rewards, not academic ones. The measure's non-academic focus might account for the lack of association with measures of academic productivity. In the case of academic delay of gratification, we modified the measure by simplifying the response alternatives to ease participant responding. Unexpectedly, this change resulted in a sample Cronbach's alpha of only .64, consistent with the argument that reduced reliability of the measure may account for the nonsignificant findings on this measure.

Our findings generally support our hypothesis that social media use limits productivity in an academic context. Depletion sensitivity played a mediating role in this relationship. Our research also corroborates prior findings that the amount of time spent on social media is negatively correlated with academic productivity (Al-Menayes, 2015). In terms of depletion sensitivity, our results support previous findings that individuals who are more sensitive to depletion have more trouble engaging in repeated acts of self-control (Salmon et al., 2014), as we found that depletion sensitivity is negatively correlated to academic productivity, which requires self-control. Previous research indicated that extensive use of social media would increase impulsivity (Wegmann et al., 2020); however, delay discounting (which we used to measure general impulsivity) was not significantly predicted by the social media use variables. Therefore, delay discounting was an ineffective measure of impulsivity in this case.

LIMITATIONS

This study has several potential limitations. We used self-reports of time spent on social media (in minutes) as one measure of social media addiction, instructing participants to report screen time statistics from social media applications. This was not a predictive measure on its own, which may be attributed to insufficiently detailed instructions for self-reporting; participants were instructed to report their social media screen time for the current day shown in the Settings application, with no standardization regarding a time of day for reporting. Participants who took the survey in the morning likely reported a significantly lower screen time than participants who took it in the evening.

A second limitation comes from our sample of participants. All participants were students from a top-tier public research university with selective admission (30% acceptance rate). As a result of the university's challenging admissions standards, our participants' self-reports of GPA, number of assignments they recently failed to turn in, and grades on their last three assignments were all restricted in range and overrepresented high performance. For instance, 69% of participants reported that they turned in all their assignments in the past month. These data could not be sufficiently transformed, so they were not included in parametric statistical analyses. Furthermore, we had to transform self-reports of GPA and grades on participants' last three assignments to conduct parametric statistical analyses. The strong academic performance of participants raises questions about the generalizability of our findings to other college and university students.

Another possible limitation comes from participants self-reporting their academic performance. The accuracy of their responses cannot be determined. On the other hand, participants' responses were completely anonymous, so they had little incentive to deceive. Generally, their responses mirror the overall high performance typically demonstrated by students at the university. Nevertheless, future studies could address this concern by using university-provided student performance data to ensure response accuracy.

Additionally, our decision to simplify the Academic Delay of Gratification Scale (Abd-El-Fattah & Al-Nabhani, 2012) from five response alternatives to two resulted in a decrease in reliability. The original Cronbach's alpha of 0.87 decreased to a sample Cronbach's alpha of 0.64, as mentioned earlier. This limitation in reliability may have contributed to the non-significance of academic delay of gratification as a mediator.

Similarly, the Freeney and O'Connell (2010) delay discounting task consisted only of one item, which may be somewhat unreliable in the context of our study. This measure's reliability is also unknown, which may have contributed to the nonsignificant findings related to delay discounting. The Freeney and O'Connell (2010) scale also required participants to rate their ability to wait for a raffle prize as its monetary value increases. In the context of academic responsibility and performance, this measure of monetary discounting may not accurately reflect the choices made by participants in our study.

Suggestions for Future Research

Considering the above limitations, future studies should collect self-reports of social media 'screen time' in a more standardized way. For instance, participants should be instructed to report their weekly or monthly average (as opposed to an unspecified daily measurement); such averages are readily available on the Settings application of most smartphones. Future studies could also test whether certain social media apps, like X, Instagram, or TikTok, have varying effects regarding fostering social media addiction or decreasing academic productivity. Sites like TikTok, which involve more scrolling behavior, might produce differing results from sites like X, which involve primarily verbal behavior (in the form of private communication or public discourse).

Furthermore, because depletion sensitivity only partially mediated the relationship between social media addiction and academic productivity, future studies might test other possible mediators. For example, perceived time available for academic work and/or procrastination may mediate the social media addiction-productivity relationship. Procrastination has been linked to dissatisfaction with studying and increased dropout rates (Lindner et al., 2023). Another promising mediator is academic activity (involvement with school clubs and academic competitions), which was found in a Vietnamese student sample to be related to social media use (Ngo et al., 2023).

Additionally, students with stronger self-control have a reduced likelihood of experiencing psychological distress, whereas individuals with lower self-control are more at risk for psychiatric problems (Caspi et al., 2013; Gilbert et al., 2023). Social media addiction may diminish students' self-control capacities and thus may lead to psychological distress, which may hinder academic success.

Another potential mediator that a future study might explore is sustained attention. Sustained attention during challenging or unappealing tasks is crucial for comprehension and thus for academic success (Segal, 2023). Addictive social media use may decrease students' ability to sustain attention during academic tasks, especially given research linking social media addiction with the development or worsening of ADHD symptoms (Boer et al., 2020).

Finally, future studies could evaluate whether other addictions have a similar effect on academic performance. As defined earlier, addictive behavior is a repetitive habit pattern that increases the risk of associated medical or social problems; these patterns are typically characterized by immediate gratification coupled with delayed, harmful consequences (Marlatt et al., 1988). This definition suggests that any form of addictive behavior (e.g., gambling, eating, sexual behavior, or hobbies) is likely to

produce decrements in academic performance. Future studies could test whether different kinds of addictive behavior are associated with similar decrements in academic success.

Conclusions and Practical Implications

Overall, the current study confirms previous findings that social media use negatively correlates with academic productivity and extends them by showing that depletion sensitivity partially mediates that relationship. Delay discounting and academic delay of gratification did not mediate that relationship. If replicated, our results can guide instructors, app developers, policy makers, administrators, and students.

Because using social media during academic tasks has been shown to diminish productivity and reduce information retention, university instructors may be encouraged to develop and enforce policies that prohibit cell phone use during class. To address the use of social media during personal study time, some programmers have already developed mobile apps that restrict cell phone usage for specified periods of time to enhance focus (e.g., Forest, SPACE). With additional data illuminating the negative impact of social media use on collegiate academic success, such app developers might direct their marketing efforts to college students. Additionally, our data illuminate the mediating role depletion sensitivity plays in this relationship. Policy makers and school administrators may put forth initiatives to educate students on the potential drawbacks of habitual social media use, including the significance of ego depletion; they may advise students to engage in other free-time activities that might be more effective at replenishing their self-control resources. Students themselves should be invited to examine the extent to which their own use of social media has affected their studies and their depletion sensitivity. By revealing details on the relationship between social media use and collegiate academic performance, this study empowers individuals at all levels of academia to reflect on and thereby mitigate the negative impacts of social media addiction.

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