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Clarifying the Relationship Between Instagram Use and Mental Health: Exploring the Role of Individual Differences in Problematic Instagram Use and Goal Pursuit

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by

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Abstract

Social media platforms are increasingly becoming part of the everyday life of Americans. The increasing use of social media platforms has been parallel to the declining mental health of adolescents, and young adults causing scientists and the public alike to wonder if there is a link between these trends. The aim of this study was to explore how the self-regulation framework can enrich social media use research by taking into account individual differences in goal pursuit, and conflict. In addition, this study aimed to clarify the relationship between screen time and mental health. Social media use, mental health, and self-regulation strategies were measured in a digital sample of young adults ages 18-29 (*N*=200). The results indicated that there were no significant relationships between anxiety, depression, negative affect, and Instagram screen time. There was, however, a significant relationship between anxiety, depression, negative affect, and problematic Instagram use which depicted conflict between social media use and other goals. In addition, results suggested that the process model of self-control can be applied to self-regulatory strategies in relation to social media use. Situational strategies seem to be more effective at reducing Instagram use, as opposed to cognitive strategies. These findings clarify the current contradictory screen time literature, and expand the domains in which the process model of self-control has been examined. There are practical implications from these results. Namely that future research about social media use and mental health should decentralize screen time as a key factor and begin to further explore the role of goal pursuit and conflict in this domain.

Keywords: social networking sites, social media, Instagram, self-regulation, goal-pursuit, cognitive strategies, situational strategies

Increased Use of Social Networking Sites

In recent years, social networking sites have had a vast and rapid increase in users, and a continuation of this upward trend is predicted (Tankovska, 2021). In fact, in 2020, more than 3.6 billion people used social networking sites and spent a daily average of 144 minutes on these sites alone (Tankovska, 2021). In the public lexicon, and even in scientific literature at times, the phrase "social media" is often used to describe two close but separate constructs; social media, and social networking sites. There is a significant distinction, however, between the two. Social media can be best understood as an umbrella term that refers to a large number of online platforms whereby users have the ability to produce, share, and collaborate on the content they consume (Kuss & Griffiths, 2017). Consequently, social media includes but is not limited to weblogs, social networking sites, virtual video game worlds, Wikis, etc. Social networking sites, on the other hand, are best understood as a subset of social media sites. Social networking sites (SNSs) refer to online platforms where users are encouraged to "create individual profiles, interact with real-life friends, and meet other people based on shared interests" that can be found by viewing the content that other users share (Kuss & Griffiths, 201; p. 3529). Popular present-day social networking sites are Facebook, Instagram, Snapchat, etc. In the present paper, the terms social media and social networking sites are used interchangeably to refer to the latter concept.

According to a survey conducted by the Pew Research Center in 2019, 72% of adults in the United States reported that they use at least one social networking site compared to 37 % of adults from the previous decade (Auxier et al., 2019). The prevalence of social media use is even higher when looking at specific age groups. The same survey reports that in 2019, 90% of young adults, individuals between the ages of 18-29, reported using at least one social networking site

compared to 67 % of young adults in 2009 (Auxier et al., 2019). This increase in the use and prevalence of SNSs has resulted in recent conversation among the general public concerning the possible negative consequences of increased screen time, as well as the emergence of a prolific field of research that explores the association between SNS use and the user's physical and mental health (Andreassen, 2015; Auxier et al., 2019).

Increased Use of Social Networking Sites and Declines in Physical and Psychological Health

The increased use of SNS has paralleled the declining mental health state of adolescents and young adults. In fact, data from the National Survey of Drug Use and Health asserts that the rates of major depressive episodes reported in the last year increased by 63% from 2005 to 2017 amongst young adults between the ages 18-25 (Twenge et al., 2019). Psychological distress increased 71% among this age group from 2008 to 2017 (Twenge et al., 2019). Correlational studies suggest that increased screen time is associated with higher likelihood of obesity (Boone et al., 2007), as well as increased risk of mental health and poor sleep quality (Christensen et al., 2016; Wu et al., 2015). As a result of the congruent increase of mental health problems and social media use, researchers sought to investigate if there were associations between the two phenomena.

Critiques of Social Networking Sites Research

Research exploring the putative association between social media use, and physiological and psychological well being has had two main shortcomings; a) an assumption that the user's engagement with social media constitutes as addictive behavior, and b) a poorly operationalized measure of social media use that relies on estimates and with varying definitions across studies.

Addiction Framework

Prior research that focuses on social networking sites and the possible effects of social network usage on the psychological and physiological well-being of users has overwhelmingly used the addiction framework as the foundation for the rationale of their study designs and their conclusions. Adopting the addiction framework to study social media use, however, requires prematurely accepting important assumptions. The first assumption made is that the mechanisms driving substance-related addictions and behavioral addictions are identical. Daniel Kardefelt-Winther and colleagues state that the inclusion of the behavioral addiction (gambling disorder) in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in 2013 created a precedent for the rise of behavioral addiction research such as "Internet addictions" (Billieux et al., 2015; Kardefelt-Winther et al., 2017). However, although gambling disorder and Internet addictions may both be categorized as "behavioral addictions," they may be completely separate constructs. In addition, researchers have pushed back against the over-pathologizing of common behaviors, such as SNS use. Upon reviewing the literature regarding social media use, it is apparent that researchers widely believe that a significant amount of research about behavioral addictions has been confirmatory research, rather than exploratory, and atheoretical (Billieux et al., 2015; Kardefelt-Winther et al., 2017). This means that researchers assumed that Internet addictions would map onto substance-related addictions and, as a result, their studies were designed to confirm this assumption rather than explore it. Kardefelt-Winther and colleagues point out the flaws in this study design and I go on to present the larger critiques here. The first major problem is that the criteria are blindly adopted from substance-related addiction disorders without the consideration that behavioral disorders, if they exist, could have completely different symptomology and relevant measures (Kardefelt-Winther et al., 2017). Secondly, the research conducted on behavioral addiction fails to first explore the behavior of interest, such as SNS use,

through the lens of coping strategies first before pathologizing it as an addiction disorder (Kardefelt-Winther et al., 2017). In other words, the studies often did not include questions about potential stressors, common coping strategies (e.g., escapism), or an individual's history of trauma or adversity—all factors that may account for increased social media use that is considered "addictive." Lastly, the definitions of specific behavioral addictions were created loosely and without proper inclusion and exclusion criteria (Kardefelt-Winther et al., 2017). In other words, based on undefined criteria of the behavioral addictive model, SNS usage can be classified as a behavioral addiction. anything could be seen through a behavioural addictive model.

Initial social networking site research prematurely focused on exploring the increasing engagement of individuals and social media through the lens of the addiction model. The present study aims to move away from the pathologizing of SNS use to explore SNS engagement through the lens of self-regulation and personalized goal pursuit.

Screen Time as an Ineffectual Measure of SNS Use

Past research about the associations between screen time and psychological and physical health has resulted in mixed findings (Jensen et al., 2019; K. Kaye et al., 2020; Karim et al., 2020; Orben, 2020). A systematic review conducted by Fazida Karim and colleagues states unyieldingly that "social media [is] responsible for aggravating mental health" while Candice Odgers and Michaeline Jensen state, in their review, that links between screen time and mental health are "a mix of often conflicting small, negative, and null association" (Karim et al., 2020; Odgers & Jensen, 2020). In a longitudinal study looking at EMA data, Jensen and colleagues concluded that, for young adolescents, digital technology usage is not correlated with higher rates of poor mental health (Jensen et al., 2019). A review of 80 systematic reviews and

meta-analyses conducted by Amy Orben concluded that, “on average,” there is a small negative correlation between screen time and mental health (Orben, 2020). A review looking at the pitfalls of screen time literature suggests that, as a measure, screen time has been poorly conceptualized, has not been standardized, and studies surrounding screen time largely use self-reported estimates which leave room for human error (K. Kaye et al., 2020). The same review suggests that using a more “objective-driven” measure can decrease the limitations of screen time as a measure (K. Kaye et al., 2020).

Self-regulation

I propose that, as an alternative to using addiction models to explore social media use, researchers conceptualize social media usage within models of self-regulation where other similar behavioral patterns, such as dieting, studying, and working, are explored. Self-regulation is the multi-faceted process by which individuals identify goals, take measures to accomplish those goals, and keep a continuous record of the progress that has been or has not been made (Inzlicht et al., 2020; Milyavskaya & Werner, 2018). Self-regulation includes a range of activities such as deciding or prioritizing goals, planning the best strategies to accomplish set goals, and pursuing or acting upon said plans (Inzlicht et al., 2020). An individual's SNS use can be understood as a “goal” that creates conflicts, or not, with other goals they may have in their life. Understanding SNS usage through the lens of self-regulation allows us to account for an individual's motivation, and the presence or absence of conflicts with other goals. I argue that researchers need to take into account individuals’ motivations, and reported conflict in relation to using social media rather than making generalizations about the relationship between screen time and mental health for whole populations. There are many different models that investigate self-regulation from different vantage points. In this study, we will investigate social networking

site usage through the framework of self-regulation. In particular, I focus on the process model of self-control to explore the role of different behavioral regulatory strategies in creating variant degrees of effectiveness in the reduction of SNS usage.

Process Model of Self-Control

The process model of self-control is a self-regulatory model that focuses on evaluating the effectiveness of different types of strategies in the face of desired goals (Inzlicht et al., 2020; Milyavskaya & Werner, 2018). According to this model, there are five types of strategies that can be implemented at different points in the self-regulatory process (Inzlicht et al., 2020; Milyavskaya & Werner, 2018). The first two strategies, situation selection and situation modification, are more proactive and fall under the category of situational strategies—the first of the two strategies being situation selection. Situation selection refers to "intentionally choosing to be in an environment that is aligned with one's goal and/or avoids temptation," (Inzlicht et al., 2020; p. 7). An example that puts this strategy to use is that in which an individual sets a goal to eat healthier foods. The individual may choose to buy groceries for that week at the farmers market, where they are more likely to buy healthy and fresh foods than if they planned to buy groceries at the supermarket where they are more likely to encounter processed foods. The second strategy is called situation modification, and this strategy refers to the active decision to make changes while in a non-optimal environment to reduce temptation or promote goal-oriented behavior (Inzlicht et al., 2020). Visualizing the individual from the previous example, imagine that this person has to go to a supermarket in which the individual is exposed to tempting food options due to a lack of accessibility to the farmer's market from the previous example. A situation modification strategy, for example, can be an active choice made by the individual to limit their consumption of unhealthy foods by only walking through the aisles that have healthy

foods and avoiding the cereal aisles. The last three strategies fall under the category of cognitive strategies; attention deployment, cognitive change, and response modulation (Inzlicht et al., 2020). Cognitive strategies are used when the individual confronts an item of temptation in order to address the conflict between the desire for the temptation and the desire to achieve the selected goal. Attention deployment refers to a focus on something other than the tempting object or situation. Imagine that the individual at the supermarket has successfully avoided the temptation of the unhealthy aisles but it is time to go to the registers to check out. The only problem is that the checkout is filled with processed and high-calorie foods. In this scenario, attention deployment can be useful because the temptation to consume unhealthy foods is unavoidable. An example of this strategy in action would be an active choice made by the individual to look straight ahead when approaching the checkout rather than letting themselves browse unhealthy food selections strategically placed by the registers. Cognitive change is the next strategy and it refers to the anchoring of positive consequences of restraint and the negative consequences of indulgence (Inzlicht et al., 2020). Imagine that the individual is unable to implement the attentional deployment strategy and they see their favorite unhealthy candy on the self while waiting in line at the checkout. At this point, the individual may resort to cognitive change to anchor themselves in their goal and deter further interaction with the tempting object. The last strategy according to the process model of self-control is response modulation. Response modulation refers to the effortful employment of willpower. At this point, the person in the supermarket example has been unable to implement the first two cognitive strategies so they find themselves grabbing their favorite candy from the shelf. The person has to rely on their willpower to determine whether or not to purchase the item they grabbed from the shelf.

The process model of self-control predicts that the "earlier" the intervention occurs, the more likely it is that a person achieves their goal. However, according to Inzlicht and colleagues, there has yet to be empirical evidence that compares the effectiveness of interventions at different "times" (Inzlicht et al., 2020). There is some evidence that has found associations between applying early strategies and more effective goal pursuit (Milyavskaya & Werner, 2018).

In this study, I will analyze whether or not there is an association between different strategies implemented in the regulation of SNS usage and the individual's mental health. I hypothesize that individuals who employ situational strategies, as opposed to cognitive strategies, will be more likely to report lower SNS usage.

Instagram

Instagram is a social networking site with more than one billion users as of 2020. Individuals can share photos and videos with their "followers" and they can message each other through this platform (Antonelli, 2020). In 2018, Instagram added a screen time feature where users can see how much time they have spent on the app for the past week (Apple, 2018). Instagram is a popular social media platform in which individuals scroll through their "feed" which is filled with posts from their followers.

The Present Study

The first goal of this study is to bring clarity to the discussion about the association between social media usage and poor mental health.

Hypothesis 1. As suggested by past researchers, I will be using a more objective measure of screen time that is specific to the social media platform Instagram. Given the results from Orben's (2019) extensive review, I hypothesize that there will be a small negative correlation

between social media use and mental health issues, such that individuals with high Instagram screen time use will be more likely to report poor mental health than those who report low screen time use.

Hypothesis 2. In accordance with the process model of self-control, I hypothesize that individuals who report that they would be more likely to use more proactive strategies (i.e., situational strategies), as opposed to cognitive strategies, will be more likely to report lower SNS usage.

Furthermore, in this project I will explore the role of "problematic behavior" and reported "motivation" on mental health and SNS use as opposed to simply accounting for how much time individuals spend on Instagram.

Methods

This study was approved by the Institutional Review Board at Bard College through an amendment of the REACH Lab's IRB approval. The project was funded by the REACH Lab at Bard College and the Andrew Jay Bernstein '68 Prize.

Participants & Sample Size Planning

Participants (N=211) were recruited through the online platform Prolific. There were two inclusion criteria; age group, and Instagram usage. Participants were required to be young adults between the ages of 18-29, and had to report that they owned and used an Instagram account. Recruiting from the desired age group was accomplished by using an in-platform filter provided by Prolific while the filtering of participants based on Instagram usage was obtained through a short pre-screener. Three participants were excluded because they did not provide consent (*N*=208). An additional eight participants were excluded from data analysis because they met the exclusion criteria of missing key data (*N*=200). Participants self-reported their gender identity;

1.5% identify as genderqueer or gender noncomforming, 41.5 % of participants identify as female, 55.5% identify as male, 1% identify as transgender, and one participant prefered to not say. There were twenty countries reported as countries of residence all around the world. The top three countries reported were Portugal (25.8%), Poland (20.6%), Mexico (17%).

Power Analysis

A correlation power analysis was conducted using R.Studio in order to determine how many participants were required. Initially the parameters of this analysis were the following; 0.05 alpha level, power of .80, and an effect size of 0.15 which was drawn in reference to previous research (Orben & Przybylski, 2019; Twenge & Campbell, 2018). This analysis indicated that the total sample size needed was 350 participants. We intended to recruit 350 participants. However, due to lack of funding, the final sample size was 200 participants. The power analysis that we conducted indicated that with these parameters (N=200, alpha = 0.05, and an effect size of 0.15,) the power of the present study is 0.57.

Design

This is a correlational study where the association between mental health, and Instagram use are explored. The primary variables measured were: negative affect, positive affect, depression, anxiety, total Instagram screen time (IG screen time), cognitive strategy use (Cog strategy), situational strategy use (Sit strategy), problematic Instagram use (IG use), and desire.

Materials

PANAS. The Positive and Negative Affect Schedule is a scale widely used to assess positive and negative affect (Díaz-García et al., 2020). The PANAS is a reliable self-report measure shown to have high internal consistency, and it is stable over a two-month period

(Watson et al., 1988). The PANAS asks participants to "indicate the extent you have felt this way over the past week" and then lists twenty emotions (Watson et al., 1988). Each emotion is accompanied by a likert-scale response format from 1(very slightly or not at all) to 5(extremely). A positive affect score is then obtained by adding the ten items representing positive emotions (such as "proud" and determined) and the mean positive affect is reported at 33.3 with a standard deviation of 7.2. As a result, high positive affect scores represent high positive affect while a low score represents a low positive affect. A negative affect score is then obtained by adding the ten items representing negative emotions (such as "upset" and ashamed") and the mean negative affect is reported at 17.4 with a standard deviation of 6.2. As a result, high negative affect scores represent high negative affect while a low score represents a low negative affect. This scale will provide a metric of mental health (See Appendix A).

STAI. The State-Trait Anxiety Inventory measures current symptoms of anxiety and likeliness to be anxious (Julian, 2011). The STAI includes two self-report measures and, in this paper, we utilize the STAI Y-2 in order to measure trait anxiety. The trait anxiety subscale consists of twenty items that aim to evaluate the "anxiety proneness" of a given individual (Julian, 2011). The twenty items are on a four-point Likert Scale ranging from "almost never" to "almost always." Participants read items like "I feel pleasant" or reserved items like "I feel like a failure" and they are asked to indicate if they generally feel this way (See Appendix B).

PHQ-8. The eight-item Patient Health Questionnaire is a self-report depression scale. This scale has shown that it has validity to measure the severity of depressive symptoms (Kroenke et al., 2009) (See Appendix C).

Novel Instagram Questionnaire. The novel Instagram questionnaire used in this study consists of a series of questions regarding Instagram use and it evaluates the following measures;

total Instagram screen time (IG screen time), cognitive strategy use (Cog strategy), situational strategy use (Sit strategy), problematic Instagram use (IG use), and desire. IG screen time is an objective measure of screen time calculated in minutes. In order to calculate cognitive strategy scores, we asked participants to "indicate how likely they are to do the following things when [they] want to reduce [their] Instagram use." Then, participants had five items such as "try to avoid looking at your phone" and were asked to report how likely they were to use each strategy. Situational strategy scores were calculated the same way except that participants saw items such as "turn your phone off." Problematic Instagram use was calculated using five questions that participants read such as "how often do you try to reduce your Instagram usage without success?" and indicated the frequency by using a zero to one hundred sliding scale. Lastly, desire refers to participants' self-reported desire to reduce the time they spend on Instagram via one question in the survey with a five-point Likert scale (See Appendix D).

Measures

For all measures that involved computing a sum score, missing data was handled by using participants' average item-level responses to fill in the missing data.

Negative Affect. Negative affect was operationalized as scores calculated by using the Positive and Negative Affect Schedule (PANAS). Negative affect scores are calculated by adding the scores of ten-items from the PANAS.

Positive Affect. Positive affect was operationalized as scores calculated by using the PANAS. Positive affect scores are calculated by adding the scores of ten-items from the PANAS.

Depression. Depression was operationalized as scores calculated from participants' response to the Patient Health Questionnaire-8 (PHQ-8) scale. Depression scores were calculated by adding the scores of the eight items in the PHQ-8 survey.

Anxiety. Anxiety was operationalized as scores calculated by using the State-Trait Anxiety Inventory (STAI) questionnaire, in particular, the trait anxiety subscale. Anxiety scores are calculated by adding the scores of the twenty items in the trait anxiety subscale, after appropriate items are reversed.

Total Instagram Screen Time (IG Screen Time). IG screen time was operationalized as the total number of minutes that an individual spent on Instagram in the past week. Participants were asked to open the Instagram app on their mobile phones and report their screen time as it appeared in the app's internal feature. This internal feature records the time in hours and minutes that an individual has spent on the app in the last week. Participants enter their usage time for each day of the past week and the sum of the total weekly use was added. This is an objective measure as participants do not have to estimate. However, not all participants correctly entered their screen time for all days of the week and these data were left blank.

Cognitive Strategy Use. Use of cognitive strategy was operationalized as the average score of five items present in the novel Instagram Use and Screen Time questionnaire. Each item was on a sliding scale from zero to one hundred. High scores indicate higher likely use of cognitive strategies while low scores indicate lower likely use of cognitive strategies.

Situational Strategy Use . Use of situational strategy was operationalized as the average score of five items present in the novel Instagram Use and Screen Time questionnaire. Each item was on a sliding scale from zero to one hundred. High scores indicate higher likely use of situational strategies while low scores indicate lower likely use of situational strategies.

Problematic Instagram Use (Problematic Use). Problematic use was operationalized as the average score of five items present in the novel Instagram Use and Screen Time

questionnaire. Each item was on a sliding scale from zero to one hundred. High scores indicate higher problematic Instagram use while low scores indicate lower problematic Instagram use.

Desire. Motivation to reduce social media use was operationalized as the response to one item present in the novel Instagram Use and Screen Time questionnaire. This item was assessed with a 5-point Likert Scale. Low scores indicate a low desire to reduce time spent on Instagram and high scores indicate high desire to reduce time spent on Instagram.

Preferred Strategy. Preferred strategy was operationalized by comparing participants' cognitive strategy use scores and their situational strategy use scores. Participants were placed in the cognitive category if their use of cognitive strategies was higher than their use of situation strategies and visa-versa.

Procedure

The identity of all participants was kept anonymous, as they were Prolific participants with anonymized alphanumeric Prolific IDs. Demographic information was obtained directly from the Prolific database of these participants.

Pre-screener. Participants who met the inclusion criteria were first recruited in Prolific via a short pre-screening survey consisting of the question "do you own and actively use at least one Instagram account?" The prolific ID's of participants who answered "yes" were collected and we used this list as an "allowed list" for the study.

Study. Informed consent was first gathered from all participants (See Appendix E). Immediately after obtaining informed consent, participants filled out the PANAS questionnaire, the STAI questionnaire, the PHQ-8 questionnaire, as well as the novel Instagram questionnaire. Lastly, participants were presented with a debriefing statement clarifying the goals of the study and received their compensation.

Data Analysis

The data for the present study was analyzed using Jamovi Version 1.2 16.0. First, a correlation matrix was used to compute pairwise correlations between all variables of interest. Next, two multiple linear regressions models were conducted for anxiety and negative affect. The multiple linear regression was conducted using the GAMLj package.

Results

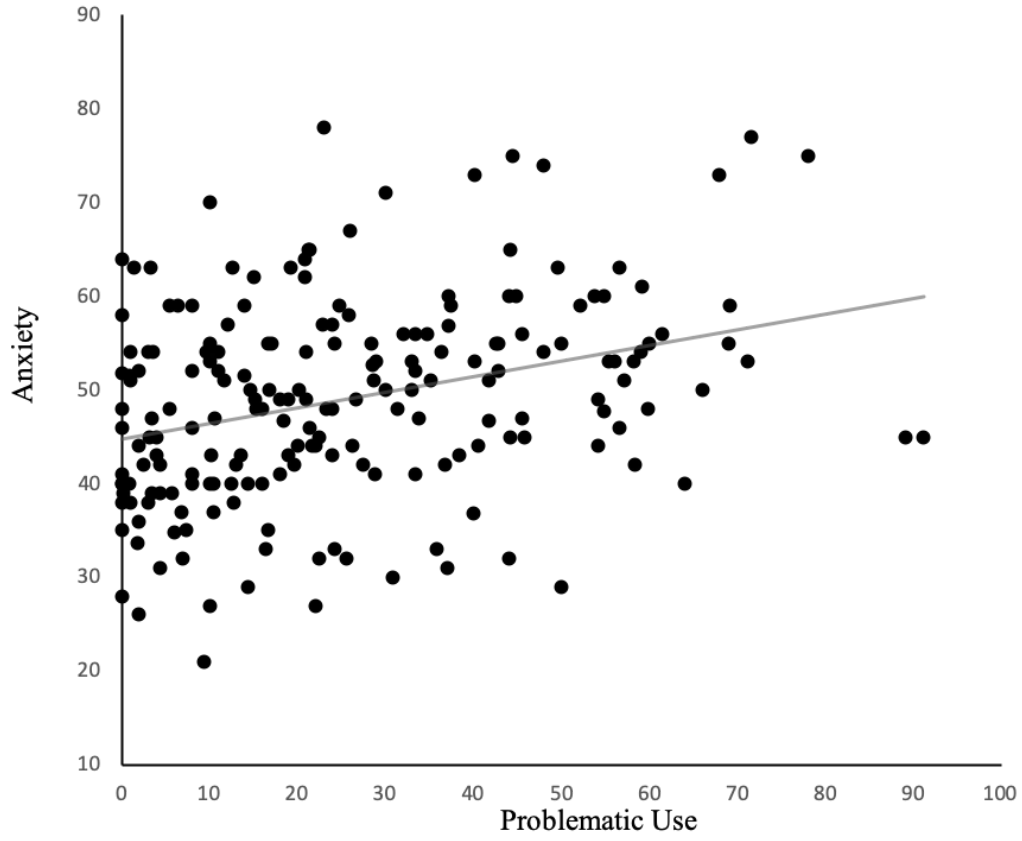
There were no significant correlations between total Instagram screen time and poor mental health (See Table 1). Instagram screen time and anxiety were not significantly associated, (r (186) =.12, p = .12). Instagram screen time and depression were not significantly correlated (r (186) = 0.065, p = .37). Likewise Instagram screen time was not significantly associated with negative affect, (r (186)= .091, p = .21).

Anxiety

There was a significant positive relationship between anxiety scores and problematic Instagram use, r(195) = .32, p < .001, such that high anxiety scores were associated with a high amount of problematic Instagram use. A multiple linear regression was calculated to predict anxiety scores based on problematic Instagram use, while controlling for total Instagram screentime (see *figure 1*). The results of the regression indicated that 7.21% of the variance in anxiety scores is accounted for by the predictors, F(2,182) = 8.15, p < .001. Looking at the individual predictors, the results showed that problematic Instagram use positively predicts anxiety, (B = .15 [95% CI: .07, .22], t = 4.47, p <.001), but total Instagram screen time does not (B <.001 [95% CI: -.0049, .0051], t = .048, p = .96) (See Table 2).

Figures 1

Scatterplot showing the relationship between anxiety and problematic Instagram use among young adults (r=.32, p<.001).



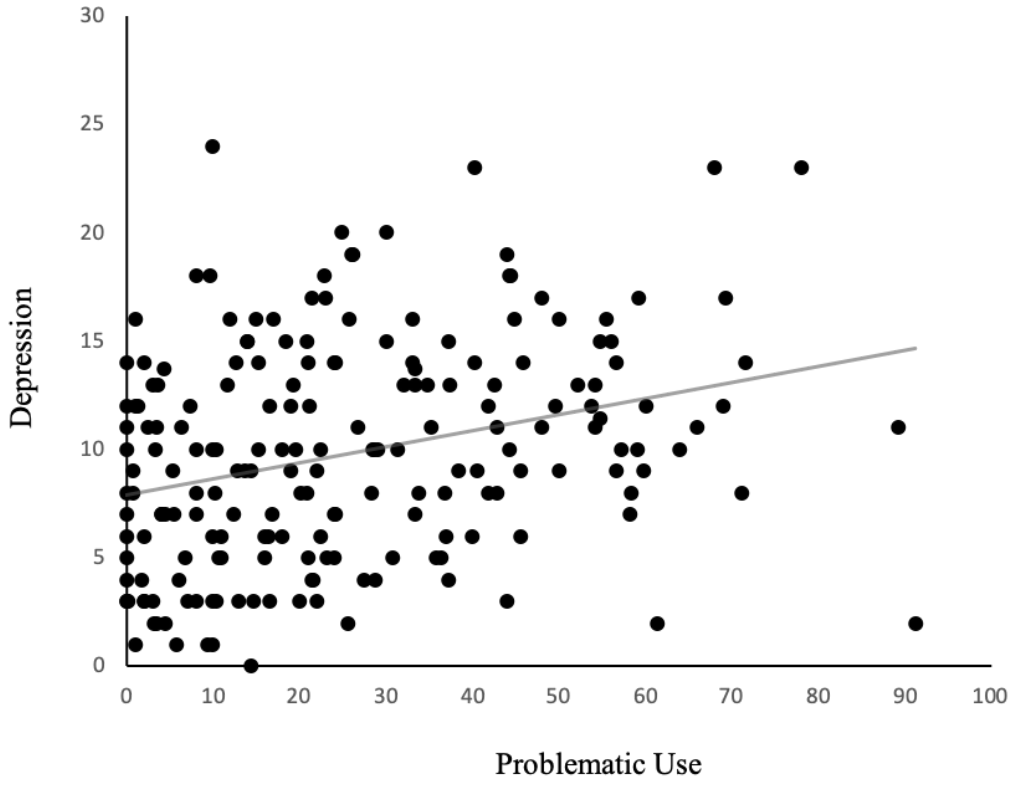
Depression

There was a significant positive relationship between depression and problematic Instagram use, $r(195) = .30$, $p < .001$, such that high depression scores were associated with a high amount of problematic Instagram use. A multiple linear regression was calculated to predict depression based on problematic Instagram use, while controlling for total Instagram screentime (see *figure 2*). The results of the regression indicated that 9.24 % of the variance in depression scores was accounted for by the predictors, $F(2,182) = 10.36$, $p < .001$. Looking at the individual predictors, the results showed that problematic Instagram use positively predicts depression, (B =

.085 [95% CI: .047, .12], $t = 4.46$, $p < .001$), but total Instagram screen time does not ($B < .0001$ [95% CI: -0.0034, .0015], $t = -0.78$, $p = .44$) (See Table 3).

Figure 2

Scatterplot showing the relationship between depression and problematic Instagram use among young adults (r=.299, p<.001).



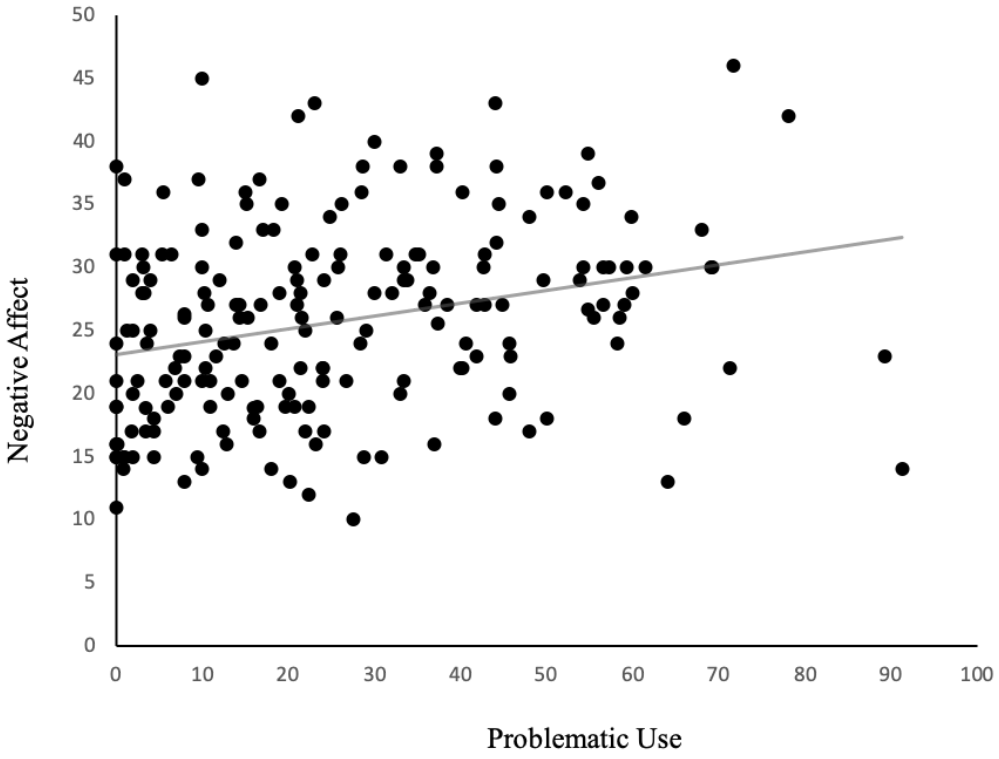
Negative Affect

There was a significant positive relationship between negative affect and problematic Instagram use, $r(195) = .28$, $p < .001$, such that high negative affect was associated with a high amount of problematic Instagram use. A multiple linear regression was calculated to predict negative affect based on problematic Instagram use, while controlling for total Instagram

screentime (see *figure 3*). The results of the regression indicated that 5.48 % of the variance in anxiety scores is accounted for by the predictors, $F(2,182) = 6.34$, $p < .002$. Looking at the individual predictors, the results showed that problematic Instagram use positively predicts negative affect, ($B = .095$ [95% CI: .039, .15], $t = 3.38$, $p < .001$), but total Instagram screen time does not ($B < .001$ [95% CI: -0.0039, .0032], $t = -0.16$, $p = .87$) (see Table 4).

Figure 3

Scatterplot showing the relationship between depression and problematic Instagram use among young adults (r=.28, p<.001).

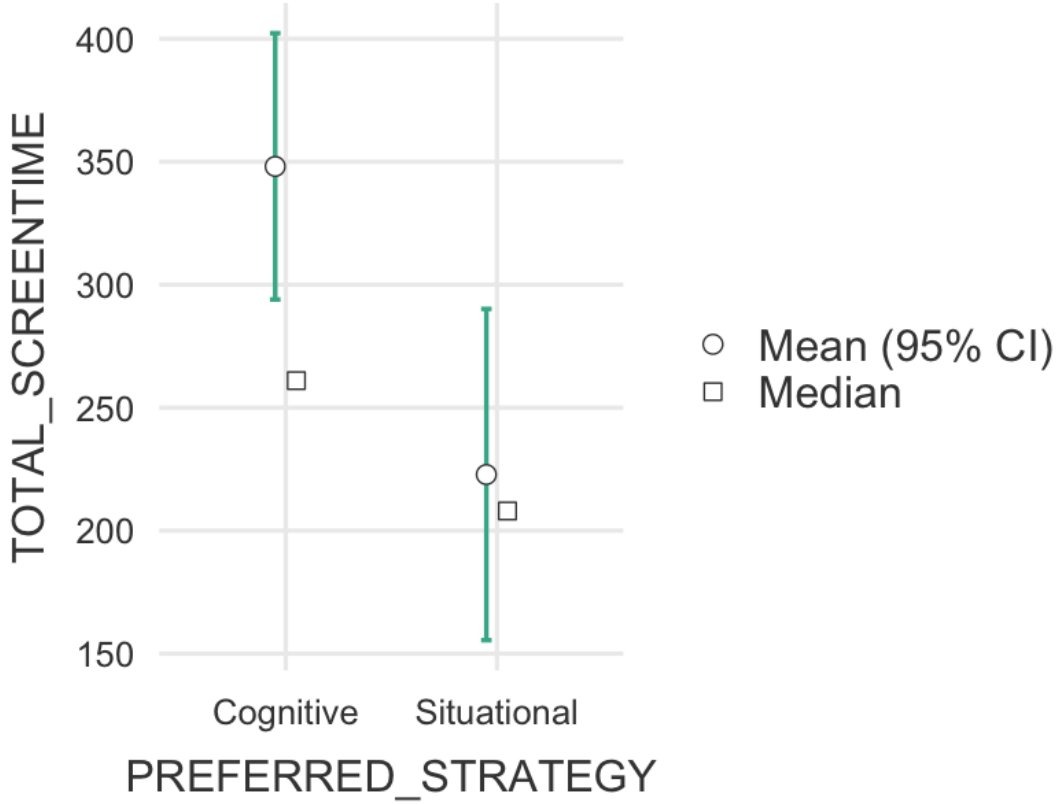


Cognitive and Situational Strategies

Prefered Strategy. An independent samples t-test was conducted to compare preferred self-regulation strategies. There was a significant difference in average Instagram screen time between participants who prefer cognitive strategies (*M*=348, *SD* = 335), and those who prefer situational strategies (*M*= 223, *SD* = 191); *t*(176) = 2.01, *p* = .046 (See Table 5).

Figure 4

Significantly different means of total Instagram screen time based on preferred self-regulation strategies.



Desire. In regards to individual's desire to reduce their Instagram use, there was a significant positive correlation between desire and use of cognitive strategy, *r* (196)= .35, *p* = < .001, and desire and use of situational strategy, *r* (194) = .19, *p* = <.009.

Total Instagram Screen Time. There was a significant positive correlation between IG screen time and use of cognitive strategy, r (184) = .17, p = .022. Interestingly, there was no significant correlation between IG use and use of situation strategies r (184) = .014, p = 0.85.

Problematic Instagram Use. There was a medium positive significant relationship between problematic use and use of cognitive strategies, r (194) = .41, p <.001. Interestingly, the relationship between problematic use and situational strategies was smaller, r (191), = 22, p < .002.

Discussion

Overall, the findings in this study support some of my prior hypotheses and the rationale.

Mental Health and Instagram Screen Time

With the first hypothesis, I predicted that there would be an association between poor mental health and Instagram screen time. The data does not support this hypothesis as there were no significant correlations between Instagram screen time and anxiety, depression, or negative affect. The aim of this study was to explore how self-regulation, goal pursuit, and conflict influence the way that individuals interact with social media while bringing the screen time literature further by using an objective measure of screen time. The current screen time literature is full of contradictory results, and I based my hypothesis on what I believed to be the most robust study which was a review of reviews and meta-analysis about screen time and mental health (Orben, 2020). This review concluded that, “on average,” there was a “very small” relationship between screen time and mental health (Orben, 2020). Although the data analysis rendered this to be a null hypothesis, this strengthens the argument for moving away from models that focus on a one-dimensional screen time-mental health rationale. What this null hypothesis suggests is that researchers should not focus on screen time measures to explore how

social media affects mental health. Furthermore, previous research (including the review cited above) examined poorly operationalized measures of screen time which could have resulted in mixed results. This study takes advantage of new technologies that provide objective measures of screen time, such as the Instagram in-app screen time feature, to bypass possible self-report biased estimates of screen time. Using a more objective measure may provide a better representation of the real associations between screen time and mental health.

Mental Health and Problematic Instagram Use

All three markers of poor mental health were positively correlated to problematic Instagram use. Anxiety, depression, and negative affect were associated with problematic Instagram use which is a measure that reflects people's report of conflict in their goal pursuits. One of the items that constituted problematic use, for example, asked about the frequency at which using Instagram prevented participants from completing other goals. This suggests that self-regulation, goal pursuit, and conflict assessment are key factors to account for when exploring the relationship between social media use and mental health. Furthermore, these findings have practical implications for interventions targeting mental health and social media use. According to the trends seen in this study, future interventions should not target screen time as a predictor of poor mental health, but they should assess individuals' conflict with social media use.

Use of Cognitive vs Situational Strategies

The second hypothesis predicted that individuals who reported that they were more likely to use situational strategies, as opposed to cognitive strategies, would be more likely to report lower social media use, in this case lower total Instagram screen time. The data analysis supports this hypothesis; the average screen time for individuals who preferred to use cognitive strategies

was significantly higher than the average screen time for individuals who preferred situational strategies. This is in accordance with the process model of self-control which states that proactive strategies, such as situational strategies, are more likely to be effective at preventing a person from engaging in an undesired behavior (Duckworth et al., 2016). Situational self-control strategies are understood to be effective because they create distance between the undesired behavior, or stimuli—making temptation less likely to occur. Previous literature has explored the difference in effectiveness of cognitive strategies and situational strategies in the domains such as craving and physical activity but this is the first sdy to my knowledge in which their effectiveness is explored in relation to social media.

In addition, while people's desire to reduce their Instagram screen time was significantly correlated to the use of both situational and cognitive strategies, this relationship is stronger for the use of cognitive strategies. One possible explanation is that individuals who want to reduce their Instagram use, but who resort to cognitive strategies, fail in their goal pursuit resulting in a continued strong desire to decrease their social media use. Similarly, total Instagram use was positively associated with cognitive strategies but it was not significantly associated with situational strategies. This discrepancy also suggests that people who are using situational strategies are more successful at achieving their goal of reduced screen time than those who use cognitive strategies. In addition, problematic Instagram use was correlated positively to both the use of cognitive strategies and situational strategies, the correlation is stronger for the use of cognitive strategies. This further suggests that cognitive strategies are less effective as a tool to reduce social media. It is important to point out that individuals do not use cognitive or situational strategies in isolation. In fact, there is a significant positive correlation between the use of cognitive strategies and the use of situational strategies, $r = .412$, $p = .001$. Individuals

may use one type or the other based on factors specific to their current circumstances. For example, a person who might typically use situational strategies to reduce their social media use may find themselves in a train on their way home from the holidays. Although they would typically put their phone on the other side of the room to prevent temptation, the current situation is not conducive to that strategy so they may use a cognitive strategy at that moment. Another factor to consider is that we asked participants about the likelihood that they would use certain strategies in the case that they wanted to reduce their Instagram usage. This measure of the use of self-regulatory strategies does not capture participant's actual choice of different strategies. The operationalization of the use of different strategies also does not capture an important dimension; effective use of the strategy. In other words, these measures do not address whether or not participants are successfully using these strategies. This might explain another interesting correlation that emerged; use of situational strategies was significantly positively correlated with anxiety. It is possible that what this correlation is highlighting is a non-preventatively approach of using situational strategies. In other words, some individuals may not be employing situational strategies in a preventative manner but rather as a last resort. Imagine a college student who needs to stop using their phone to finish an assignment. They might first try just putting their phone down at their desk, but when the deadline approaches and they realize that they continue to go on their phone, they might put their phone in a different location (situational) as a last resort. This process may result in high levels of anxiety due to the pressure of the deadline.

Limitations

There are several limitations to this study. Firstly, given the correlational design of this study, casualty cannot be implied. Secondly, several measures derived from the novel Instagram questionnaire rely on self-reports of "likelihood" and estimates such as problematic use, use of

cognitive strategies, and use of situational strategies. In addition, all the variables derived from the novel Instagram questionnaire are not standardized measures. As a result, they may not exactly capture the intended constructs as it is possible that something else is being measured. The preferred strategy, in particular, is a poorly operationalized variable. This is because it simply compares which strategy had a higher average, however, as is evident by the association between use of cognitive strategies and use of situational strategies, the use of these tools is more complex than what is captured by this variable.

It is also important to note that data collection occurred in March 2021, one year into the global COVID-19 pandemic. It is possible that people's social media use, anxiety, depression, and negative affect have been influenced by this pandemic and all of the stressors that may be associated with it. Furthermore, this study focused on how individuals engage with the Instagram platform in particular. Since all social media platforms are designed with various attention-grabbing mechanisms it is possible that these results are not generalizable to other social media platforms. Due to the focus of young adults, another possibility is that these findings are not generalizable to other age groups that may have completely different relationships to social media.

In relation to the use of cognitive and situational strategies, these measures did not account for how participants were using those strategies. Do the participants actually use the strategies that they saw on the questionnaire? Do they use them effectively? Do they try them in combination? Do they try cognitive strategies first and then move to situational? These are questions that are not captured by the measures that I used. An important limitation in the present study is the lack of consideration of differences in motivations to use Instagram and how those differences may or may not affect self-regulation processes. Past research has found an

association between the fear of missing out and social networking use (Kuss & Griffiths, 2017; Moore & Craciun, 2020). A separate study identified eight different potential motivations for social networking use and compared them across different platforms and some significant differences emerged (Alhabash & Ma, 2017). Accounting for this variable may shine an important light on how self-regulation and mental health may be influenced by different goal pursuits (such as the goal of being validated).

Future Directions

Future research should continue to use objective, app-generated screen time measures to clarify the role that screen time plays in social media use and mental health. In additional, future research about the use of cognitive and situational strategies may benefit from Ecological Momentary Assessment (EMA) in order to capture important dimensions and details of how and why people resort to specific strategies during specific circumstances.

Future studies should also try to determine causality by designing and conducting ethical experiments. A pivotal step moving forward may be to standardize the variables that are introduced in this study in order to discern what constructs are actually being measured. Including a variety of age groups, and social media platforms may be necessary in order to identify if the trends in this study are generalizable across age groups, and social media sites.

Conclusion

The aim of this study was to explore how self-regulation can enrich social media use research while clarifying the relationship between screen time and mental health. This was in an effort to provide an alternative to social media use research that assumed that individuals' engagement with social networking sites were a sign of addictive behavior. The findings of this

research suggests that in fact there are no correlations between social media use and poor mental health. In fact, this study suggests that taking into account problematic social media use key when predicting mental health outcomes. In addition, the data supports the process model of self-control which predicts that situational strategies are more effective than cognitive strategies due to their ability to limit temptation. Future interventions should ask “is your social media use conflicting with other goals?” rather than “how much time do you spend on social media?” and rather than telling them to reduce their screen time, these interventions must provide training on effective situational strategies.

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Correlation Matrix

		NEGATIVE_AFFECT	POSITIVE_AFFECT	ANXIETY	DEPRESSION	AVERAGE_SCREENTIME	TOTAL_SCREENTIME	COGNITIVE_STRATEGY	SITUATIONAL_STRATEGY	PROBLEMATIC_USE	DESIRE
NEGATIVE_AFFECT	Pearson's r	—									
	p-value	—									
POSITIVE_AFFECT	Pearson's r	−0.174 *	—								
	p-value	0.014	—								
ANXIETY	Pearson's r	0.682 ***	−0.413 ***	—							
	p-value	<.001	<.001	—							
DEPRESSION	Pearson's r	0.605 ***	−0.239 ***	0.695 ***	—						
	p-value	<.001	<.001	<.001	—						
AVERAGE_SCREENTIME	Pearson's r	0.109	−0.029	0.090	0.049	—					
	p-value	0.136	0.696	0.219	0.506	—					
TOTAL_SCREENTIME	Pearson's r	0.091	−0.053	0.115	0.065	0.877 ***	—				
	p-value	0.212	0.468	0.116	0.373	<.001	—				
COGNITIVE_STRATEGY	Pearson's r	0.058	0.045	0.041	0.076	0.154 *	0.168 *	—			
	p-value	0.417	0.533	0.567	0.290	0.035	0.022	—			
SITUATIONAL_STRATEGY	Pearson's r	0.123	−0.028	0.143 *	0.102	−0.015	0.014	0.427 ***	—		
	p-value	0.086	0.700	0.046	0.156	0.838	0.849	<.001	—		
PROBLEMATIC_USE	Pearson's r	0.276 ***	−0.078	0.318 ***	0.299 ***	0.318 ***	0.360 ***	0.412 ***	0.217 **	—	
	p-value	<.001	0.276	<.001	<.001	<.001	<.001	<.001	0.002	—	
DESIRE	Pearson's r	0.136	0.028	0.139	0.087	0.286 ***	0.261 ***	0.353 ***	0.186 **	0.610 ***	—
	p-value	0.054	0.691	0.050	0.219	<.001	<.001	<.001	0.009	<.001	—

Note. * p < .05, ** p < .01, *** p < .001

Table 1. Correlations between mental health markers, social media use, and self-regulatory strategies

Model Info

Info	
Estimate	Linear model fit by OLS
Call	ANXIETY ~ 1 + PROBLEMATIC_USE + TOTAL_SCREENTIME
R-squared	0.0822
Adj. R-squared	0.0721

[4]

Model Results

ANOVA Omnibus tests

	SS	df	F	p	η^2p
Model	1667.053	2	8.14588	<.001	0.082
PROBLEMATIC_USE	1437.131	1	14.04479	<.001	0.072
TOTAL_SCREENTIME	0.240	1	0.00234	0.961	0.000
Residuals	18623.128	182			
Total	20290.182	184			

Fixed Effects Parameter Estimates

			95% Confidence Interval					
Names	Estimate	SE	Lower	Upper	β	df	t	p
(Intercept)	49.094	0.74371	47.62643	50.56124	0.00000	182	66.0119	<.001
PROBLEMATIC_USE	0.147	0.03931	0.06977	0.22491	0.28529	182	3.7476	<.001
TOTAL_SCREENTIME	1.23e−4	0.00254	−0.00489	0.00513	0.00368	182	0.0484	0.961

Table 2. Multiple linear regression model with total Instagram screen time and problematic Instagram use as predictors of anxiety.

Model Info

Info	
Estimate	Linear model fit by OLS
Call	DEPRESSION ~ 1 + PROBLEMATIC_USE + TOTAL_SCREENTIME
R-squared	0.1022
Adj. R-squared	0.0924

[4]

Model Results

ANOVA Omnibus tests

	SS	df	F	p	η^2p
Model	496.4	2	10.364	<.001	0.102
PROBLEMATIC_USE	477.6	1	19.945	<.001	0.099
TOTAL_SCREENTIME	14.7	1	0.613	0.435	0.003
Residuals	4358.3	182			
Total	4854.7	184			

Fixed Effects Parameter Estimates

			95% Confidence Interval					
Names	Estimate	SE	Lower	Upper	β	df	t	p
(Intercept)	9.8332	0.35978	9.12331	10.54306	0.0000	182	27.331	<.001
PROBLEMATIC_USE	0.0849	0.01902	0.04741	0.12246	0.3362	182	4.466	<.001
TOTAL_SCREENTIME	−9.61e−4	0.00123	−0.00338	0.00146	−0.0589	182	−0.783	0.435

Table 3. Multiple linear regression model with total Instagram screen time and problematic Instagram use as predictors of depression.

Model Info

Info	
Estimate	Linear model fit by OLS
Call	NEGATIVE_AFFECT ~ 1 + PROBLEMATIC_USE + TOTAL_SCREENTIME
R-squared	0.0651
Adj. R-squared	0.0548

[4]

Model Results

ANOVA Omnibus tests

	SS	df	F	p	η^2p
Model	664.48	2	6.3374	0.002	0.065
PROBLEMATIC_USE	597.66	1	11.4004	<.001	0.059
TOTAL_SCREENTIME	1.39	1	0.0266	0.871	0.000
Residuals	9541.28	182			
Total	10205.76	184			

Fixed Effects Parameter Estimates

			95% Confidence Interval					
Names	Estimate	SE	Lower	Upper	β	df	t	p
(Intercept)	25.8213	0.53233	24.77096	26.87163	0.0000	182	48.506	<.001
PROBLEMATIC_USE	0.0950	0.02814	0.03949	0.15054	0.2594	182	3.376	<.001
TOTAL_SCREENTIME	−2.96e−4	0.00182	−0.00388	0.00329	−0.0125	182	−0.163	0.871

Table 4. Multiple linear regression model with total Instagram screen time and problematic Instagram use as predictors of negative affect.

Independent Samples T-Test

					95% Confidence Interval		
		statistic	df	p	Lower	Upper	Cohen's d
TOTAL_SCREENTIME	Student's t	2.01	176	0.046	2.41	248	0.398

Group Descriptives

	Group	N	Mean	Median	SD	SE
TOTAL_SCREENTIME	Cognitive	147	348	261	335	27.6
	Situational	31	223	208	191	34.4

Table 5. Independent samples T-test of preferred strategy and total Instagram screen time

Appendix A

Positive and negative affect schedule

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Positive and Negative Affect Schedule (PANAS-SF)

Indicate the extent you have felt this way over the past week.		Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
PANAS 1	Interested	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 2	Distressed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 3	Excited	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 4	Upset	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 5	Strong	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 6	Guilty	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 7	Scared	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 8	Hostile	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 9	Enthusiastic	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 10	Proud	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 11	Irritable	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 12	Alert	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 13	Ashamed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 14	Inspired	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 15	Nervous	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 16	Determined	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 17	Attentive	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 18	Jittery	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 19	Active	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PANAS 20	Afraid	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Appendix B

Self-Evaluation Questionnaire
STAI form Y-2

Name……

DIRECTONS: A number of statements which people have used to describe themselves are given below. Read each statement and then write the number in the blank at the end of the statement that indicates **how you generally feel**. There is no right or wrong answer. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

S. No.		Almost Never	Some - time	Often	Almost Always
21.	I feel pleasant	1	2	3	4
22.	I feel nervous and restless	1	2	3	4
23.	I feel satisfied with myself	1	2	3	4
24.	I wish I could be as happy as others seem to be	1	2	3	4
25.	I feel like a failure	1	2	3	4
26.	I feel rested	1	2	3	4
27.	I am calm, cool, and collected	1	2	3	4
28.	I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29.	I worry too much over something that really doesn't matter	1	2	3	4
30.	I am happy	1	2	3	4
31.	I have disturbing thoughts	1	2	3	4
32.	I lack self confidence	1	2	3	4
33.	I feel secure	1	2	3	4
34.	I make decision easily	1	2	3	4
35.	I feel inadequate	1	2	3	4
36.	I am content	1	2	3	4
37.	Some unimportant thoughts runs through my mind and bothers me	1	2	3	4
38.	I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39.	I am a steady person	1	2	3	4
40.	I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Appendix C

Personal health questionnaire depression scale (PHQ-8)

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Personal Health Questionnaire Depression Scale (PHQ-8)

Over the **last 2 weeks**, how often have you been bothered by any of the following problems?
*(circle **one** number on each line)*

How often during the past 2 weeks were you bothered by...	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself, or that you are a failure, or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3

Appendix D

Instagram Questionnaire

Beginning Instagram Section

In the following questions you will be asked to report the amount of time you spend on Instagram. You will need your phone to answer these questions.

IG Screen Time

Use your finger to touch each "bar" and write the amount of time you spent on Instagram each day. (0h, 0mins)

Monday

Tuesday

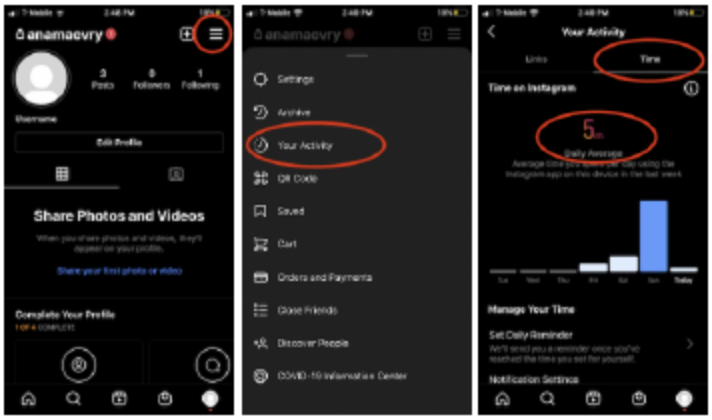
Wednesday

Thursday

Friday

Open the Instagram app on your phone and follow the instructions below.

1. Go to your profile
2. Select the icon on the top right corner
3. Select "Your Activity"
4. Select "Time"



What is your Daily Average time? 0h, 0mins

Saturday

Sunday

Have you set a Daily Reminder on the Instagram app?

If you have, you will see a number (0h, 0mins) next to "Set Daily Reminder" which is located under the bars.

- ○ Yes
- ○ No

How long did you set the Daily Reminder to? 0h, 0mins

Phone Type

Which type of mobile phone do you currently own/use?

- ○ iPhone
- ○ Android

iPhone Screen Time

Go to your "Setting" and select "Screen Time".

What is your Daily Average? 0h, 0mins

Select "See All Activity" and then select "Week".

What is your "Total Screen Time"? 0h, 0mins

Have you added a "limit" to your Instagram use through the Screen Time app?

- ○ Yes
- ○ No

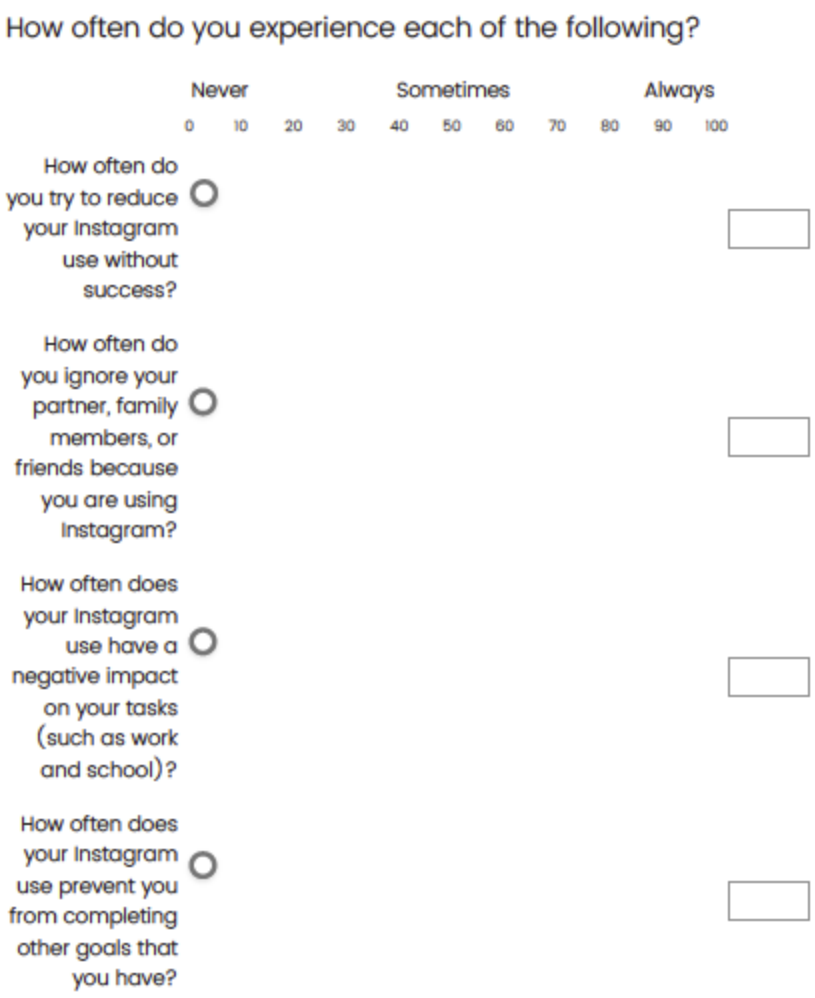
How long is your Instagram "limit" ? 0h, 0mins

Android Screen Time

1. Go to "Settings"
2. Select "Battery"
3. Tap the 3-dot menu, and go to "Battery usage "
4. Tap the 3-dot menu again, and choose "Show full device usage"

Indicate the time listen under "Battery usage since full charge > Screen" in hours and minutes (0h, 0mins).

Instagram Use


How often do you experience each of the following?
Never
Sometimes
Always
0 10 20 30 40 50 60 70 80 90 100
How often do you try to reduce your Instagram use without success?
How often do you ignore your partner, family members, or friends because you are using Instagram?
How often does your Instagram use have a negative impact on your tasks (such as work and school)?
How often does your Instagram use prevent you from completing other goals that you have?

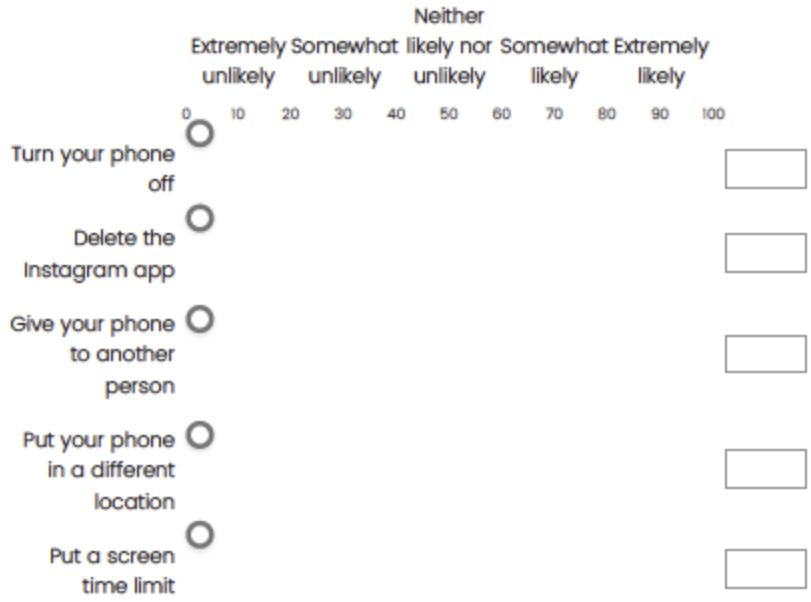
How often do you experience the following?

	Never	Rarely	Sometimes	Often	Always
A desire to reduce the time you spend on Instagram.	○	○	○	○	○

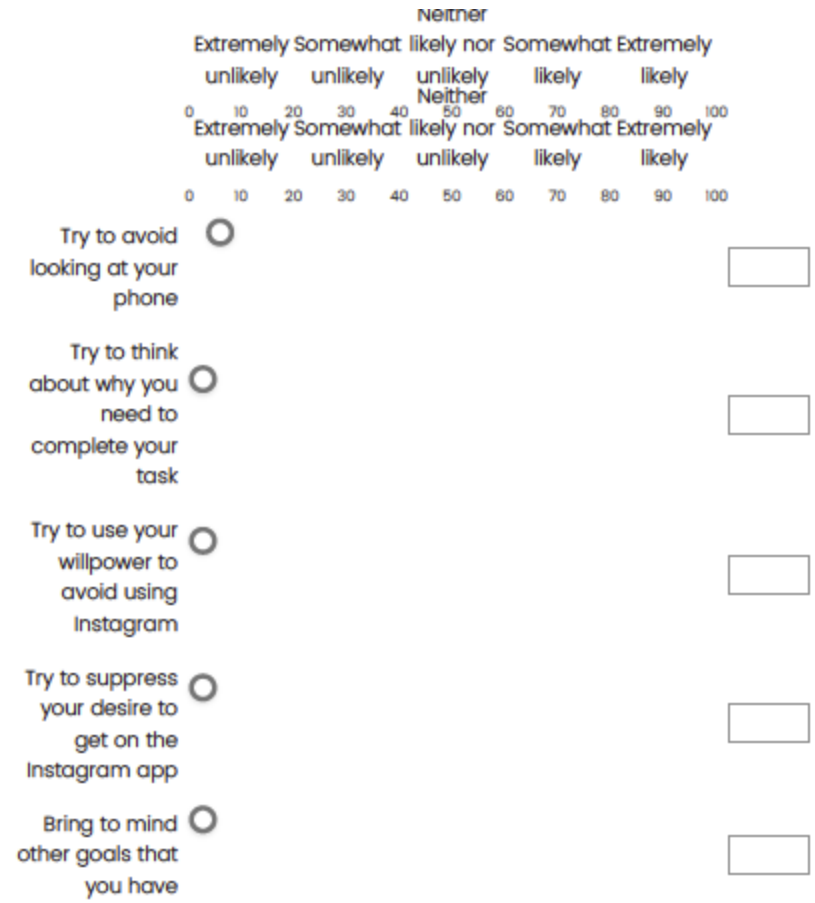
To what degree do you agree or disagree with the following statement?

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Instagram has an overall positive impact on my life.	○	○	○	○	○
Instagram has an overall negative impact on my life.	○	○	○	○	○
I check Instagram more than necessary.	○	○	○	○	○

Indicate how likely you are to do the following things when you want to reduce your Instagram use.



Indicate how likely you are to do the following things when you want to reduce your Instagram use.



Debriefing Statement

Thank you for participating in this experiment! The goal of this study was to explore if individuals' self-regulation strategies are associated with their Instagram use. We are also interested in how individuals' Instagram use is related to their psychological wellbeing. We are grateful for your participation in this study. The data collected can help researchers better understand social media use and self-regulation. This study has the potential to help bring awareness and clarity to issues of goal pursuit, self-regulation, and social media use. If you have any questions about this study, please contact us at Ana Guaba (ag7244@bard.edu), Richard Lopez, Assistant Professor of Psychology at Bard College (rlopez@bard.edu), or the Bard College Institutional Review Board at (IRB@bard.edu). Thank you!

Appendix E

Voluntary Consent Form

Welcome to the study on emotions and social media use

Background. In the present study, we are generally interested in people's experience of emotions in daily life, as well as relations between technology and social media use and various cognitive and affective processes important for health and wellbeing (broadly construed).

What you will do in the study. For this online study, you will complete a questionnaire battery assessing various aspects of psychological and physical health, as well as patterns of social media use. For most people, the study should take approximately a half hour or so.

Risks and Benefits. It is possible that some participants may experience slight discomfort when reflecting on and reporting their general thoughts, feelings, and behaviors, and/or as they occur in daily life. Such discomfort is unlikely to be any greater than what participants naturally experience. As far as potential benefits, participants may indirectly benefit from learning about research testing novel hypotheses in a relatively new field of study. Following debriefing, they may also enjoy learning about the research process more generally and the various topics under study in the Bard Psychology Program.

Compensation. In exchange for participating in the experiment, you will receive monetary compensation, prorated at $9.51 USD per hour, in your Prolific participant account.

Your rights as a participant. Your participation in this experiment is completely voluntary, and you may withdraw from the experiment at any time without penalty. You will still receive prorated payment for the amount of time you were enrolled in the study. Once data collection for the study is complete, you will receive a debriefing statement that will describe the study's aims and hypotheses in greater detail.

Contact. If you have questions about this research, please contact Richard Lopez, Assistant Professor of Psychology, Bard College, at rlopez@bard.edu.

Confidentiality. For this study, you will not share your name, email, or any other identifying information. That way, responses cannot be matched to any particular individual, and information that could be used to link your response to a specific geographic location will also be removed. In the interest of open and reproducible science, data from this study may be posted on the Open Science Framework.

If you have questions about this study, please contact Richard Lopez, Department of Psychology, Bard College, Annandale-on-Hudson, NY 12504 at rlopez@bard.edu. If you have questions about your rights as a research participant, please contact the Bard College Institutional Review Board: irb@bard.edu.

Agreement. The nature and purpose of this research have been sufficiently explained and I agree to participate in this study. I understand that I am free to withdraw at any time without incurring any penalty. I certify that I am at least 18 years of age.

Appendix F

OSL/PT Preregistration Template

Investigator's Name and Affiliation
(leave blank if this is an anonymous preregistration)

Ana Guaba, Bard College

Date of Preregistration: March 22, 2021

Names and Affiliations of Collaborators
(leave blank if this is an anonymous preregistration)

Pro. Richard Lopez, Bard College

IRB Status

- ○ IRB Review Not Necessary
- ○ Not Submitted Yet
- ○ Submitted
- ◉ Approval Received, Date: March 16, 2021

Study Title

Instagram and Self-Regulation: Proposing a New Framework to Explore Social Networking Site's Use

VARIABLES

What are your independent / grouping / predictor variables (including mediators and moderators) ? Explain how you operationalize each variable.

IG average = average number of hours spent on Instagram daily in the past week
IG total = total number of hours spent on Instagram in the past week
Screen time total = total number of hours spent of mobile device in the past week

What are your dependent / outcome variables? Explain how you operationalize each variable.

Situation self-regulation = average score on likeliness of using situational strategies where a score of 0-50 indicates low degree of situational self-regulation while a score of 50 - 100 indicates a high degree of situational self-regulation
Cognitive self-regulation = average score on likeliness of using cognitive strategies where a score of 0-50 indicates low degree of cognitive self-regulation while a score of 50 - 100 indicates a high degree of cognitive self-regulation
Depression = Score of PHQ - 8
Anxiety = Score on STAI

List any exploratory variables. These are variables that you included in your study, but are not central to your main predictions.

Gender

Did you create new, or modify existing, variables for this study? (select all that apply)

- ☐ Some, or all, variables have been used in prior, published research, and no modifications were made
- ☐ Some variables were modified from their original form
- ☑ Some variables were created for this study

If you indicated above that 'Some variables were modified,' describe how you modified existing variables here:

If you indicated above that 'Some variables were created for this study,' list and describe the variables that you created for this study:

Situation self-regulation = average score on likeliness of using situational strategies where a score of 0-50 indicates low degree of situational self-regulation while a score of 50 - 100 indicates a high degree of situational self-regulation
Cognitive self-regulation = average score on likeliness of using cognitive strategies where a score of 0-50 indicates

HYPOTHESES

What are your primary study hypotheses / research questions?

H1: I hypothesize that individuals who use situational strategies will be more likely to achieve their SNS use goals as opposed to those who use cognitive change strategies

H2: Individuals with high screen time use will be more likely to report poor psychological well-being than those who report low screen time use.

Do you have any exploratory hypotheses / research questions? If so, describe them below:

Women will be more affected by screen time than men. In other words, women with high screen time will report worst psychological well-being than men with high screen time.

At the time of this preregistration, describe the status of data collection:

- ○ No new data collection is required for this project (e.g., meta-analysis)
- ◉ Data collection has not started for this study
- ○ Data collection is in progress
- ○ Data collection is complete
- ○ Other:

If you selected 'Other' to describe the status of data collection, please explain here:

If you indicated above that data collection is 'complete' or 'in progress,' have you (or anyone else) already conducted any statistical analyses?

- ○ No data analyses have been performed
- ○ Some preliminary analyses have been performed, but not those relevant to the primary or exploratory study hypotheses described above (e.g., you calculated descriptive statistics)
- ○ Some, or all, analyses of the primary or exploratory hypotheses have been performed

If you selected 'Some preliminary analyses have been performed' describe the analyses you have already conducted:

If you selected 'Some, or all, analyses of the primary or exploratory hypotheses have been performed,' you should stop completing this form. Pre-registration of hypotheses MUST occur before you have analyzed your data.

SAMPLING

What is your target sample size? 350

How was your target sample size determined? (check all that apply)

- ☑ Power analysis
- ☐ Target sample size based on convention / past research
- ☐ Target sample size based on constraints / convenience (e.g., size of subject pool, available money to pay participants, access to participants)
- ☐ Other:

How will you determine when to stop collecting data (i.e., your stopping rule)?

- ◉ When the target sample size is reached
- ○ A particular amount of time has passed (e.g., the end of the semester)
- ○ Other (describe below)

If you selected 'Other' for your stopping rule, please explain here:

RESEARCH DESIGN

What type of research design are you using?

- ○ Experiment
- ○ Quasi-experiment
- ◉ Correlational Study
- ○ Other:

If you selected 'Other' for your research design, please explain here:

EXPERIMENTAL DESIGNS ONLY

If you are conducting an experiment, what is the nature of the manipulation?

- ○ between-participants
- ○ within-participants
- ○ mixed (at least one between and one within factor)

What are the total number conditions in your study? (e.g., a 2 x 2 design has 4 total conditions):

Will the experimenters be aware of the condition to which a particular participant has been assigned?

- ○ Yes, the experimenter will be aware of the condition to which a participant has been assigned
- ○ No, the experimenter will be blind to condition

Will participants be randomly assigned to condition?

- ○ Yes
- ○ No (describe below)

If you selected 'No' for how you will assign participants to condition, please explain here:

If you are predicting an interaction (in your hypotheses), describe the nature of that interaction below:

DATA ANALYSIS PLAN

What will be your criterion for determining statistical significance?

- ◉ $p < .05$
- ○ $p < .01$
- ○ $p < .005$
- ○ Other:

Will your tests of significance be:

- ○ One-tailed
- ◉ Two-tailed
- ○ A combination of one- and two-tailed tests

If you indicated that some tests of significance will be one-tailed, describe the hypothesis and predicted direction of the effect or association below:

Will you exclude participants from data analysis based on any of the reasons listed below?

☐ Failed attention check ☐ Failed manipulation check ☑ Missing data

Describe any additional exclusion criteria here:

1) Younger or older than 18-29. 2) Does not have an Instagram

What criterion (if any) will you use to determine whether a participant is an outlier?

◯ Greater than 3 standard deviations from the mean

◯ Other:

Which statistical tests will you use to conduct your data analyses? (check all that apply)

☐ ANOVA ☑ Correlation ☐ t-test ☐ Chi-square

☐ Regression ☐ Other/Additional

If you selected 'Other/Additional' for the statistical test above, describe the analyses you will conduct here:

If relevant, describe what types of follow-up tests will you perform (e.g., Tukey post-hoc; simple main effects). If you will conduct planned comparisons, explain the nature of those comparisons below:

For the analyses listed above, will you include any covariates or control variables? If so, describe them below and provide a justification: