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The Effects of Mindful Instagram Use on Social Comparison and College Life Satisfaction

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The Effects of Mindful Instagram Use on Social Comparison and College Life Satisfaction

A thesis presented by

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to the Department of Psychology

in partial fulfillments of the requirements

for the degree of Bachelor of Arts

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Abstract

Mindless social media use is associated with heightened social comparison, and with negative impacts on mood, well-being, and life satisfaction. I hypothesize that a mindful social media intervention will cause decreased levels of social comparison and envy, increased well-being and college life satisfaction, and an increase in overall mindfulness. Data were collected across a span of seven days, during which participants came in for an initial session to receive a mindful Instagram use intervention or a control intervention and complete a battery of questionnaires. For the following six days, intervention participants received daily text reminders to use Instagram mindfully. At the end of the week, participants came back in and completed the same questionnaires. Results revealed that the mindfulness intervention increased participants' nonjudgement mindfulness from pre- to immediate post-intervention. No significant changes between pre-intervention and one-week post-intervention were observed. Additional analyses revealed that higher baseline life satisfaction and lower malicious envy among participants predicted more mindful social media use in daily life, according to text data. More daily mindful social media use became related to mindful nonjudgment at the end of the study period. And regression analyses of baseline and follow-up data highlighted mindful nonreactivity as a potential predictor of decreases in problematic Instagram use over time. Because research has consistently found that social media use can be detrimental to mental health, these findings have important implications for the use of mindfulness interventions to lessen the harm of social media sites, particularly Instagram.

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Introduction

Social Media: The Rise

Dating back only to 1997, social media is a relatively new invention. Starting with a website called “Six Degrees” named after the six degrees of separation, the desire to connect electronically has persisted and expanded to a point that was not previously conceived of. This website, named after the theory that all living things are connected through six links or less, provided a rudimentary platform on which users could upload profile pictures and engage with others. In the following year, one of the first social media activist sites was created. Moveon.org set the precedent for creating an online space for strangers with similar political ideologies to join together for a common goal through the use of the internet. Following this, blogs became a popular medium for people to follow each other and post updates about many aspects of life. In the year 2000, the first commercial advertisement-financed social media site was launched in Sweden. This strategy set the stage for growth in advertisement-based social media sites for the subsequent decades (A Chronological History of Social Media, 2018).

Emerging in 2002 and lasting until 2015, Friendster was one of the early major social media sites on the internet. From about 2002 on, social media sites for career networking (LinkedIn), dating, music exploration, and photo sharing were constantly being created. Perhaps the most influential social media site, Facebook became open for public use in 2006. With about 2.27 billion active users to date (Facebook Users Worldwide, 2018), Facebook is one of the most visited sites on the internet (A Chronological History of Social Media, 2018). In 2010, Instagram was launched. Owned by Facebook and created by Kevin Systrom, Instagram quickly became

the world's favorite social media app for photo-sharing (Brown, 2018), perhaps due to its high amount of "limbic resonance" (Musk, 2018).

With the rise of smartphones, constant access to social media sites also became available. While the innovation of social media certainly has its benevolent intentions and outcomes, problematic cell phone and social media use have also been linked to chronic stress, low emotional stability, depression, and an overall decrease in life satisfaction and psychological well-being (Augner & Hacker, 2012; Kross et al., 2013; Huang, 2017; Shakya & Christakis, 2017). One study even found a causal relationship between quitting Facebook and higher levels of well-being. In a one week experiment with 1,095 participants, a significant difference in life satisfaction and positive emotions was shown between the control (participants who continued to use Facebook) and the treatment group (participants who stopped using Facebook for a week). The study also demonstrated that these effects were more significant for heavy Facebook users, passive Facebook users, and those who tend to envy others while on Facebook (Tromholt, 2016).

Positive Impacts

Although there are many articles, including those in the popular press (Phelan, 2018), that discuss the harmful effects of social media use (Verduyn, et al., 2017), there are still some that defend the virtues of social media use. For example, American sociologist Claude S. Fischer argues that the changes in communication seen today result from a complex mix of new habits, and not just social media alone. While an elaboration on this argument would make this claim stronger, Fischer does not provide a more comprehensive explanation in his review of Sherry Turkel's book *Reclaiming Conversation* (2016). Fischer does assert that the notion that technology drives people apart is not an adequate statement, and that authors often ignore the

benefits (Fischer, 2015). Although this article is not as scientifically relevant as peer-reviewed journal publications, it is important to acknowledge that social media users may make decisions based on these types of sources, as they are more accessible and reader-friendly.

As for empirical research, one study found that having more Facebook friends was related to stronger perceptions of social support. The researchers measured physical illness (because less physical illness is associated with higher perceptions of social support), perceived stress, stressful life events, their length of membership to Facebook, their total number of Facebook friends and how many of those they consider close friends, both interpersonal and Facebook network sizes, perceived social support, and life satisfaction using the five-item Satisfaction with Life Scale. Results indicated that the number of Facebook friends increased perceptions of social support, which reduced stress, minimized physical illness, and boosted life satisfaction (Nabi, Prestin, & So, 2013).

Another study that employed momentary sampling showed similar positive results. Over a period of five days, the study examined the relationship between supportive interactions on social networking sites (SNS) and immediate affect after the interaction. With the 339 adult participants, a positive relationship was shown among the number of SNS friends, supportive interactions, positive affect, perceived social support, sense of community, and life satisfaction (Oh, Ozkaya, & LaRose, 2014). While findings from both of these studies appear to be robust, they are not consistent with previous research (Kim & Lee, 2011). Thus it is fair to say results are mixed, and that contextual factors likely influence when social media use is positive and when it is harmful.

Consistent with the results from the previous two studies showing the positive impacts social media can have, one study conducted by Burke and Kraut explored predictions based on contemporary theories on how the type of communication one engages in influences psychological well-being. These theories include those of belongingness, relationship maintenance, signals of relational investment, social support, and social comparison.

This study differentiates between three different types of communication/engagement, including (1) targeted, composed communication such as a wall post or comment, (2) “one-click” communication such as a “like”, and (3) composed, broadcast communication such as a status updated made for a wide audience. The researchers predicted that targeted, composed communication with strong ties as opposed to weaker ties would lead to the greatest benefits. As predicted, the results demonstrated that participants’ well-being increased the most when they received composed, targeted communication from strong ties as opposed to receiving broadcast, weak tie communication, or “one-click” feedback. In other words, when people received personalized and effortful communication from close friends, they also showed an improvement in well-being. Therefore, it is possible to derive benefits from social media use, as long as it consists of interacting with people you care about in an active way (Burke & Kraut, 2016).

Negative Impacts

It is clear that social media has some possible benefits, such as allowing people to connect. For example, researchers found that among 794 preadolescents and adolescents, online communication was positively related to closeness of friendships (Valkenburg & Peter, 2007). However, online communication does not provide the same feelings of emotional closeness as in-person interaction. One study assessed this by having participants engage in four different

types of conversations each: in-person video chat, audio chat, and instant messaging. Levels of bonding were measured through self-report and nonverbal behaviors associated with bonding. Results showed significantly greater levels of bonding from the in-person condition than from instant messaging (Sherman, Minas, & Greenfield, 2013).

Given the evolved neural architecture of the human brain and consistent with the belongingness hypothesis, in-person interpersonal relationships are highly valued. With the increase of social media as a primary means of communication, some researchers have found that electronic communication can increase loneliness (Song, et al., 2014). This is a significant risk in terms of suicide and suicide-related outcomes according to the interpersonal theory of suicide, which refers to the concept that suicide is a result of three major factors: thwarted belongingness (i.e. loneliness, social disconnection), perceived burdensomeness (feeling like a burden to others) (Joiner, 2005; Van Orden, et al., 2014), and acquired capability (i.e. increased access to execution means and lowered fear of death)(Van Orden, et al., 2014). Consequently, a lack of strong attachments is linked to a wide array of negative outcomes on one's health, adjustment, and well-being (Twenge, Joiner, Rogers, & Martin, 2017; Baumeister & Leary, 1995). For all of these reasons, the popular press has taken notice of the potential harms of social media use.

In response to the controversy, an extensive review was performed by Facebook's research team that highlighted some important findings from empirical studies. While it may seem as though the Facebook research team would not be a reliable source, the research they presented did not necessarily highlight the benefits. In fact, there is an overwhelming amount of research that demonstrates the negative impacts of Facebook use. This research team began their

review by noting the difference between passive and active social media use, drawing from the findings of Verduyn's and colleagues' studies, which will be more thoroughly discussed later in this review. Passive social media use can be defined as consuming information without direct exchanges. Scrolling through one's feed and just viewing posts are examples of this. Active social media use refers to engaging in direct exchanges with others such as posting status updates or commenting on posts. Passive versus active social media use has been shown to have different impacts on well-being (e.g., Verduyn et al.).

Another study reviewed by the Facebook team examined the effects of Facebook use on well-being used experience sampling in order to garner information about in-vivo behavior and the psychological experience of using Facebook. By texting participants five times per day for two weeks, researchers examined how participants were influenced by Facebook use in terms of two measures of subjective well-being: moment-to-moment feelings as well as life satisfaction. More specifically, the text messages contained a link to a survey which asked participants about how they were feeling in that moment, how worried they felt, how lonely they felt, how much they have used Facebook since the last text message was received (some time in the previous day), and how much they have interacted with people "directly" since the last text was received. Interacting with people "directly" was defined as face to face or phone conversations. It is also important to note that participants always answered the affect questions first, and the rest of the questions were presented in random order. Results indicated that Facebook use negatively influenced both of these measures of well-being. In addition, direct in-person interactions did not produce the same effects. Although social media engagement presents as a resource that allows

people to connect, these findings show that Facebook may undermine well-being (Kross, et al., 2013).

Some researchers posit that since people tend to portray themselves in very flattering ways on social media by showing positive life developments and omitting negative ones (Barash, Ducheneaut, Isaacs, & Bellotti, 2010; Kross, et al., 2013; Newman, Lauterbach, Munson, Resnick & Morris, 2011), feelings of envy arise and then lower well-being as a result of passively scrolling through social media (Smith & Kim, 2007).

Facebook researchers also cited two additional articles to demonstrate the negative consequences of social media use. The first study used three waves of survey data to collect information concerning the associations between Facebook use and self-reported physical health, mental health, life satisfaction, and BMI (Shakya & Christakis, 2017). To measure Facebook use, the researchers gathered information including their number of Facebook friends, the number of times they have “liked” a post, the number of links they had clicked in the past 30 days, and the number of times they had updated their status in the last 30 days. It is important to note that nearly all of these measures could be considered active use, which is discussed in more detail later in this review as a moderator. Their results showed that real-world social networks (as opposed to social networking sites) were positively associated with well-being, while Facebook use was negatively associated with overall well-being. However, it is possible that this association could be explained by the fact that those who have lower levels of well-being may seek comfort and attempt to decrease feelings of loneliness by using Facebook excessively. To clarify this, the researchers accounted for a person’s initial well-being which still showed that using Facebook was associated with a decrease in well-being in the future. Overall, this study

showed that Facebook use does not promote well-being, and perhaps worse - Facebook use seems to be linked to declines in well-being (Shakya & Christakis, 2017).

Types of Use

Building on these findings, Verduyn and colleagues were interested in how Facebook usage leads to these declines. They examined whether the way people engaged with Facebook had an impact on measures of subjective well-being. In Verduyn and colleagues' first study examining the differences between passive and active Facebook use, they had some participants engage in passive Facebook use, and others in active Facebook use in a laboratory setting. After either using Facebook passively or actively for only ten minutes, participants completed a battery of questionnaires measuring their mood, how lonely they felt, and how much better or worse they felt their lives were in comparison to others. Results indicated that neither passive or active Facebook users showed changes in affect directly post-manipulation. However, passive users showed a significant decrease in affective well-being at the end of the day as compared to their baseline and post-manipulation.

For their second study using experience-sampling, the participants began by completing a set of questionnaires including the Satisfaction with Life Scale, the Beck Depression Inventory, the Revised UCLA Loneliness Scale, the Rosenberg Self-Esteem Scale, and the Social Provision Scale, all of which were modified to fit the context of the study. For the second phase, participants received five text messages per day for six consecutive days that each contained a link to an online survey asking participants to complete questionnaires on affective well-being and loneliness. On average, participants responded to 80% of the text messages. For the final phase, participants returned to the lab to complete more questionnaires including the Satisfaction

with Life Scale. Researchers also recorded the participants' number of Facebook friends, as well as data on their Facebook use. The results indicated that participants felt worse when they engaged in passive Facebook usage compared to when they did not use Facebook passively. Passive and active use were operationalized the same way for both studies. In the first study, participants were told to either post and communicate with others on Facebook (active) or to scroll through news feeds (passive). In the second study, participants reported how they used Facebook according to these definitions. With both studies combined, the results revealed that *passive* Facebook use leads to a significant decrease in affective well-being (Verduyn, et al., 2015).

Other studies have illuminated the distinction between passive and active social media use. A study conducted by Deters and Mehl demonstrated that active Facebook use led to reduced loneliness due to participants feeling more connected to their friends on a daily basis using an experimental design. For one week, participants were either asked to post more than they usually do, or they received no instructions. Compliance was monitored through a Facebook account created specifically for the study. In the experimental group, there were reductions in measures of loneliness, and the decrease in loneliness was attributed to feeling more connected to their friends. Interestingly, results also showed that the effect of posting on loneliness was independent from direct social feedback (i.e. friends "liking" or commenting) (Deters & Mehl, 2013).

Overall, the studies concluded that while active social media use can either contribute positively to subjective well-being or that it just may not contribute to declines in well-being, passive social media use clearly contributes negatively to it. In addition, one study (Verduyn, et

al., 2015) found that users engaged with Facebook passively 50% more than they engaged with it actively, which could explain the overall negative relationship with subjective well-being found in these studies (Verduyn, et al., 2017).

Mediators of Negative Impact/ Social Comparison

With all of this evidence that social media use leads to lower levels of well-being, researchers are interested in the mechanisms involved in this decline. There is a substantial amount of research that specifically focuses on self-presentation and social comparison as mediators of the negative impact of social media. One study conducted in 2011 explored the reasons why people use Facebook (Nadkarni & Hofmann, 2011). Through a systematic review, these researchers derived a two-factor model for Facebook use. They found that Facebook use is primarily determined by two basic social needs. The first is the need to belong, and the second is the need for self-presentation. These two needs can be mutually exclusive and depend on a variety of factors including cultural background, sociodemographic factors, self-esteem, self-worth, and personality traits such as introversion, extroversion, shyness, narcissism, and neuroticism.

One study examined the relationship between narcissism and objective measures of Facebook activity. The results showed that narcissism predicted both higher levels of social activity and more self-promoting content on Facebook (Buffardi & Campbell, 2008). Revealing similar results, a study conducted by Mehdizadeh (2010) showed a correlation between individuals higher in narcissism and lower in self-esteem and greater online activity, as well as self-promotion. This self-promotion content also sometimes contained Photoshopped images (Mehdizadeh, 2010).

Also revealing information about social comparison and presentation, Steers, Wickham, and Acitelli (2014) examined how seeing others' highlight reels on social media sites can impact users' psychological well-being in two studies. In the first study, an association was found between time spent on Facebook and depressive symptoms for both genders. In the second study, a 14-day diary design was used in order to further investigate this relationship. Results indicated that the association between time spent on Facebook and depressive symptoms was mediated by three types of social comparison: upward, nondirectional, and downward. Upward social comparison is defined as seeing oneself as inferior to others, and can lead to qualities associated with depression such as lower self-esteem and negative self-evaluations. Conversely, downward comparison involves viewing oneself as superior to others, which could lead to lower anxiety and depressive symptoms. However, the authors suggested that engaging in frequent social comparisons of any kind, despite the direction, is linked to lower well-being (Steers, Wickham & Acitelli, 2014).

Similar to the previous study, Chou and Edge (2012) were interested in the impact of Facebook use on perceptions of others' lives based on the notion that people tend to present themselves in a favorable way. The authors argue that those who are involved more deeply with Facebook will be more vulnerable to a distorted perception of others because of the following two factors. The first factor is the use of the availability heuristic. The researchers predicted that those who engage with Facebook heavily will employ an availability heuristic in order to manage the vast amount of information presented on the social media platform. By doing so, individuals will make judgements about others based on information they can easily recall. Considering that people construct overly favorable self-representations online, the averaged perceptions of others

tend to be overwhelmingly positive, thus giving the impression that others are happy and living better lives than the observer. As Facebook use increases, more examples of this are available, thus making heavy Facebook users more vulnerable to this negative consequence. The second factor is the correspondence bias, the common attribution error that refers to the tendency to assume others' actions or image reflect their personality traits, rather than attributing them to situational factors. In the context of social media and distorted representation, viewing posts of others being happy could lead to the assumption that others have a happy disposition, while ignoring the situation that could lead to that person's apparent happiness, such as being on vacation. This bias is more likely to occur as a result of viewing profiles of people whom they have never met in comparison to closer Facebook friends. As a result, those who have more Facebook friends who are strangers are more likely to see others as happier and living better lives than them. In both hypotheses, a consequence of heavy use involving many online "friends" is believing that life is not fair. The analyses provided support for both hypotheses (Chou & Edge, 2012).

Also acknowledging that people vary in their tendencies to engage in social comparison, a study conducted by Vogel and colleagues (2015) used an individual difference variable called Social Comparison Orientation (SCO). This study conducted by Vogel and colleagues examined differences in Facebook use based on scores for Social Comparison Orientation. The first two studies used a correlational approach that demonstrated that participants who exhibited high SCO used Facebook more heavily. The second study differed from the first in that they used different assessments of Facebook use. In the first, they answered questions about frequency of Facebook use, and in the second, they used a more tailored measure for their study (the Facebook Intensity

Scale). In the third study, an experimental design was used which revealed that participants high in SCO reported poorer self-perceptions, lower self-esteem, and more negative affect balance after engaging with Facebook in their controlled lab setting, as compared to those who scored lower on SCO (Vogel, Rose, Okdie, Eckles, & Franz, 2015).

To further explore this topic, Appel, Gerlach, and Crusius (2016) reviewed the available literature on the interplay between Facebook use, social comparison, envy, and depression. The studies they reviewed showed that Facebook use, especially passive use, predicts increases in measures of social comparison including envy. In several studies, social comparison or envy mediated a positive relationship between Facebook use and negative psychological outcomes such as depression (Appel, Gerlach & Crusius, 2016).

To further substantiate this relationship, an experiment had 268 college-age young adults complete an initial online survey as well as a three-week follow up test (Feinstein, et al., 2013). The researchers predicted that negative social comparison on Facebook would be associated with increases in rumination, which was predicted to be associated with depressive symptoms. Rumination was measured with the Ruminative Responses Scale. Results indicated a significant relationship between negative social comparison on Facebook and the predicted variables. Additionally, Facebook social comparison, rumination, and depressive symptoms were all positively and significantly associated with one another (Feinstein, et al., 2013).

The Media's Response

With rising depression and suicide rates being significant public health concerns with over 40,000 Americans dying by suicide each year (Center for Disease Control, 2017), it seems as though many people are seeking an explanation and looking at heightened social media use as

one contributing factor. One recent article discusses “JOMO”, or the “Joy of Missing Out”. The antithesis of the popular phrase “FOMO”, or “Fear of Missing Out”, JOMO refers to the content feeling associated with disconnecting from the constant updates of social media and appreciating the present moment. Acknowledging the collective reliance on smartphones and the easy access they provide to social media updates, this approach centers around finding a balance between constant use and complete abandonment of the technology. While this can be difficult to achieve, those who engage in JOMO suggest simply being more mindful about cell phone use (Phelan, 2018).

Despite its technology-resistant implications, JOMO has caught the attention of tech industry moguls such as Sundar Pichai, the C.E.O. of Google and the leaders of Apple. Both having released a version of digital well-being initiatives, it seems as though these companies are reacting to the rising awareness of the negative impacts of frequent social media use. However, their intentions are unclear, given that social media sites and the technologies that support them are engineered to make the user addicted to them and provide information that is valuable for resale and direct marketing (Phelan, 2018).

As for Google’s take on the “TWS” (time well spent on devices) movement, the central idea is that in order to increase the quality of time spent on cell phones, especially smartphones, as well as decrease the quantity of time spent, people must understand their habits. Google states that by being aware of your usage patterns, you can take action accordingly. In order to track overall usage time as well as time spent on a specific app, Google created Dashboard: a system wide tracking feature on Android devices. Similar to the popular app “Moment,” Google’s feature tells users how many times they unlock their phone and how many notifications they

receive. With this information, the notion is that users can subsequently adjust their habits and use their devices less. From screen-time awareness alone, 56 percent of Moment users reported using their phones an average of 24 minutes less per day (Gonzalez, 2018). However, data shows that these initiatives have had little impact on users. Despite the impact that Moment has shown on its users, Google's app has only influenced about six percent of its customer base to use their phones less (Gonzalez, 2018). Among these users, the average decrease in screen-time is 26 minutes per day.

In response to this, other apps that help users wind down at set times have been developed. For example, Google's Wind Down app puts the device on do not disturb and adjusts the display settings to a grayscale at a predesignated time (Gonzalez, 2018). To investigate the value of a "do not disturb" function, researchers at Carnegie Mellon University had people turn off notifications at work and outside of work and tracked associated impacts. They found that turning off notifications during work hours led participants to feel less stressed and more productive. However, when participants were outside of the work context, they reported feeling anxious and stressed out of fear that they were missing important incoming information and violating social expectations. An interesting finding of this study was that all participants said they would not give up notifications altogether, despite their reduced feelings of stress and increased productivity during work hours. Despite their negative impact, the participants still considered notifications to be essential. Although these findings revealed information that could perhaps generalize to a larger sample, this specific pilot study only included 12 participants, which is a significant limitation (Pielot & Rello, 2015). Nonetheless, strategies for self-managing social media use will need to take into the context-specificity of social media use and impacts,

and be mindful of the powerful norms for social media availability that have been established in our culture.

Consistent with the notion that constant notifications are detrimental to well-being, Apple's take on digital health also offers awareness-raising strategies to prevent overuse. While Google's Dashboard system prevents the user from accessing certain apps after the designated time limit has been reached, Apple's system simply notifies users that they have exceeded a time limit (Gartenberg, 2018).

It is apparent that in order to instill lasting changes for most people, more help is needed than just phone use monitoring and an app timer. It is likely that successful initiatives will need to strike a balance between FOMO and JOMO (Gonzalez, 2018).

Mindfulness

Mindfulness can be defined as “the basic human ability to be fully present, aware of where we are and what we're doing, and not overly reactive or overwhelmed by what's going on around us” (What is Mindfulness, 2018), and it might be the antidote to social media addiction. There is evidence supporting the efficacy of mindfulness in clinical treatment, especially for depression (Mindfulness Based Cognitive Therapy for Depression; Sipe and Eisendrath, 2012) as well as for stress reduction in a variety of different populations (Evans, Wyka, Blaha, & Allen, 2018). Essentially, mindfulness is accepted as an effective treatment for a wide variety of issues including anxiety, depression, burnout in the workplace, and even chronic pain (Kinnunen, Puolakanaho, Tolvanen, Mäkikangas, Lappalainen, 2018). Its applicability is also being tested in more and more domains (e.g., pain management, substance use treatment, etc.). The main questions being asked empirically about mindfulness interventions currently involve how lasting

the effects are, what factors moderate intervention success, and how else we may be able to apply them to enhance well-being. This thesis will explore its potential as a tool for creating awareness of problematic social media use, decreasing social comparison, and improving wellbeing.

Origin of Mindfulness and Mindfulness-Based Stress Reduction

Mindfulness was largely brought to the secular surface by Jon Kabat Zinn, the founder of Mindfulness-Based Stress Reduction. Formerly inextricable from its religious roots, mindfulness was secularized and popularized in the West by Kabat-Zinn through his redefining of the term in the 1970's. With no mention of reincarnation, enlightenment, or other Buddhist terms, Kabat-Zinn defined mindfulness as, "The awareness that arises through paying attention on purpose in the present moment, and non-judgmentally" (Heffernan, 2015). By making this more accessible to Americans, Kabat-Zinn was able to communicate these complex Buddhist ideas to the public through his books *Guided Mindfulness Meditation* (1990), *Wherever You Go, There You Are* (1994), *Mindfulness Meditation in Everyday Life and Exercises and Meditation* (1994), and many more.

Taking these accessible teachings even further, Kabat-Zinn developed Mindfulness-Based Stress Reduction (MBSR) in 1979 in order to "recontextualize" Buddhist dharma within the frameworks of science, medicine, and healthcare. With major studies showing the deleterious effects of stress on the body, Kabat-Zinn aimed to apply the foundations of dharma to stress reduction (Kabat-Zinn, 2011).

One review found that chronic exposure to stress hormones at any point in one's life impacts brain structures involved in cognition and mental health. However, these effects are

mediated by the timing and duration of the exposure, as well as genetic and environmental influences. Stress triggers the activation of the hypothalamus-pituitary-adrenal (HPA) axis, which produces glucocorticoids by the adrenals. In the brain, there are receptors for these steroids. Ultimately, these regulate gene expression. Therefore, chronic activation of the HPA axis leads to long-lasting effects on brain function (Lupien, McEwen, Gunnar, Heim, 2009). The harmful effects of stress on the body have also been shown by Nobel Laureate Elizabeth Blackburn. Her research has demonstrated that on the cellular and subcellular level, chronic stress accelerates aging, leading to a significantly shortened life-span (Epel, et al., 2004).

An integral component of MBSR is its emphasis on patient participation. “It is invitational, and depends on the patient’s willingness to tap into those profound innate resources we all have by virtue of being human, the capacities for learning, growing, healing, and transformation inherent in the systematic cultivation of awareness itself and its sequelae” (Kabat-Zinn, 2011). This may pose an obstacle in terms of empirical research of MBSR, as the degree of participation is, one, a moderator, and two, difficult to measure because of the reliance on homework assignments. Participation in this therapeutic practice is done “by watching yourself in your daily life with alert interest with the intention to understand rather than to judge, in full acceptance of whatever may emerge, because it is here, you encourage the deep to come to the surface and enrich your life and consciousness with its captive energies. This is the great work of awareness; it removes obstacles and releases energies by understanding the nature of life and mind. Intelligence is the door to freedom and alert attention is the mother of intelligence” (Maharaj, 1973).

More specifically, MBSR is typically an 8-10 week program in which approximately 30 participants meet weekly for a two and a half hour instruction and practice in mindfulness meditation. As a group, they discuss stress, coping, and receive homework assignments. Around the sixth week, participants engage in an all-day mindfulness session. Through this process, participants learn mindfulness meditation skills such as a body scan, yoga postures, breathing techniques, and performing everyday tasks mindfully such as walking, standing, and eating. Outside of group meetings, participants are instructed to practice these mindful techniques for at least 45 minutes per day, six days per week (Baer, 2003). One possible consequence of mindfulness training is the realization that most sensations, thoughts, and emotions fluctuate, passing by “like waves in the sea” (Linehan, 1993; Baer, 2003).

Mindfulness Training as a Clinical Intervention

In 2003, Ruth Baer published a review of mindfulness training as a clinical intervention. Detailing the increasing popularity of mindfulness interventions, Baer mentions that by 1997, over 240 hospitals in the United States and abroad were offering stress reduction programs with a basis in mindfulness (Salmon, Santorelli, Kabat-Zinn, 1998). In addition, training in mindfulness is also an important aspect of Dialectical Behavior Therapy (Linehan, 1993). Central to DBT is the relationship between acceptance and change. While MBSR follows a regulated structure, mindfulness skills taught in DBT are tailored to the patient with the guidance of their therapists. Highlighted by Linehan, one limitation to MBSR is the inability of some individuals to fully participate due to severe impairments (Linehan, 1994). Participants of DBT are instructed to do a variety of mindful tasks such as imagining the mind as a conveyor belt and

labeling their thoughts, learning to observe the breath, and mindful awareness during everyday activities like making tea or drawing a bath (Baer, 2003).

Baer argues that Acceptance and Commitment Therapy (ACT) and Relapse Prevention are also consistent with mindfulness practices, albeit tacitly. In ACT, clients are taught to separate themselves from an observing self who watches their bodily sensations, thoughts, and emotions. One example of this is restructuring a thought like “I am a bad person” to “I am having the thought that I am a bad person”. Clients are also instructed to experience these thoughts nonjudgmentally, while not attempting to change or avoid them (Kohlenberg, Hayes, & Tsai, 1993). Namely, clients will sometimes engage in a task in which they imagine their thoughts written on signs held by parading soldiers in order to observe them without becoming absorbed by any of them (Hayes, 1987). All of these qualities are parallel to mindfulness teachings found in MBSR (Baer, 2003).

As for Relapse Prevention (RP), mindfulness is used as a coping technique in response to urges to engage with substance use. While addiction is “an inability to accept the present moment and a persistent seeking of the next ‘high’” (Marlatt, 1994), mindfulness involves acceptance of the present moment and inevitable changes (Baer, 2003). RP employs the metaphor “urge surfing” which refers to the notion that urges to use substances are like waves that grow and eventually subside. Thus, the client is encouraged to “ride the waves” and learn that the urges will pass. In addition, urges must be accepted as normal and expected to repeat in response to appetitive cues. With this acceptance, clients will be enabled to observe these urges nonjudgmentally and cope with them (Baer, 2003).

Common Mechanisms In Mindfulness Training

Clearly, mindfulness practices have established their place in modern psychotherapy. Among these treatment strategies, Baer suggests that there are several mechanisms that may help to explain how mindfulness can lead to symptom reduction and changes in behavior: exposure, cognitive change, self-management, relaxation, and acceptance (Baer, 2003).

To exemplify the effect of exposure, Baer uses Kabat-Zinn's initial study of MBSR on patients with chronic pain (Kabat-Zinn, 1982). During the extended periods of motionless meditative sitting, instructors encouraged participants to not shift their positions despite their discomfort. Instead, they were told to carefully focus on the pain and to adopt a nonjudgmental attitude towards the sensations, as well as the associated cognitions (i.e. "this is unbearable"). This ability is thought to reduce stress associated with the pain. Kabat-Zinn suggests that repeated exposure to pain without the emotional reactivity will gradually desensitize the patient to their chronic pain. This will ultimately lead to lower levels of distress and suffering (Kabat-Zinn, 1982).

A similar mechanism can also be applied to anxiety and panic. When panic sensations arise, participants are instructed to observe these sensations nonjudgmentally without attempting to escape or avoid them. This can lead to a reduction in emotional reactivity to these sensations (Kabat-Zinn, 1992).

The next common mechanism in mindfulness skills training is cognitive change. Kabat-Zinn (1982, 1990) suggests that nonjudgmental observation of one's thoughts can lead to cognitive restructuring; one's thoughts are "just thoughts" rather than reflections of reality. In addition, this way of thinking does not require escape or avoidance behavior, which is central to patients receiving DBT. In 1991, Heatherton and Baumeister posited their theory of binge eating

disorder as an escape from self-awareness and the associated unpleasant state (Heatherton & Baumeister, 1991). This escape model was cited by Kristeller and Hallet (1999) in a MBSR study with patients with binge eating disorder. In this six-week meditation-based group intervention, binges decreased in frequency (from 4.02 per week to 1.57 per week), and in severity. Additionally, scores on the Binge Eating Scale (BES) and Beck Depression and Anxiety Inventories decreased significantly. Patients' sense of control also increased significantly. This study suggests that meditation training may be an effective treatment for binge eating disorder.

The theme of cognitive change can also be found in two studies conducted by Teasdale and colleagues. In 1999, Teasdale suggested an alternative to cognitive therapy that focuses on changing one's relationship to depressive thoughts and inner experiences. Teasdale referred to this as a metacognitive insight mode, in which thoughts are perceived as events in the mind. Through the acquisition of mindfulness skills, individuals can enter this mode and thus change their inner contexts in which depressive thoughts and feelings are processed (Teasdale, 1999). In 1995, Teasdale and colleagues suggested that this nonjudgmental and decentered view of one's thoughts through mindfulness training can interfere with ruminative patterns associated with depressive episodes (Nolen-Hoeksema, 1991).

The next common thread suggested by several mindfulness researchers is that improved self-observation and self-management may have an impact on coping skills. For example, Kabat-Zinn suggests that in his 10-week Stress Reduction and Relaxation Program to train chronic pain patients in self-regulation, increased awareness of pain through detached observation can lead to decreased suffering. At the end of the trial, 65% of the patients showed a reduction of at least

33% in the mean total Pain Rating Index, and 50% showed a reduction of at least 50%.

Significant decreases in mood disturbance and psychiatric symptoms were also shown (Kabat-Zinn, 1982). The effects of self-management have also been cited to contribute to success in studies concerning recognition of satiety cues in those with binge eating disorder (Kristeller & Hallett, 1999), as well as in patients recovering from addiction and depression (Marlatt, 1994; Teasdale, et al., 1995).

The next factor may be the most obvious, yet the most widely misunderstood component of mindfulness meditation. While relaxation may be a helpful consequence for treating stress-related disorders such as psoriasis and fibromyalgia (Goldenberg et al., 1994; Kabat-Zinn et al., 1998; Kaplan, Goldenberg, & Galvin-Nadeau, 1993), it is not actually the purpose of mindful meditation. Rather, it is to learn to nonjudgmentally observe one's current conditions. In addition, relaxation is not unique to mindfulness meditation; it is common among various therapeutic strategies (Shapiro, 1982).

The final commonality among mindfulness-based programs is perhaps the most central (Hayes, Jacobsen, Follette, & Dougher, 1994). Kabat-Zinn even described acceptance as one of the several foundations of mindfulness practice (Kabat-Zinn, 1990). Baer uses the acceptance of panic attacks as an example. While many clinicians emphasize the importance of changing all unpleasant aspects of one's life and symptomatology, acceptance is also very important (Hayes, 1994). With panic attacks, an individual may engage in a variety of maladaptive behaviors such as substance abuse, avoidance of events, and excessive anxiety. If that individual could accept that panic attacks will occur and that they are temporary, they could adjust their perception of panic attacks and cope with them more adaptively (Baer, 2003).

Baer's review of mindfulness meditation research provides a rather comprehensive assessment of the literature up until 2003. Including 21 studies, Baer closely examines the various treatment groups, methodologies, adherence to mindfulness practices, and patients' reactions to treatments. This next section will more closely examine the intricacies of these studies following a similar structure to Baer's review, with a focus on psychological symptoms, as well as additional and relevant research that was published after Baer's review (2003).

Mindfulness and Mental Illness

In 1992, Kabat-Zinn and colleagues conducted a study designed to determine the effectiveness of an 8-week group mindfulness meditation program on 22 patients with generalized anxiety disorder (GAD) or panic disorder. One strength of this study is that scores did not solely rely on self-reports; therapists' ratings were also employed. Both types of ratings were obtained weekly pre- and post-MBSR, as well as monthly during the three month follow up period. Results showed a significant decrease in anxiety and depression scores after treatment for 20 of the subjects. These reductions were also maintained during the follow-up period. In addition, the number of patients experiencing panic symptoms was also significantly reduced. This suggests that MBSR can be an effective treatment for anxiety and panic symptoms. Three years following this experiment, Miller, Fletcher, and Kabat-Zinn (1995) obtained follow-up information on 18 of these subjects. Results showed that ongoing compliance with the meditation practices they learned in their original treatment program showed lasting benefits. Given the ambiguity about the lasting effects of mindfulness meditation, this sample provides support for its longevity.

In 2000, Teasdale and colleagues examined the effects of MBCT on patients with major depressive disorder (MDD). This group intervention was designed to train these patients to disengage from dysphoria-activated depressogenic thinking that may mediate relapse. In this randomized control trial, patients were either assigned to continue treatment as usual or to receive MBCT in addition to their current treatment. Over a period of 60 weeks, major depression relapses were assessed. Among patients who previously experienced three or more episodes of depression (77% of the sample), MBCT significantly reduced their risk of relapse. For patients with only two previous depressive episodes, MBCT did not have this effect. The authors attribute this disparity to the autonomous relapse processes involving reactivation of depressogenic thinking. However, this does not adequately explain the difference between those with three previous episodes from those with two. The authors also noted that this treatment program is a cost-efficient strategy (Teasdale, et al., 2000).

In another study using patients with GAD or panic disorder, 41 participants were randomly assigned to either a meditation-based stress management program or to an anxiety disorder education program. However, this study differs from the previous studies in that the mindfulness-based stress management program was used as an adjunct to their stabilized pharmacotherapy. It is also important to note that this program consisted of exercise, stretching, muscle building, relaxation, and “hypnotic suggestion”. While these all may be beneficial, they deviate from Kabat-Zinn’s MBSR (Kabat-Zinn, 2011). Despite this, results showed that participants in the mindfulness group significantly improved on all anxiety scales measured. For measures of depression, there were no significant findings (Lee, et al., 2006).

In 1985, a similar study was conducted that used mindfulness and meditation as an adjunct to psychotherapy. In a more symptomatically diverse population with diagnoses ranging from severe narcissistic and borderline personality disorders to anxiety and obsessive disorders, the effect of a 10 week meditation program was examined. Mostly meditation-based but still employing mindfulness meditation, the patients meditated as a group as well as daily at home. The program produced significant improvement in well-being such as in anxiety and depression according to both ratings of themselves and by their psychotherapists. These results suggest that meditation can be an important adjunct to psychotherapy, even for individuals with severe and persistent mental health difficulties (Kutz, et al., 1985).

While mindfulness research involving a broader range of socioeconomic backgrounds is slightly lacking, there are some studies focusing on more diverse populations. One such study focused on a bilingual (English and Spanish) mindfulness meditation-based stress reduction program in an inner-city setting. The practices included breathing meditation, eating meditation, walking meditation, and mindful yoga. Statistically significant decreases were found in medical and psychological symptoms, as well as an increase in self-esteem. Many of the participants also reported dramatic improvements in attitude, beliefs, habits, and behaviors. The authors suggest that these findings support the use of mindfulness meditation courses in inner-city community health centers with patients with various diagnoses (Roth & Creaser, 1997).

Student Populations

One strength of this area of research is the vast array of studies using clinical populations as opposed to mostly undergraduate samples. However, the importance of reviewing literature using student populations remains, especially for the present research which focuses on mindful

social media use in college students. One study used 28 undergraduate students to examine the effects of an 8-week stress reduction program based on mindfulness meditation. The participants were randomly assigned to either an experimental group or a control group. Following the experiment, the treatment group showed significant reductions in “overall psychological symptomatology”, increases in sense of control and utilization of “an accepting or yielding mode of control” in their lives, and higher scores on measures of spiritual experience. The author attributes the success of the program to the development of detached observation and awareness of the contents of consciousness (Astin, 1997).

Another study using a student population aimed to gather information on how researchers can better prepare future doctors for the stresses of medical practice. The study examined the effects of an 8-week meditation-based stress reduction program on 78 pre-medical and medical students. Findings revealed a reduction in self-reported state and trait anxiety, reports of overall psychological distress including depression, an increase in scores of overall empathy levels, and an increase in a measure of spiritual experiences. These findings were also replicated in the waitlist control group (Shapiro, Schwartz, & Bonner, 1998).

Finally, a smaller study consisting of 25 first-year college students tested the effects of mindfulness training on stress responses via the autonomic nervous system (ANS). Participants were randomly assigned to either a mindfulness training group or a “sham” mindfulness stress reduction condition. Psychophysiological and stress responses were assessed pre- and post-training. In addition, trait mindfulness was tested before the training began. Results indicated that participants in the treatment group had a reduced stress response post training, and a “more balanced” ANS. Additionally, participants who were lower in trait mindfulness showed more

exaggerated effects than those who already had higher ratings of trait mindfulness. The author suggests that mindfulness could be an effective treatment for reducing stress in college students (Zitron, 2018).

Self-Compassion as a Moderator

While there are many possible moderators for the benefits of mindfulness, self-compassion as a moderator is heavily studied. Baer, Lykins, and Peters (2012) investigated cross-sectional associations between self-reported mindfulness, self-compassion, meditation experience, and psychological well-being in 77 experienced meditators and 75 demographically matched non-meditators. Findings suggest that mindfulness and self-compassion skills may have significant roles in the improved well-being related to mindfulness training. However, the authors suggest that longitudinal studies are needed in order to confirm these findings. In addition, this study is only correlational and cannot establish a clear causal relationship between self-compassion and the benefits of mindfulness training (Baer, Lykins, & Peters, 2012).

In an experimental study, Evans and colleagues examined the role of self-compassion in improved well-being as a result of an 8-week MBSR program using a community based sample. This program was conducted at a major academic medical center, which could indicate that the structure more closely matched the intended format of MBSR, as opposed to programs that were loosely based on mindfulness and meditation practices. Results showed a significant reduction of symptoms on the Profile of Mood States (POMS), and statistically significant increases on the Mindful Attention Awareness Scale (MAAS) and the Self-Compassion Scale (SCS) following the completion of the program. The authors defined these changes as notable improvements in

well-being. Using mediation analyses, self-compassion was shown to mediate the relationship between mindfulness and well-being following the training program. These results provide support for the notion that self-compassion mediates the positive outcome associated with mindfulness (Evans, Wyka, Blaha, Allen, 2018).

A longitudinal study assessing the mediating effects of mindfulness and self-compassion on trait anxiety did not demonstrate the same outcome. While results showed that both mindfulness and self-compassion increased following a meditation intervention, they did not show that self-compassion mediated mindfulness. More specifically, increases in mindfulness precipitated increases in self-compassion. However, both self-compassion and mindfulness were associated with reductions in anxiety (Bergen-Cico & Cheon, 2013).

Analysis of the Mindfulness Evidence Base

Mindfulness as a treatment for a wide array of disorders and discomforts has been deeply studied for decades. Throughout the course of these studies, there have been some important methodological issues to note. In many of the studies, a control group is not used. While the results of these studies may remain robust, one cannot eliminate the possibility of a placebo effect (Baer, 2003). However, it is possible that a placebo effect could be an effective component of mindfulness training.

The second methodological issue present in many studies is the use of small sample sizes. To detect a medium to large effect ($d = 0.7$) with a two-tailed test, an experiment would require at least 33 participants (Cohen, 1977; Baer 2003). However, in this case of mindfulness training programs, there could be some advantages to using a smaller sample size. Given that mindfulness programs are partially administered in group settings, a smaller participant pool

could allow for more internal consistency rather than spreading the treatment too thin and having unbalanced attention and care among the recipients.

The final methodological inconsistency is the integrity of the treatment administration. While many of these discussed studies mention that their therapists were “experienced” (Baer, 2003), there is a “poetry of mindfulness, and the appropriate uses of the poetic imagination within mindfulness-based interventions” (Kabat-Zinn, 2003). Thus, adequacy of training for mindfulness intervention leaders and treatment fidelity within mindfulness interventions should be topics of study.

Despite these issues, the literature strongly suggests that mindfulness may improve various mental and physical health problems, and positively impact psychological well-being.

Mindfulness as a Way to Combat the Negative Impacts of Social Media

With the growing literature in both social media use and mindfulness, it seems rather logical to place the two together. However, causal research on the effects of mindfulness on social media use, particularly harmful social media use, has barely been done. While some studies consider mindfulness as a moderator for social media use (Turel & Osatuyi, 2017; Timmerman, 2002; Charoensukmongkol, 2016), very few studies focus on the impact of mindfulness on social media use. Given the addictive quality of social media (Koc & Gulyagci, 2013; Andreassen, 2015; Kuss, et al., 2014) and the positive effects on addiction from mindfulness training (Marlatt, 1994), it is possible that mindfulness skills could have desirable effects on addictive social media use. One study using a sample of 211 employees in Thailand showed that people who are highly addicted to social media tended to have lower mindfulness. They also found that lack of mindfulness was associated with higher emotional exhaustion,

which the researchers defined as the state of depletion and fatigue, a core component of burnout (Sriwilai & Charoensukmongkol, 2014). In addition, social media use can lead to depression and anxiety (Verduyn, et al., 2015; Lepp, Barkley, Karpinski, 2014), which have also been shown to be positively influenced by the acquisition of mindfulness skills.

While the type of social media use is important in determining the effects, for example, passive vs. active social media use (Verduyn, et al., 2015), one study broadly examined the relationship between social media use and mindfulness. With a sample of 200 participants, a negative correlation was shown between mindfulness and social media use. More specifically, higher social media use was related to lower mindfulness. Interestingly, individuals with a diffuse-avoidant identity style showed higher rates of social media use compared to normative and informational identity styles (Jaglan, 2016). According to Twenge and colleagues, adolescents who spent more time on social media and smartphones were more likely to report mental health issues (Twenge, Joiner, Rogers, & Martin, 2017).

One psychologist who specializes in mindfulness wrote about the connection between mindful social media use and well-being. In Dr. Willard's book *Growing Up Mindful* (2016), he discusses how the sheer volume and constant nature of social media can lead to excessive comparison to other people's' highlight reels of their lives. As the research shows (Feinstein, et al., 2013; Buunk & Gibbons, 2006), this leaves people feeling unhappy. In response to this, Dr. Willard developed a nine step mindful social media practice in order to help people understand how using social media makes them feel. Thus, those who use this mindfulness technique can make more informed decisions about how frequently they want to invite these emotions into their day (Willard, 2016). While this is an encouraging publication, it has yet to be empirically tested.

The consideration of mindfulness as a moderator in social media use is certainly a step in the right direction. However, more experimental research is needed in order to observe how mindfulness can help alleviate the negative impacts of social media use. That is the goal of the present study.

The Present Study

In the present study, I hypothesized that a mindful social media intervention would cause decreased levels of social comparison and envy, increased well-being and college life satisfaction, and an increase in overall mindfulness. Data were collected across a span of seven days, during which participants came in for an initial session to receive a mindful Instagram use intervention or a control intervention and complete a battery of questionnaires. For the following six days, intervention participants received daily text reminders to use Instagram mindfully. At the end of the week, participants came back in and completed the same questionnaires. The study investigated the short-term and longer-term effects of this mindful social media use intervention. To analyze the results, repeated measures ANOVAs and regressions were used.

Methods

Research Design

This randomized trial of a mindful social media intervention employed an experimental design, with pre-intervention, immediate post-intervention and 1-week follow-up assessments on four measures. Therefore, it is a repeated measures mixed design.

Participants

Participants in the study included 53 Connecticut College students recruited through SONA as well as through word of mouth. The sample was largely female, and predominantly

white. See Table 1 for full demographics. Some participants received class credit through SONA, while non-SONA participants received a \$10 amazon gift card. In order to be included in the study, it was required to have an actively used Instagram account as well as a smartphone. While there was no dropout throughout the study, one participant was excluded from analysis due to an inability to receive daily texts. In addition, one participant was excluded from the study as a result of inconsistency in their self-created identification number. For final analyses, 51 participants were included.

Table 1. *Sample Demographics*

	<u>Control</u>		<u>Treatment</u>		<u>Total Sample</u>	
	Frequency	%	Frequency	%	Frequency	%
Gender						
Male	7	30.500	2.000	6.900	9	17.3
Female	16	69.5	27	93.1	43	82.7
Class Year						
Freshman	10	43.5	14	48.3	24	46.2
Sophomore	7	30.4	6	20.7	13	25
Junior	0	0	0	0	0	0
Senior	6	26.1	9	31	15	28.8
Race						
Caucasian	18	78.3	22	75.9	40	76.9
Asian/Asian American	1	4.3	2	6.9	3	5.8
Hispanic/Latinx	2	8.7	1	3.4	3	5.8
African American	0	0	1	3.4	1	1.9
Biracial	1	4.3	0	0	1	1.9
Other	1	4.3	3	10.3	4	7.7

Materials

Each participant filled out six questionnaires on Qualtrics. The following questionnaires were randomly ordered: Problematic Use of Mobile Phones (PUMP), The Five Facet Mindfulness Questionnaire, The Students' Life Satisfaction Scale, The Positive and Negative Affect Scale (PANAS), The Scale for Social Comparison (SCS), and the Benign and Malicious Envy Scale (BeMaS).

The Social Media Mindfulness Practice. The Social Media Mindfulness Practice (Willard, 2016) is the intervention that was employed during the session for the intervention group. Participants in the treatment condition also received a link to this practice in their daily texts. It consists of eight steps that help guide the participants through a way to engage with social media mindfully. For example, one of these steps was “close your eyes and focus on your emotional state for three breaths before you begin to engage” (see Appendix A).

Problematic Use of Mobile Phones. At baseline, and then at both follow-up assessments, all participants completed the randomly arranged set of questionnaires. One of which was the Problematic Use of Mobile Phones scale (PUMP; Merlo, Stone & Bibbey, 2013), which measures the degree to which an individual uses their cell phone in a problematic manner. This scale consists of 20 items with strong internal consistency (Cronbach's $\alpha = .94$). The measure consists of a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale was modified in the present study to assess problematic Instagram use, specifically. For example, an item such as “when I decrease the amount of time spent using my cell phone I feel less satisfied” was modified to “when I decrease the amount of time spent using Instagram I feel less satisfied” in order to fit the specific needs of the study (see Appendix B).

The Positive and Negative Affect Schedule (PANAS). In order to measure participants' mood during the study, the Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988) was used. The scale consists of 20 items rated on a Likert scale ranging from 1 (very slightly or not at all) through 5 (extremely). Both the positive and negative affect subscales have high internal consistencies (Cronbach's $\alpha = .89$ for positive affect; Cronbach's $\alpha = .85$ for negative affect; Crawford & Henry, 2004). An example of a positive affect item is "interested" and one item measuring negative affect is "scared"(see Appendix C).

The Benign and Malicious Envy Scale (BeMaS). In order to measure the type of envy participants experience and the degree to which they experience it, the BeMaS (Lange & Crusius, 2015) was used. Consisting of two subscales (benign envy and malicious envy), there are 10 items that are rated on a 6 point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Both subscales have high internal consistency (Cronbach's $\alpha = .84$ for benign; Cronbach's $\alpha = .90$ for malicious). An example of an item on the benign envy subscale is "when I envy others, I focus on how I can become equally successful in the future". An example of an item on the malicious envy subscale is "I wish that superior people lose their advantage" (see Appendix D).

The Scale for Social Comparison Orientation (SCS). In order to measure the severity of a participant's comparison of themselves to others, the short version of the Scale for Social Comparison Orientation (Gibbons & Buunk, 1999) was used. This measure consists of 11 items that are rated using a Likert scale ranging from 1 (I disagree strongly) to 5 (I agree strongly). Items on this scale consist of phrases like "I often compare myself with others with respect to what I have accomplished in life" (see Appendix E).

The Students' Life Satisfaction Scale (SLSS). While there are many scales to measure life satisfaction, there are fewer scales that target the specific student experience in terms of life satisfaction. The Students' Life Satisfaction Scale (Huebner, 1991) measures an individual's satisfaction with their life specifically during college years. This brief measure consists of 7 items for which there is a Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The scale demonstrates acceptable internal consistency (Cronbach's $\alpha = .77$). An example of an item is "I would like to change many things in my life" (see Appendix F).

The Five Facet Mindfulness Questionnaire. A central part of this study, five aspects of mindfulness were measured (Baer, Smith, Hopkins, Krietemeyer & Toney, 2006). This scale consists of five subscales, including observe, describe, awareness, nonjudgement, and nonreact. Altogether, it measures if participants act and think mindfully and to what degree. All subscales demonstrate adequate internal consistencies with alphas ranging from .73 for nonreactivity to .91 for describe. An example of an observe item is "When I'm walking, I deliberately notice the sensations of my body moving". An example of a describe item is "I'm good at finding words to describe my feelings". An example of an awareness item is "When I do things, my mind wanders off and I'm easily distracted". An example of a nonjudgment item is "I criticize myself for having irrational or inappropriate emotions". Finally, an example of a nonreact item is "I watch my feelings without getting lost in them". All 39 of these statements were answered on a Likert scale ranging from 1 (never true or very rarely true) to 5 (very often or always true) (see Appendix G). It is important to note that the Five Facet Mindfulness Questionnaire is a well-established measure that assesses general mindfulness, but not mindfulness in the specific context of social media or Instagram use.

Background Demographics. The Background Demographics questionnaire briefly asks about basic demographic information in addition to a self-report of Instagram use and mindfulness (see Appendix H).

Procedure

There were two different conditions involved in this study: the treatment condition and the control condition. While participants were not individually randomly assigned to a group, the time slots were randomly chosen to be either treatment or control by flipping a coin. Participants signed up for sessions based on their schedules and availability. This led to a total of 29 treatment participants and 22 control participants over six treatment sessions and four control sessions.

In the treatment condition, the randomly assigned participants came into a classroom in Bill Hall. First they read and signed an Informed Consent document (See Appendix A). Then, they completed all six measures in a random order before the intervention was administered. Then, I read them the steps outlined in the mindful social media use intervention. Following this, I asked them to scroll through Instagram using these instructions for ten minutes (Verduyn, et al., 2015). Then, I asked them to complete the same scales administered in the pre-intervention battery to complete the session, in random order. The treatment group also received daily text reminders prompting them to respond with how many times they had used social media mindfully that day with a number between 0 and 100. The text also included a link to the mindful social media steps for their reference. These texts were mostly administered through an email account created for the study. In some cases, texts were sent from my personal cell phone when the email method was unsuccessful.

As for the control group, they completed the same series of questionnaires at the same time points. But, when they came into the same classroom, they watched a non-mindful global warming video (see appendix G), and then they scrolled through social media as they normally would for the same time as the intervention group. The control group filled out the same scales as the treatment group. In the week following this control intervention, control participants were also sent daily texts, but they were asked only to report the current temperature outside. The reason texts were sent to the control group as well was to eliminate the possibility that receiving texts was a factor in causing improvement on the different measures. It is possible that receiving daily texts could elevate mood, feelings of belongingness, and/or social support. At the second session for the control group, participants came into the classroom and filled out the same surveys as in the first session, in random order.

For both groups, each participant created an ID number using the following formula: They were asked to use the first three letters of their mother's or mother figure's name, as well as the last four digits of their cell phone number. This procedure has been used successfully in prior studies conducted at the college. This way, participants used the same ID number on pre and post assessments and data could be matched.

Results

Overview

The objective of the present study was to assess the effect of a brief mindful social media use intervention on problematic Instagram use (PUMP), five facets of overall mindfulness (FFMS), affect (PANAS), and student life satisfaction (SLS), as well as on social comparison (SCS) and feelings of envy (BeMaS). Life satisfaction was the primary outcome variable of

interest, and social comparison was of interest because of its role as a potential mediator between problematic Instagram use and low life satisfaction. First, intercorrelations between measures are presented in subsets. Then, tests for pre-existing differences between intervention and control groups are presented, as well as tests of initial gender differences.

After these preliminary analyses, tests of intervention effects are presented for two intervals: 1) Pre-intervention or baseline assessments (Time 1a) compared to assessments completed directly post-intervention (Time 1b), and 2) Pre-intervention or baselines assessments (Time 1a) compared to assessments completed at one-week follow-up (Time 2). Then, analyses of mindful social media use, provided via text data by participants in the week between Time 1b and Time 2 are presented for intervention participants. Finally, longitudinal predictions of changes in problematic Instagram use are made using the sample as a whole.

Pre-Intervention Intercorrelations and Means

First, correlations between mindfulness and problematic social media use were assessed using the Five Facets of Mindfulness and Problematic Instagram Use measures at Time 1a (see Table 2; means and standard deviations are also included for descriptive purposes). There were significant negative correlations between problematic social media use and four of the five facets of overall mindfulness: describe ($r = -.37$), awareness ($r = -.43$), nonjudgement ($r = -.53$), and nonreactive ($r = -.35$). The relationship was similarly negative, but not significant, for problematic social media use and the mindfulness dimension of observe ($r = -.22$). Thus, for all participants, some aspects of overall mindfulness were moderately correlated with problematic Instagram use before the intervention, and others were modestly correlated, with only one mindfulness dimension being not significantly related to problematic Instagram use.

Table 2. Correlations between PUMP and Five Facets of Mindfulness

		Observe	Describe	Awareness	Nonjudge	Nonreact
1	PUMP	-.220	-.370**	-.426**	-.529**	-.353*
	<i>Mean</i>	3.353	3.264	3.001	3.150	2.918
	<i>SD</i>	0.570	0.684	0.511	0.591	0.538

Note. PUMP = Problematic Mobile Phone Use measure adapted to assess problematic Instagram use in the present study; $p < .05$, * $p < .01$, ** $p < .001$ ***

Next, the relationship between problematic Instagram use, key outcome variables (life satisfaction and affect) and key moderator variables (social comparison and envy) at Time 1a were assessed (see Table 3). There was a negative correlation between problematic Instagram use and life satisfaction ($r = -.37$, $p = .009$) indicating higher problematic Instagram use was associated with lower life satisfaction before the intervention. There was also a positive correlation between problematic Instagram use and negative affect ($r = .40$, $p = .004$), which suggested that greater negative mood was related to greater problematic Instagram use before the intervention. Additionally, problematic Instagram use and social comparison were positively related ($r = .31$, $p = .030$), suggesting that more problematic Instagram use was related to higher levels of social comparison. Unexpectedly, problematic Instagram use was negatively associated with malicious envy ($r = -.53$), suggesting that more problematic Instagram use was related to lower feelings of malicious envy. This unexpected finding suggests possible reporting problems with the malicious envy scale, an issue that will be revisited in the discussion.

Table 3. Correlations between PUMP and SLSS, PANAS, SCS, and BeMaS (Benign and Malicious)

		SLSS	PANAS+	PANAS-	SCS	Benign	Malicious
1	PUMP	-.366**	.200	.403**	.307*	-.222	-.530**
	<i>Mean</i>	4.571	26.942	15.865	40.942	2.962	4.501
	<i>SD</i>	0.652	5.493	5.552	5.644	1.153	0.912

Note. PUMP = Problematic Instagram Use; PANAS+ = Positive Affect; PANAS- = Negative Affect; SCS = Social Comparison; BeMaS = Benign and Malicious Envy; $p < .05$, * $p < .01$, ** $p < .001$ ***

Next, the relationships between mindfulness dimensions and life satisfaction were assessed (see Table 4) at Time 1a, revealing only one significant moderate correlation with nonjudgement ($r = .34$). This demonstrates that those who were higher in life satisfaction were also higher in nonjudgement at Time 1a. Next, the correlations between mood and mindfulness were examined, revealing a positive relationship between positive affect and observe ($r = .32$). This correlation suggests that higher positive affect was related to higher ratings of observational mindfulness. In addition, two moderate negative relationships between negative affect and awareness ($r = -.40$) and nonjudgement ($r = -.42$) were found. These relationships show that as negative affect increased, those two facets of mindfulness decreased.

Table 4. Correlations between Mindfulness, SLSS, and PANAS

		Observe	Describe	Awareness	Nonjudge	Nonreact
1	SLSS	.256	.024	.234	.340*	.278
2	PANAS+	.325*	.088	-.189	-.045	.180
3	PANAS-	.243	-.065	-.403**	-.424**	-.308

Note. SLSS = Social Life Satisfaction Scale, PANAS+ = Positive Affect, PANAS- = Negative Affect $p < .05$, * $p < .01$ **, $p < .001$ ***

Finally, correlations between mindfulness, social comparison, and envy were assessed at Time 1a (see Table 5). These revealed a strong negative correlation between social comparison

and nonjudgement ($r = -.64$), indicating that as social comparison increased, nonjudgement mindfulness decreased. In addition, a moderate negative correlation was found between social comparison and nonreact ($r = -.48$), revealing that as social comparison increased, nonreactive mindfulness decreased. Unexpectedly, nonjudgement was moderately positively associated with malicious envy ($r = .48$). This unexpected relationship was part of a pattern of unexpected relationships with malicious envy, suggesting problems with this particular scale in this sample.

Table 5. Correlations between Mindfulness, Social Comparison, and Envy at Time 1a

		Observe	Describe	Awareness	Nonjudge	Nonreact
1	Social Comparison	.04	-.11	-.18	-.64**	-.48**
2	Benign Envy	.09	-.13	-.04	.27	-.04
3	Malicious Envy	.03	.11	.29*	.48**	.18

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

Assessment of Pre-Intervention Differences Between Intervention and Control Groups

Due to recruitment constraints, it was not feasible to randomly assign each participant to the intervention or control group. Rather, group sessions were randomly assigned to receive either the treatment or control intervention, but participants did not know for which group they were signing up. In order to assess whether there were pre-intervention differences between treatment and control participants, a series of t -tests was conducted. While there were mostly no significant differences found, these tests revealed that there was a significant difference in both positive, $t(35.09) = 2.18$, $p = .036$, and negative affect, $t(31.02) = 2.52$, $p = .018$. For both tests, the Levene's test for inequality of variances was significant, so an adjusted t -test was used.

Therefore, any analyses involving mood will need to bear in mind that control group participants

reported both more positive mood ($M_{control} = 29.00$, $SD = 6.41$ vs. $M_{intervention} = 25.53$, $SD = 4.31$) and more negative mood ($M_{control} = 18.27$, $SD = 6.77$, vs. $M_{intervention} = 14.21$, $SD = 3.77$) than participants in the intervention groups, at pre-test.

Preliminary Tests of Gender Differences on Pre-Intervention Assessments

All variables were also tested for pre-existing gender differences. This series of analyses revealed that the only difference between male and female participants was that men ($M = 3.38$, $SD = 0.58$) were more nonreactive, $t(48) = 2.63$, $p = .024$, on the mindfulness measure than women were ($M = 2.83$, $SD = 0.48$). Because there was only one difference, and because there were too few men to have sufficient power to test for gender interactions with treatment condition, analyses proceeded combining men and women.

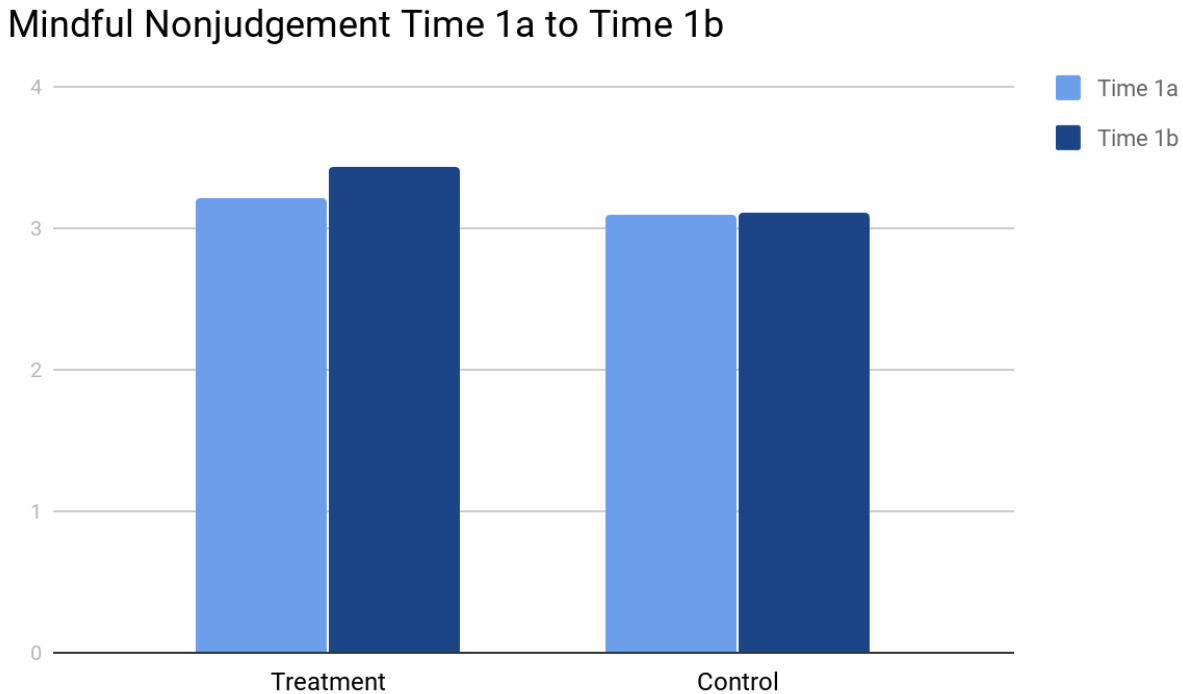
Repeated Measures ANOVA: Pre-intervention to Immediate Post-Intervention

A series of repeated measures ANOVAs were conducted to analyze the effects of the mindful social media use intervention within the first session (Time 1a: pre-intervention to Time 1b: immediate post-intervention) on problematic Instagram use, mindfulness, social comparison, life satisfaction, envy, and affect.

The first repeated measures ANOVA specifically examined the effect of the mindfulness intervention on problematic Instagram use. There was a significant multivariate effect for time, Wilk's $\lambda = .890$, $F(1, 48) = 5.92$, $p = .019$, $\eta^2 = .110$, showing that all participants reported lower problematic Instagram use at the end of the session ($M = 2.42$) than they did at the beginning of the session ($M = 2.51$). The interaction between time and treatment was not significant, Wilk's $\lambda = .988$, $F(1, 48) = .603$, $p = .441$, $\eta^2 = .012$. Thus, the mindfulness intervention did not have an immediate impact on problematic Instagram use.

The second repeated measures ANOVA examined the effect of the social media mindfulness intervention on aspects of overall mindfulness. While the multivariate test for time was significant, Wilk's $\lambda = .768$, $F(5, 44) = .266$, $p = .035$, $\eta^2 = .232$, the multivariate interaction between time and treatment, Wilk's $\lambda = .872$, $F(5, 44) = 1.29$, $p = .285$, $\eta^2 = .128$, was not significant. However, we next examined univariate tests for exploratory purposes. These tests indicated that there was a significant univariate time effect for Awareness, $F(1, 48) = 4.35$, $p = .042$, $\eta^2 = .083$. For all participants, mindful awareness decreased from pre-test ($M = 2.99$) to immediate post-test ($M = 2.89$). There was also a significant univariate time effect for nonjudgement, $F(1, 48) = 4.58$, $p = .038$, $\eta^2 = .087$. For all participants, mindful nonjudgement increased from pre-test ($M = 3.15$) to immediate post-test ($M = 3.27$). More central to the hypotheses of this study, univariate tests revealed a marginally significant time by treatment interaction for nonjudgement, $F(1, 48) = 3.37$, $p = .073$, $\eta^2 = .066$, with the treatment group showing a larger increase in nonjudgement than the control group did (see Figure 1).

Figure 1: Mindful Nonjudgement changes from Time 1a to Time 1b

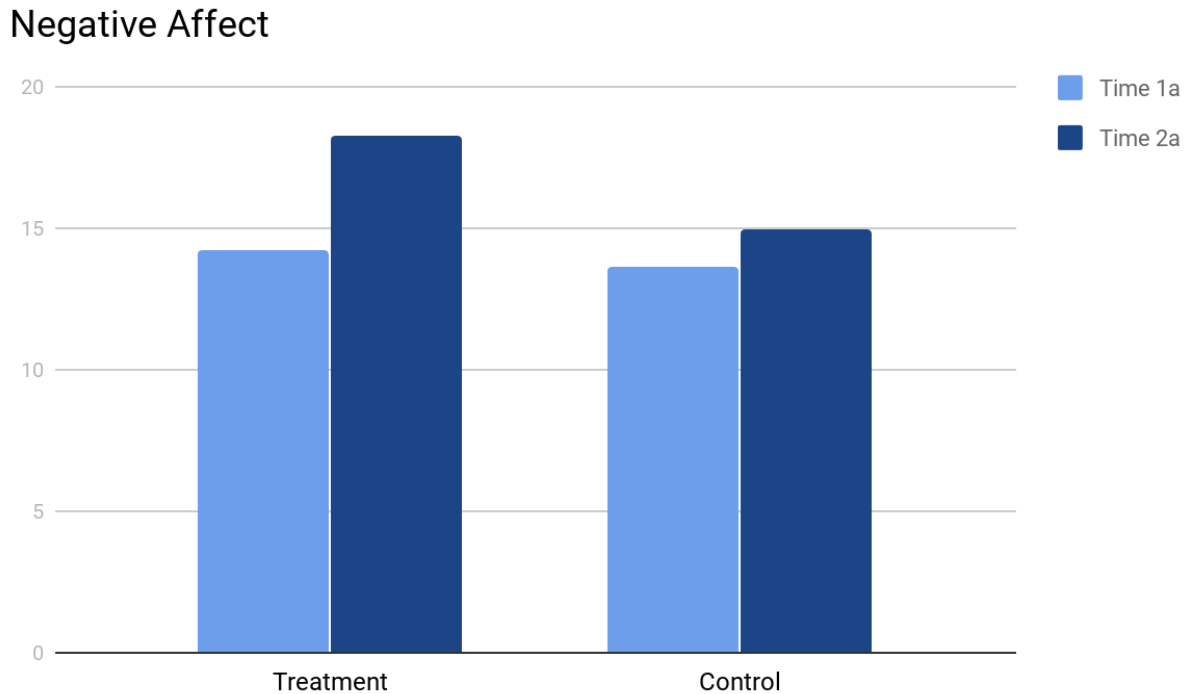


The third repeated measures ANOVA examined the effect of the social media mindfulness intervention on college life satisfaction. There was no significant multivariate time effect between Time 1a and Time 1b $F(1, 48) = .23, p = .634, \eta^2 = .01$). There was also no multivariate time by treatment effect $F(1, 48) = 1.53, p = .222, \eta^2 = .03$). Because there were no subtests for this measure, there were no univariate analyses to probe. Following this, another repeated measures ANOVA examined the effect of the intervention on social comparison, revealing no significant multivariate effect for time, $F(1, 48) = 1.49, p = .228, \eta^2 = .03$, or time by treatment, $F(1, 48) = .01, p = .922, \eta^2 = .00$. Again, there were no univariate tests to probe.

Next, a repeated measures ANOVA was conducted to examine the effect of the intervention on positive and negative affect. While there was a significant multivariate effect for time, $F(2, 47) = 19.58, p < .001, \eta^2 = .455$, there was no significant multivariate time by

treatment interaction, $F(2, 47) = 2.43, p = .099, \eta^2 = .094$, but univariate tests are reported for exploratory purposes. There was a significant univariate time effect for both positive, $F(1, 48) = 31.89, p = .000, \eta^2 = .399$, and negative affect, $F(1, 48) = 10.41, p = .002, \eta^2 = .18$. For all participants, positive affect decreased from Time 1a ($M = 27.27$) to Time 1b ($M = 22.46$), and negative affect decreased from Time 1a ($M = 16.24$) to Time 1b ($M = 14.28$). More central to the hypothesized treatment effect, there was also a significant univariate interaction between time and treatment for negative affect, $F(1, 48) = 4.97, p = .031, \eta^2 = .094$ (see Figure 2). Contrary to predictions, control group participants experienced a greater decline in negative affect after watching a global warming video and scrolling through social media for 10 minutes than did intervention participants who received a mindful social media use intervention before scrolling through social media for 10 minutes.

Figure 2: Changes in Negative Affect from Time 1a to Time 1b



Finally, a repeated measures ANOVA was conducted to assess the effect of the intervention on benign and malicious envy, which revealed no significant results for time ($F(2, 47) = .784, p = .462, \eta^2 = .032$), or for the time by treatment interaction ($F(2, 47) = .407, p = .668, \eta^2 = .017$). None of the univariate tests yielded significant results.

Repeated Measures ANOVA: Pre-intervention to One Week Post-Intervention

An identical series of Repeated Measures ANOVAs was conducted on 1) the Five Facets of Mindfulness; 2) problematic Instagram use on the PUMP; 3) student life satisfaction; 4) positive and negative affect; 5) social comparison and; 6) the two facets of envy on the BeMaS. None of these analyses yielded significant multivariate intervention effects between Time 1a and Time 2. Univariate effects were also explored. Below, the analyses of most interest (PUMP and mindfulness) are presented for illustration.

While there was no time by treatment multivariate interaction effect for PUMP from Time 1a to Time 2, Wilk's $\lambda = .992$, $F(1, 50) = .413$, $p = .523$, there was a marginal time effect Wilk's $\lambda = .936$, $F(1, 50) = 3.40$, $p = .071$, $M_{\text{Time1}} = 2.48$, $M_{\text{Time2}} = 2.387$, indicating a lowered amount of problematic Instagram use among both the treatment and control groups across the week. As for mindfulness, there were no significant multivariate findings for time, Wilk's $\lambda = .85$, $F(5, 46) = 1.62$, $p = .174$, or for the time by treatment interaction, Wilk's $\lambda = .913$, $F(5, 46) = 0.87$, $p = .508$. There were also no significant univariate findings for these dimensions of mindfulness.

Summary. This section of analyses tested for significant intervention effects in the short term (within session) and in the longer term (1 week), and probed for possible univariate effects on measures with multiple subscales even when multivariate tests were not significant, for exploratory purposes. The intervention did not have a significant effect on problematic Instagram Use in the short term or in the long term. Although there were no significant intervention effects at the multivariate level for the primary variable of Mindfulness, there was a significant short-term effect of the social media mindfulness intervention for nonjudgement mindfulness, with intervention participants showing a larger increase in nonjudgement than control participants did. There was one other time by treatment interaction effect that was not predicted, and this revealed that control participants experienced greater short-term reductions in negative mood than intervention participants did. These findings are interpreted in the discussion section. Several overall time effects were found, but these only described general pre-post differences experienced by all participants, and not treatment effects.

Analyses of Daily Mindful Social Media Use

This next set of analyses examined intervention participants' reports of social media mindfulness during the week between Time 1b and Time 2. Table 6 shows the means for these ecological momentary assessment (EMA) reports of mindful social media use in the last 24 hours, collected via text, averaged over all 6 reporting days, over the first 3 days, and over the last 3 days of the week. Mean numbers of text responses per participant are also reported. Only mindful social media use intervention participants provided text data of their mindful social media use.

Table 6. Descriptive Statistics of Average Mindful Social Media Use According to Text Responses

	N	Min.	Max.	M	SD
1 Average MSM Use	28	.00	47.00	8.49	11.42
2 Days 1-3	28	.00	41.33	8.36	11.09
3 Days 4-6	28	.00	52.67	8.65	12.18

Note. MSM = Mindful Social Media Use

To understand these data, first, correlational analyses were conducted to see if initial ratings of overall mindfulness at Time 1a were related to intervention participants' EMA ratings of social media mindfulness during the week. Correlations revealed no significant associations. Thus, initial overall mindfulness did not predict participants' abilities to use social media mindfully during the week. However, intervention participant EMA ratings of daily social media mindfulness across the week were related to their Time 2 mindful nonreactivity subscale scores ($r_{full\ week} = .52$), suggesting that higher levels of social media mindfulness practice during the week was related to lower overall nonreactivity ratings at the end of the week (see Table 7).

Table 7. Correlations between Daily Social Media Use and Ratings of Mindfulness

		Observe	Describe	Awareness	Nonjudge	Nonreact
1	Avg. MSM Use	-.02	-.09	-.21	-.23	.52**
2	Days 1-3	.03	-.02	-.22	-.16	.53**
3	Days 4-6	-.06	-.15	-.19	-.29	.50**

Note. MSM = Mindful Social Media Use; $p < .05$, * $p < .01$ **, $p < .001$ ***

In analyses focused on problematic Instagram use, EMA social media mindfulness during the week, was not related to initial Time 1a ($r = .11$) or follow-up Time 2 PUMP ratings ($r = .228$).

Correlational analyses of other variables that may help explain better use of social media mindfulness during the week after the intervention showed two trends. One trend indicated that those who were initially higher in life satisfaction were better at social media mindfulness in the first three days according to EMA text data ($r = .33$, $p = .091$). In addition, a marginal correlation was found showing that people who were higher in malicious envy at Time 1a were less able to be mindful about their social media use as the week progressed ($r = -.36$, $p = .062$). This effect was observed in text data from the last three days of the week, but not with text data from the first three days of the week. Given the unexpected associations of malicious envy with other Time 1a variables in prior analyses, this intriguing finding should be interpreted cautiously.

These analyses suggest that perhaps people who are initially more satisfied with their lives and lower in malicious envy may respond better to a short intervention on social media mindfulness.

Longitudinal Prediction of Problematic Instagram Use

This final set of analyses examined all participants as a whole in longitudinal analyses to see if overall mindfulness predicted problematic Instagram use over time. In these analyses, each

mindfulness facet was used in a separate regression. The regressions predicted Time 2 problematic Instagram use from a Time 1a mindfulness facet controlling for Time 1a problematic Instagram use. The regression involving Time 1a mindful nonreactivity was the only one in which mindfulness made a significant prediction, $F(2,49) = 67.75, p = .000, R^2 = .73, \beta = -.170, p = .033$. In this model, Time 1a PUMP predicted Time 2a PUMP ($\beta = .789, p = .000$) as expected, but mindful nonreactivity at Time 1a also predicted Time 2 PUMP even when Time 1a PUMP was in the equation. For the analyses of other mindfulness facets, mindfulness did not make a significant independent contribution to the model.

Other longitudinal analyses were run, to examine other potential predictors of problematic Instagram use over time. In analyses of social comparison, envy, mood, and life satisfaction, only social comparison was related to increases in problematic Instagram use over time. Specifically, there was a trend for higher social comparison at Time 1a predicted higher problematic social media use at Time 2, $F(2,49) = 64.83, p = .000, R^2 = .72, \beta = .136, p = .084$, even when PUMP at Time 1a was accounted for ($\beta = .809, p < .001$).

Discussion

The present study sought to evaluate the effects of a mindful social media use intervention on problematic Instagram use, and on various mediator and outcome variables including social comparison and life satisfaction. It was hypothesized that the intervention would have a positive impact on problematic Instagram use which would result in a positive impact on college life satisfaction and mood, possibly through reductions in social comparison and envy, and also possibly through increases in overall mindfulness. More specifically, it was expected that those receiving the mindfulness intervention compared to the control group would report

higher ratings of life satisfaction, lowered social comparison, less problematic Instagram use, and more overall mindfulness. These differences were evaluated across 3 time periods in two sessions (pre and post), to test for short-term and longer-term effects.

Use of mindful social media during the week between the initial session and the final session was also recorded via text. These ecological momentary assessment (EMA) data were used to understand who was better able to engage in mindful social media use after the intervention. Finally, the ability to predict increases in problematic Instagram use from mindfulness and other mediating variables was also examined in the sample as a whole. Only weak intervention effects were found, but cross-sectional and longitudinal associations between key variables of interest suggest both the importance of mindful social media use and the need for stronger interventions to impact it.

Intervention Effects

From pre-test (Time 1a) to immediate post-test (Time 1b), an increase in nonjudgement mindfulness in the treatment group was observed that was not seen in the control group. This suggests that after completing the mindful social media task, participants in the treatment group reported lower ratings of judgment. This subscale contains items concerning judgement of one's own feelings. For example, "I make judgments about whether my thoughts are good or bad", and "I tell myself I shouldn't be feeling the way I'm feeling". The mindful social media use practice specifically asks the participant to pay attention to one's feelings, asking them to observe and not react to them and realize what scrolling through Instagram is communicating to their subconscious. The intervention asks the participant to wait before they scroll and to process

one's thoughts and emotions before they act. Therefore, it seems as though this mindfulness practice most clearly targeted nonjudgement towards one's own feelings.

Contrary to predictions, the other time by treatment effect revealed that control participants experienced greater short-term reductions in negative mood than intervention participants did. It is possible that control participants were affected by the global warming video (negatively) and used the distress-relieving potential of Instagram to reduce that negative affect. While data were not obtained concerning what participants viewed while scrolling, this could have been valuable information to explain this decrease in negative affect. In addition, mindful social media use does not necessarily alleviate negative feelings. Rather, it allows for them to exist, without judgement and without reaction. It is possible that sitting with one's thoughts and feelings caused some negative affect to be there and linger, and scrolling through social media mindfully may have made them feel worse than the control participants.

Other than the aforementioned findings, there were no time by treatment intervention effects. This could be attributed to a number of factors. One reason may be that participants were not heavily monitored throughout the week, and it is possible that they were not engaging with Instagram in a mindful way as frequently as they could have been. In addition, this study bore the typical limitations of operating at a small college: a lack of demographic diversity and a small sample size. Having a more diverse sample would have provided further insight because men versus women or white students versus students of color at a predominantly white institution might have different motivations for using social media. It also may be the case that different groups respond better to different types of interventions or to interventions that are more targeted and relevant to their experiences and needs. For example, a white student may

engage with social media in order to compare themselves to their peers, while a student of color may use social media to access their peers that they do not see on campus. Future research might consider this limitation.

Also, many successful mindfulness interventions take place in mindfulness or yoga settings in which participants either have pre-existing knowledge and practice of mindfulness, or they are taught more comprehensively about mindfulness and its potential benefits than they were in the present study. While a brief definition of mindfulness was verbally administered directly before the intervention, it is possible that participants did not obtain a good grasp of the concept at hand or that they had prior beliefs about mindfulness and its relevance to their life that interfered with their engagement with the intervention. Another reason could be that the scales only scratched the surface, or were too global, and did not adequately measure mindful social media use. It could be that a more specific measure of mindful social media use that was modeled after the instructions for the intervention would have shown effects that did not show up strongly and clearly on a global mindfulness measure.

Finally, the ambiguousness of certain PANAS items may have skewed the results related to affect. For example, “jittery”, “tired”, “alert”, and “distracted” do not have distinctly negative connotations. This may explain the multiple instances of negative affect being related to other scales in the opposite direction that one would expect.

Daily Mindful Social Media Use

While analyzing the data obtained from the daily text responses was not included in the original hypotheses, it did allow for further exploration of the treatment group’s levels of mindful social media use throughout the week. More specifically, this data shed light on factors

that allowed participants to engage with social media more mindfully than others after receiving the mindful social media use intervention. Evidently, those who were initially higher in life satisfaction were more mindful in their social media use in the first three days following the intervention. In addition, those who felt more malicious envy at Time 1a were less mindful than others as the week went on (in the last 3 days). This demonstrates that perhaps people who are initially more satisfied with their lives and lower in malicious envy may respond better to a short intervention involving social media mindfulness. This suggests that if more participants were already high in life satisfaction and low in malicious envy, there could have been stronger intervention effects. In addition, this could suggest that if people are more satisfied with their lives and experience envy in a less resentful way, then they may be more mindful already, and thus more receptive to a social media mindfulness intervention. Therefore, future studies may want to target life satisfaction and envy when planning the intervention, and develop stronger interventions for people who are less satisfied with their lives or more consumed with malicious envy.

Predictions of Problematic Instagram Use Over Time

In order to see what predicted the outcome variables at the one-week follow-up, regressions were conducted. The series of regressions revealed that social comparison at Time 1a predicted mindful social media use at the one-week follow-up, even when problematic Instagram use at Time 1a was accounted for. In other words, if participants initially engaged in more social comparison, they were more likely to report using Instagram problematically at the follow-up.

Strengths and Limitations

While there were some limitations, there were certainly some strengths to the study. The main strength is that this study was the first of its kind in terms of creating a mindful social media use intervention with the goal of alleviating some of the harmful effects associated with negative social media use in a college setting. In the current literature, there are a very limited amount of studies that empirically evaluate wellness concepts. Another strength of this study was that all of the study sessions were administered by the same person, allowing for consistency throughout the process and preventing administration style as being a confounding variable. Finally, the study was successful in that none of the participants dropped out, despite the anticipation of a few dropouts due to the longitudinal participation required from the participants.

As for the weaknesses, when analyzing pre-test differences, it was observed that the control group reported both more positively and negatively on the mood scale, indicating that they experienced more heightened positive and negative moods during the pre-test. This observation could help explain why there were no intervention effects on mood and makes the analysis of this scale in relation to other measures more challenging, as this scale did not demonstrate equality of variance across groups.

When examining pre-existing differences among genders, it was revealed that the male participants were more nonreactive than female participants in the pre-test according to the Five Facet Mindfulness Scale. While this was the only observed gender difference, all analyses proceeded to combine men and women. However, the gender distribution between treatment and control was skewed in that seven out of the nine male participants were in the control condition. This gender imbalance between groups could have had an impact on the findings. However, the

power of the study would have been negatively affected if the male participants were decidedly omitted from the study. Therefore, all of the male participants were included in the analyses.

In addition, problematic Instagram use was unexpectedly negatively associated with malicious envy, suggesting that more problematic Instagram use was related to lower feelings of malicious envy. While this could be the case among participants, it seems intuitively unlikely. One explanation for this is that there was an issue with the scale itself. More specifically, accurately completing this questionnaire requires a certain level of self-awareness about one's feelings of jealousy. Also, the malicious envy statements are not particularly flattering for one's character, which may contribute to possible self-reporter bias. For example, some items are "I wish that superior people lose their advantage", "If other people have something that I want for myself, I wish to take it away from them", and "Seeing other people's' achievements makes me resent them". Therefore, it is possible that the malicious envy scale was not successful in measuring envy in the present study because it provoked defensive self-censoring. It is interesting, however, that people who reported higher malicious envy (even if self-censored) had a difficult time adhering to the mindful social media use assignment (outside of the lab in day to day life) during the final 3 days of the trial period. This possible "sleeper effect" is intriguing and suggests that the measure may tap into something important. More research on this relatively new scale is needed.

Recommendations for Future Research

Given the severity of the harmful effects of social media and the strong supportive evidence for the positive effects of mindfulness in various dimensions of life, a scale that properly measures mindful social media use could be a valuable addition to this area of research.

In addition, a longer intervention period or an analytic approach better suited for the EMA data may have produced more of a treatment effect. Perhaps it would have been more effective if it were administered for a period of time that allowed for a habit to be developed. For example, the use of EMA could have included more suggestions for mindful social media use and a clearer and expanded definition of mindfulness. The daily texts could have also been used to garner information about the participant's process during the day when using social media in order to further understand the participant experience. While the texts served as daily reminders, they may not have been sufficient in activating mindfulness. Additional reminders such as a sticker on their phones or texts with motivational phrases during the day when social media is likely being used may be an improvement to a study of this kind for future research. Finally, it may be more effective to administer a recording of a meditation or mindfulness practice for the participants to listen to daily, rather than just being reminded once per day.

Conclusion

Overall this study shows that 1) there are correlations between mindfulness and with problematic Instagram use at baseline and many problems associated with problematic Instagram use, 2) mindful social media use can be cultivated (i.e. the nonjudge treatment effect) and 3) it is shown that social comparison predicts higher problematic Instagram use over time in the present study. But, habits are hard to change, and may be easier to change in those who are relatively better off (higher life satisfaction and lower envy). Thus, this study offers evidence of a potentially promising route to changing problematic social media habits, but also suggests that it will take a more intensive intervention and more intentional habit change support to make a difference.

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Appendix A. Social Media Mindfulness Practice

Administration: Verbally during intervention sessions with this introduction: Now I'm going to read you these 8 instructions before I ask you to scroll through Instagram. These will help you notice how Instagram makes you feel and how to use it more mindfully. Mindfulness is the basic human ability to be fully present, aware of where we are and what we're doing, and not overly reactive or overwhelmed by what's going on around us.

1. Find a comfortable, alert, and ready posture. Shrug your shoulders, take a few breaths, and bring awareness to your physical and emotional state in this particular moment.
2. Now click on your phone.
3. Before you open up Instagram, consider your intentions and expectations. As you focus on the icon, notice what experiences you have in your mind and body.
4. Why are you about to check this site? What are you hoping to see or not see? How are you going to respond to different kinds of updates you encounter? By checking your Instagram feed, are you interested in connecting or in disconnecting and distracting?
5. Close your eyes and focus on your emotional state for three breaths before you begin to engage.
6. Opening your eyes now, look at the first status update or photo, and then sit back and close your eyes again.
7. Notice your response—your emotion. Is it excitement? Boredom? Jealousy? Regret? Fear? How do you experience this emotion in the mind and body? What's the urge—to read on, to click a response, to share yourself, or something else?
8. Wait a breath or two for the sensations and emotions to fade, or focus on your breath, body, or surrounding sounds.

Please engage mindfully with Instagram until I tell you to stop- we will do this for about 10 minutes.

Appendix B: Problematic Use of Mobile Phones (PUMP)**Instrument Type:** Rating Scale

Test Format: 20 items, self-report, 1-5 (1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree); modified to target Instagram use by changing “cell phone” to “Instagram”

1. When I decrease the amount of time spent using Instagram I feel less satisfied.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

2. I need more time using Instagram to feel satisfied than I used to need.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

3. When I stop using Instagram, I get moody and irritable.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

4. It would be very difficult, emotionally, to give up Instagram.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

5. The amount of time I spend using Instagram keeps me from doing other important work.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

6. I have thought in the past that it is not normal to spend as much time using Instagram as I do.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

7. I think I might be spending too much time using Instagram.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

8. People tell me I spend too much time using Instagram (social media).

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

9. When I am not using Instagram, I am thinking about using it or planning the next time I can use it.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

10. I feel anxious if I have not received an Instagram notification in some time.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

11. I have ignored the people I'm with in order to use Instagram.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

12. I have used Instagram when I knew I should be doing work/schoolwork.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

13. I have used Instagram when I knew I should be sleeping.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

14. When I stop using Instagram because it is interfering with my life, I usually return to it.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

15. I have gotten into trouble at work or school while using Instagram.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

16. At times, I find myself using Instagram instead of spending time with people who are important to me and want to spend time with me.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

17. I have checked my Instagram when I knew it was dangerous to do so.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

18. I have almost caused an accident because of my Instagram use.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

19. My Instagram use has caused me problems in a relationship.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

20. I have continued to use Instagram even when someone asked me to stop.

1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree

Appendix C: The Positive and Negative Affect Schedule (PANAS)**Instrument Type:** Rating Scale**Test Format:** 20 items, 1-5 (1-very slightly or not at all, 2-a little, 3-moderately, 4-quite a bit, 5-extremely)

1. Interested _____ 11. Irritable _____ 2. Distressed _____ 12. Alert
_____ 3. Excited _____ 13. Ashamed _____ 4. Upset _____ 14.
Inspired _____ 5. Strong _____ 15. Nervous _____ 6. Guilty _____ 16.
Determined _____ 7. Scared _____ 17. Attentive _____ 8. Hostile
_____ 18. Jittery _____ 9. Enthusiastic _____ 19. Active _____ 10.
Proud _____ 20. Afraid _____

Appendix D. Benign and Malicious Envy Scale

Instrument Type: Rating Scale

Test Format: 6 point scale to indicate dispositional envy to assess personality differences in regards to peoples' reactive tendencies to benign or malicious envy of superior comparison standards.

Benign envy

(1) When I envy others, I focus on how I can become equally successful in the future.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(3) If I notice that another person is better than me, I try to improve myself.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(4) Envyng others motivates me to accomplish my goals.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(7) I strive to reach other people's superior achievements.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(9) If someone has superior qualities, achievements, or possessions, I try to attain them for myself.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

Malicious envy

(2) I wish that superior people lose their advantage.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(5) If other people have something that I want for myself, I wish to take it away from them.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(6) I feel ill will toward people I envy.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(8) Envious feelings cause me to dislike the other person.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

(10) Seeing other people's achievements makes me resent them.

1 - strongly agree, 2- agree, 3- somewhat agree, 4- somewhat disagree, 5- disagree, 6- strongly disagree

Appendix E. Scale for Social Comparison Orientation (INCOM, SCS)

Instrument Type: Rating Scale

Test Format: 1-5 (1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly)

1. I often compare myself with others with respect to what I have accomplished in life

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

2. If I want to learn more about something, I try to find out what others think about it

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

3. I always pay a lot of attention to how I do things compared with how others do things

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

4. I often compare how my loved ones (boy or girlfriend, family members, etc.) are doing with how others are doing

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

5. I always like to know what others in a similar situation would do

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

6. I am not the type of person who compares often with others

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

7. If I want to find out how well I have done something, I compare what I have done with how others have done

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

8. I often try to find out what others think who face similar problems as I face

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

9. I often like to talk with others about mutual opinions and experiences

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

10. I never consider my situation in life relative to that of other people

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

11. I often compare how I am doing socially (e.g., social skills, popularity) with other people

1- I disagree strongly, 2- I disagree, 3- I neither agree nor disagree, 4- I agree, 5- I agree strongly

Appendix F. Students' Life Satisfaction Scale

Instrument Type: Rating Scale

Test Format: 1-6 (1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree)

1. My life is going well.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

2. My life is just right.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

3. I would like to change many things in my life.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

4. I wish I had a different kind of life.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

5. I have a good life.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

6. I have what I want in life.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

7. My life is better than most.

1-Strongly Disagree, 2-Moderately Disagree, 3-Mildly Disagree, 4-Mildly Agree, 5-Moderately Agree, 6-Strongly Agree

Appendix G. Five Facet Mindfulness Questionnaire

Instrument Type: Rating Scale

Test Format: 39 items, 1-5 (1-never or very rarely true, 2-rarely true, 3-sometimes true, 4-often true, 5-very often or always true)

1. When I'm walking, I deliberately notice the sensations of my body moving.
2. I'm good at finding words to describe my feelings.
3. I criticize myself for having irrational or inappropriate emotions.
4. I perceive my feelings and emotions without having to react to them.
5. When I do things, my mind wanders off and I'm easily distracted.
6. When I take a shower or bath, I stay alert to the sensations of water on my body.
7. I can easily put my beliefs, opinions, and expectations into words.
8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
9. I watch my feelings without getting lost in them.
10. I tell myself I shouldn't be feeling the way I'm feeling.
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
12. It's hard for me to find the words to describe what I'm thinking.
13. I am easily distracted.
14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
15. I pay attention to sensations, such as the wind in my hair or sun on my face.
16. I have trouble thinking of the right words to express how I feel about things
17. I make judgments about whether my thoughts are good or bad.

18. I find it difficult to stay focused on what's happening in the present.
19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
21. In difficult situations, I can pause without immediately reacting.
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
23. It seems I am "running on automatic" without much awareness of what I'm doing.
24. When I have distressing thoughts or images, I feel calm soon after.
25. I tell myself that I shouldn't be thinking the way I'm thinking.
26. I notice the smells and aromas of things.
27. Even when I'm feeling terribly upset, I can find a way to put it into words.
28. I rush through activities without being really attentive to them.
29. When I have distressing thoughts or images I am able just to notice them without reacting.
30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
32. My natural tendency is to put my experiences into words.
33. When I have distressing thoughts or images, I just notice them and let them go.
34. I do jobs or tasks automatically without being aware of what I'm doing.
35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

36. I pay attention to how my emotions affect my thoughts and behavior.

37. I can usually describe how I feel at the moment in considerable detail.

38. I find myself doing things without paying attention.

39. I disapprove of myself when I have irrational ideas.

Appendix H. Background and Demographics Questionnaire

1. How many times per day do you check Instagram, on average? _____

2. How many minutes per day, on average, do you use Instagram? _____

3. How often do you practice mindfulness in your day to day life?

1 = not at all to 7= very frequently

4. How often you you engage in meditation?

1 = not at all to 7= daily

5. Age _____

6. What is your gender? _____

7. What is your class year? _____

8. What is your race/ethnicity? _____

Appendix I. Global Warming Video for Control Group

Title: Global Warming 101 | National Geographic

Length: 3:03 (about the same amount of time that the intervention steps will take)

Before the video starts, they will be given this introduction: You will now watch this short video about global warming.

Appendix J. Recruiting Materials

SONA Study Listing

Study Title: A Study of Social Media Use and Modern Life

Requirements: Must have a smartphone and an actively used Instagram account. You will also be asked to provide your cell phone number. You will receive half of the credit hours upon attendance of the first session, and the other half upon attendance to the second session.

Appendix K: Informed Consent DocumentStudy Title: **A Study of Social Media Use and Modern Life**

Principal Investigator: Micaela Zebroski, '19
Connecticut College
mzebrosk@conncoll.edu

•You are being invited to participate in Micaela Zebroski's research about social media use and modern life. This research is being conducted for an honors thesis in Psychology under the supervision of Professor Zakriski.

•This research will involve three parts. In part 1 (today), you will complete four untimed surveys and complete an instructional task in which you reflect on an everyday activity. In part 2 (one per day for six days), you will receive and respond to daily texts about an everyday activity. In part 3, (one week from today), it will involve completing more surveys. Surveys will include questions about personality, habits, mood, well-being, and social media use.

•While the direct benefits of this research to society are not known, you may learn more about yourself and your relationship with social media and other daily habits.

- This research will take about 105 minutes total (45 minutes for the first session, 5 minutes per day for 6 days, and 30 minutes for the second session). You will either be paid \$10 for this time, if you are not eligible for SONA participant pool credit, or you will be compensated with 105 minutes of research credit.

- There are no known risks or discomforts related to participating in this research beyond those experienced in everyday life. There is a chance that some people will experience distress related to what they learn about themselves from the surveys or the activities associated with the study. Everyone will be given resources at the end of the study in case they would like to learn more or talk with someone about their feelings.

- Your participation is voluntary, and you may decline to answer any questions as you see fit.

- You may withdraw from the study without penalty at any time. This means you can stop your participation at any time by simply leaving the room, or not responding to follow-up texts, or not returning for the second session. We hope that you will participate in all parts of the study, but it is totally your choice whether to do so or not.

- Information you provide will be identified with a code number and NOT your name.

With your permission, we will collect your cell phone number and your phone carrier to contact you by text once per day for one week in part 2 of this study. Your cell phone number will be

stored with the ID you make up for this study, and not with your name. We will delete your cell phone number as soon as data collection is completed.

- You may contact the researcher who will answer any questions that you may have about the purposes and procedures of this study. Micaela Zebroski (researcher) can be contacted at mzebrosk@conncoll.edu.

- This study is not meant to gather information about specific individuals and your responses will be combined with other participants' data for the purpose of statistical analyses.

- You are being asked to consent to the publication of the study results as long as the identity of all participants is protected.

- This research has been approved by the Connecticut College Human Subjects Institutional Review Board (IRB). Concerns about any aspect of this study may be addressed to Professor Ann Devlin, asdev@conncoll.edu.

A copy of this informed consent will be given to you.

I am at least 18 years of age, have read these explanations and assurances, and voluntarily consent to participate in this research on social media use and modern life.

Appendix L: Debriefing Form

Debriefing Statement

First of all, thank you for participating in this research dealing with mindful social media use. In this research, I am looking at the effects of a mindful social media use intervention on college life satisfaction and social comparison. This study was an experiment with one condition having an intervention and the other not. Concerns have been raised about the impact of social media use on well-being and its potential to erode mindfulness, but little research has examined mindful social media use and its potential to enhance mindfulness. Members of Connecticut College are filling out these questionnaires and engaging with the given tasks. One of the issues in this literature is the role that social media use has on life satisfaction and social comparison.

Typically, researchers have assessed the effects of mindfulness in a variety of settings, however, this study examined the effect that engaging with social media mindfully with daily reminders had on individuals' overall life satisfaction. To my knowledge, no research has actually focused on the effects that a mindful social media intervention has on these outcomes of interest.

Although this topic is being written about in popular press, there is little to no empirical analysis of mindful social media use interventions. Some examples of popular press attention include The New York Times article "How to Make This the Summer of Missing Out", as well as NPR's article on mental health, "The Risk of Teen Depression and Suicide is Linked to Smartphone Use, Study Says".

If you have any questions or concerns about the manner in which this study was conducted, please contact the Acting IRB Chairperson [Professor Devlin, asdev@conncoll.edu].

If after participating in this study you are feeling distressed about your social media use or its impacts on your well-being, you may want to consider meeting with CC Curtiss (860-439-2826 or cc.curtiss@conncoll.edu), Director of Wellness Programming, about wellness resources on campus and/or make an appointment with Student Counseling Services (by calling 860-439-4587 or by emailing SCS@conncoll.edu) to discuss your concerns with a counselor.

If you are interested in this topic and want to read the literature in this area, you might enjoy the following articles:

- Evans, S., Wyka, K., Blaha, K. T., & Allen, E. S. (2018). Self-compassion mediates improvement in well-being in a mindfulness-based stress reduction program in a community-based sample. *Mindfulness*, doi:10.1007/s12671-017-0872-1
- Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior*, 31, 343-350. doi:10.1016/j.chb.2013.10.049
- Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., ... Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General*, 144(2), 480–488. <https://doi.org/10.1037/xge0000057>
- Willard, D. (2016, August 04). Before You Scroll, Try This Mindful Social Media Practice. Retrieved May 1, 2018, from <https://www.mindful.org/before-you-scroll-try-this-social-media-practice/>