



MONTCLAIR STATE
UNIVERSITY

Montclair State University
**Montclair State University Digital
Commons**

Theses, Dissertations and Culminating Projects

5-2023

The Association of Mindfulness, Passive Social Media Use, Social Comparisons, FoMO and Depression in College Students

Cody Weeks

Montclair State University

Follow this and additional works at: <https://digitalcommons.montclair.edu/etd>



Part of the [Clinical Psychology Commons](#)

Recommended Citation

Weeks, Cody, "The Association of Mindfulness, Passive Social Media Use, Social Comparisons, FoMO and Depression in College Students" (2023). *Theses, Dissertations and Culminating Projects*. 1275.
<https://digitalcommons.montclair.edu/etd/1275>

This Dissertation is brought to you for free and open access by Montclair State University Digital Commons. It has been accepted for inclusion in Theses, Dissertations and Culminating Projects by an authorized administrator of Montclair State University Digital Commons. For more information, please contact digitalcommons@montclair.edu.

**The Association of Mindfulness, Passive Social Media Use, Social Comparisons, FoMO and
Depression in College Students**

DISSERTATION

Submitted to the Faculty of
Montclair State University in partial fulfillment
of the requirements
for the degree of Doctor of Philosophy

by

Cody Weeks, M.A.

Montclair State University

Montclair, NJ

May 2023

Dissertation Chair: Dr. Jazmin Reyes-Portillo

MONTCLAIR STATE UNIVERSITY
THE GRADUATE SCHOOL
DISSERTATION APPROVAL

We hereby approve the Dissertation

**THE ASSOCIATION OF MINDFULNESS, PASSIVE SOCIAL MEDIA USE, SOCIAL
COMPARISONS, FOMO AND DEPRESSION IN COLLEGE STUDENTS**

of

Cody Weeks

Candidate for the Degree:

Doctor of Philosophy

Graduate Program:

Clinical Psychology, Ph.D.

Dissertation Committee:

[Redacted]

Dr. Jazmin Reyes-Portillo, Ph.D.
Dissertation Chair

[Redacted]

Dr. Samantha Coyle, Ph.D.

[Redacted]

Dr. Hannah Szlyk, Ph.D.

[Redacted]

Dr. Michael Bixter, Ph.D.

Certified by:

[Redacted]

Dr. Kenneth Sumner
Associate Provost for Academic Affairs
and Acting Dean of the Graduate School

5/1/2023

Date

Copyright © 2023 by Cody Weeks. All rights reserved.

Abstract

There is mounting concern that social media use among young adults has contributed to the increase in depression in this population, particularly college students. Passive social media use (i.e., browsing or following behavior) has been linked to higher rates of depression and other mental health symptoms among college students. However, scant research has focused on factors that may be used to alter passive social media use and decrease depression, such as mindfulness. Thus, the current study aimed to examine 1) the association between passive social media use and mindfulness, 2) to assess the mechanisms by which mindfulness may influence passive use, such as social comparisons and fear of missing out (FoMO), and 3) to assess whether mindfulness is indirectly related to decreased depression via its association with social comparisons, FoMO, and passive use. A path analysis was conducted to test the study's hypotheses. We recruited 500 undergraduate students aged 18-30 currently enrolled at Montclair State University. Participants completed an online survey assessing the degree to which they engage in passive social media use, social comparisons, and FoMO, and their level of mindfulness. Mindfulness was negatively associated with passive social media use. Path analyses suggest that mindfulness was indirectly related to passive social media use via social comparisons and FoMO. More specifically, higher levels of mindfulness were associated with less social comparisons and FoMO, which in turn, was associated with lower passive social media use. Likewise, path analysis results suggest that increased mindfulness was related to fewer depressive symptoms via its impact on social comparisons, FoMO, and passive social media use. Increasing mindfulness may be useful for decreasing social comparisons, FoMO, and passive social media use and may be an important target in interventions aimed at promoting adaptive social media use and decreasing depression.

Acknowledgments

First and foremost, I would like to extend my gratitude to my amazing mentor, Dr. Jazmin Reyes-Portillo. She took a chance on me in 2018, by offering me admission to MSU, and I will forever be eternally grateful. Without her leadership, guidance, and patience, I would not have been able to complete this work. I would also like to thank all of my committee members, Dr. Hannah Szlyk, Dr. Samantha Coyle, and Dr. Michael Bixter, who all provided tremendous support and guidance. More broadly, I would like to express my gratitude to the directors of the clinical psychology doctoral program, Dr. Jeremy Fox, Dr. Chris King, and Dr. Jazmin Reyes-Portillo, who have all worked so hard to ensure that our program is top-notch, accredited, and that all of the students are thriving.

Contents

Introduction.....1

 Social Media and Depression.....2

 Passive Social Media Use.....3

 Mindfulness.....6

 Social Comparisons8

 FoMO10

 The Current Study12

Methods.....13

 Participants13

 Procedures14

 Measures14

 Patient Health Questionnaire14

 Fear of Missing Out Scale15

 Facebook Iowa-Netherlands Comparison Orientation Measure15

 Multidimensional Scale of Facebook Use16

 The Mindful Attention Awareness Scale16

 Data Analysis.....17

 Power Analysis.....18

Results.....19

 Descriptive Statistics.....19

 Bivariate Correlations.....19

 Path Analyses.....20

 Exploratory Analyses.....22

 Exploratory Hierarchical Linear Regressions22

 Exploratory Path Analyses24

Discussion.....25

| | |
|---|-----------|
| MINDFULNESS AND SOCIAL MEDIA | vii |
| Limitations and Future Research..... | 31 |
| Future Direction and Clinical Implications..... | 32 |
| Conclusion..... | 33 |
| References..... | 35 |
| Appendix A. Tables..... | 52 |
| Appendix B. Figures..... | 59 |
| Appendix C. Study Materials..... | 66 |
| Adapted Surveys..... | 66 |

Introduction

Depression is a major mental health concern among college-aged individuals. According to a national survey on mental health (Han, 2020), over 15 million Americans experienced at least one major depressive episode in 2019, and young people aged 18-25 had the highest rates of depression. National surveys (e.g., The National College Health Assessment and The Healthy Minds Study) show that depression is on the rise among college students (Duffy et al., 2019). For instance, Lipson et al. (2019) found that the number of students screening positive for depression has increased steadily, from 24.8% in 2009 to 29.9% in 2017 (Lipson et al., 2019). Though some research has found benefits associated with using social media, such as increased happiness and life satisfaction and decreased loneliness (Pittman & Reich, 2016), there is mounting concern that the growing social media use among young adults has contributed to the rise in depression (Hunt et al., 2018; Lin et al., 2016). Moreover, the highest social media use occurs among college-aged people (Clement, 2020). According to Pew Research Center, over 90% of young people 18-29 years old have social media accounts (Clement, 2020), with the vast majority of these users accessing social media daily for an average of three hours per day (Auxier & Anderson, 2021; Henderson, 2020).

Early social media research primarily focused on the relationship between time spent on social media and depression, which yielded mixed results (Heffer et al., 2019; Hunt et al., 2018; Jelenchick et al., 2013; Kross et al., 2013; Lin et al., 2016). Recent research suggests that how people engage with social media may be a better predictor of mental health symptoms than time spent on social media (Escobar-Viera et al., 2018; Hunt et al., 2021; Verduyn et al., 2015; Wang et al., 2019). More specifically, some research evaluating the relationship between social media use and depression has examined differences in mood resulting from active (i.e., generating content) versus passive (i.e., browsing on social media without generating content) social media use (Escobar-Vierra et al., 2018; Hunt et al., 2018; Thorisdottir et al., 2019). Early research on social media patterns linked passive social media use (Verduyn et al., 2015) to higher levels of depression and other mental health symptoms among college-aged people, while findings on

active social media use and depression have been consistently mixed (Burke et al., 2010; Hunt et al., 2018; Puukko et al., 2020).

Though numerous studies have examined how social media use may lead to increased depression, there has been a dearth of research examining factors that may alter social media use patterns known to adversely impact depression symptoms, such as passive use. One potential factor that may be used to modify passive use and decrease depression is mindfulness. Mindfulness, which includes present-moment awareness, having an intention for behavior and a non-judgmental attitude has been found to be a target of interventions to decrease depressive symptoms (Cavanagh et al., 2013; Hofman et al., 2010). Given that mindfulness is associated with decreased compulsive social media use (Apaolaza et al., 2019; Gamez-Guadix & Calvate, 2016) and depression (Carpenter et al., 2019; Pearson et al., 2015; Waszczuk et al., 2015), it may also be linked with less passive use. However, no research to date has examined the relationship between mindfulness and passive social media use. In addition to exploring the direct relationship between mindfulness and depression, it is also important to assess the mechanisms by which mindfulness may influence passive use, such as social comparisons and fear of missing out (FoMO). An important step in intervention development is to identify the mechanisms by which an intervention affects a clinical outcome. Moreover, before developing a clinical intervention, researchers have begun to prioritize conducting research that demonstrates that a potential intervention may affect a “hypothesized target” (Hillefors, 2020). Because research has identified FoMO and social comparisons to be related to decreased mindfulness (Baker et al., 2016; Langer et al., 2010; O’Connell, 2020), increased passive social media use (Rozgonjuk et al., 2019), and greater depression (Baker et al., 2016; Burnell et al., 2019; Hunt et al., 2018; Wolniewicz et al., 2020), understanding whether there is a mechanism that explains the relationship between mindfulness and depression through social comparisons, FoMO, and passive social media use may be vital in identifying targets for future interventions aimed at promoting adaptive social media use and preventing depression among college students.

Social Media Use Patterns and Depression

The relationship between social media use and mental health symptoms has long been a subject of interest (Subrahmanyam & Smahel, 2010), and recent research suggests that how individuals use social media can influence depressive symptoms (Burke et al., 2010; Escobar-Viera et al., 2018; Verduyn et al., 2015). Social media use has been categorized as either *active* or *passive* use (Burke et al., 2010; Escobar-Viera et al., 2018; Verduyn et al., 2015). *Active use* consists of the individual generating and sharing content and communicating with other users (e.g., commenting on posts, liking statuses, voting on social media posts, directly communicating with others, sharing photos, and creating and posting content) (Escobar-Viera et al., 2018; Thorisdottir et al., 2019; Verduyn et al., 2015). *Passive use* refers to browsing or following behavior where the individual does not generate content and is instead strictly consuming content (e.g., scrolling through feeds, browsing, watching videos, and viewing posts) (Escobar-Viera et al., 2018; Thorisdottir et al., 2019; Verduyn et al., 2015). Though some research finds that active use is related to decreased depression symptoms (e.g., Chen et al., 2016; Escobar-Viera et al., 2018; Thorisdottir et al., 2019), other research finds the opposite, or no relationship at all (Frisson & Eggermont, 2016; Jónsdóttir, 2021; Pennington, 2021; Puukko et al., 2020). With much of the research on active social media use and depression yielding mixed results, recent studies have focused on the relationship between passive social media use and depression (Valkenburg et al., 2022; Valkenburg et al., 2022; Valkenburg et al., 2022; Beyens et al., 2021).

Passive Social Media Use

Passive social media use regularly occurs among college students and has been linked to negative mental health outcomes. College students have been found to engage in passive use over 50% of the time when using social media (Hall, 2018) and cross-sectional research has consistently identified a link between passive use and negative mental health outcomes (Escobar-Viera et al., 2018; Thorisdottir et al., 2019). In general, cross-sectional research finds passive social media use to be related to decreased self-esteem (Jónsdóttir, 2021), life satisfaction (Krasnova et al., 2013), and sense of belonging (Tobin et al., 2015), as well as increased anxiety and depression (Escobar-Viera et al., 2018; Thorisdottir, 2019; Wang et al., 2019). Similarly,

cross-sectional research focused on college students has found passive social media use to be associated with decreased subjective well-being (Chen et al., 2016), concentration deficits, lack of attentional control (Alloway & Alloway, 2012), and greater depression (Burnell et al., 2019).

To date, only one experimental study has examined the effects of passively using social media on mood among college students. Specifically, Verduyn et al. (2015) examined the effects of actively or passively using social media on participants' overall moods. In their study, 84 undergraduate students (mean age=19.9 years; 61% female) were randomly assigned to either actively or passively use Facebook for 10 minutes. Those in the active condition were instructed to communicate/post on Facebook while avoiding browsing/scrolling. Those in the passive condition, in turn, were instructed to browse/scroll without posting or interacting with others (Verduyn et al., 2015). Although no changes in mood were detected among participants immediately following the intervention, those in the passive use group reported lower mood at the end of the day, whereas there was no change in mood for those in the active group. Despite limitations, such as having a small sample size and the use of a single item to assess mood, this study mirrors previous cross-sectional research finding an association between passive use and increased depression.

Longitudinal research in this area has also been scarce, with only two longitudinal studies examining the association between passive social media use and depression (Aalbers et al., 2018; Wang et al., 2019) having been conducted to date. Specifically, Aalbers et al. (2018) conducted a longitudinal study with 125 undergraduate students (mean age=20.44; 69% female) to examine the relationship between passive social media use and individual depressive symptoms (i.e., depressed mood, fatigue, concentration issues, and loss of interest), in order to understand from a network perspective, how symptoms impact each other over time. Their approach contrasts with cross-sectional research in this area focused on passive use and clinically elevated levels of depression (Burnell et al., 2019; Escobar-Viera et al., 2018). Students' depressive symptoms and passive use were assessed seven times per day for 14 days (Aalbers et al., 2018) using measures developed by the study's authors. They found a positive

relationship between passive social media use and many symptoms associated with depression (including concentration issues, loss of interest, fatigue, and depressed mood), though these relationships disappeared when accounting for all study variables. They also found that depressive symptoms (e.g., fatigue and loss of interest) positively predicted passive social media use across time points, suggesting that increased symptoms related to social withdrawal may be driving passive use. Although the relationship between depressive symptoms and passive social media use disappeared when accounting for all study variables, the results are largely consistent with the cross-sectional studies described above finding passive use to be related to an increased number of depression symptoms and clinically elevated depression (Burnell et al., 2019; Escobar-Viera et al., 2018).

Similarly, Wang et al. (2019) conducted a longitudinal study with 266 undergraduate students (mean age= 20.21; 77% female) in China examining whether envy mediated the association between passive use of QZone (a popular social networking site in China) and depression across a one-year period. They also examined whether life satisfaction moderated this mediation effect. While passive social media use was directly related to depression, this effect was fully mediated by envy. Additionally, among those with higher levels of life satisfaction, greater passive use was related to increased envy, which in turn, was associated with more depression. It may be that passively using social media can even be damaging to the mental health of those who have a positive outlook or appear less vulnerable to becoming depressed.

In sum, results from cross-sectional, experimental, and longitudinal studies suggest that passive social media use may be a risk factor for increased depressive symptoms. Some research has also begun to examine mechanisms that explain how increased passive use leads to more depression, such as envy (Wang et al., 2019). However, scant research has examined psychological factors that can be modified to decrease passive social media use, particularly among college students. There is an urgent need for research evaluating strategies to decrease passive social media use and improve mental health symptoms among college students, as they

are most at risk for engaging in passive social media use and developing depression (Clement, 2020; Duffy et al., 2019).

Mindfulness

Increasing an individual's mindfulness has been found to be an effective technique for decreasing depressive symptoms (Carpenter et al., 2019; Pearson et al., 2015; Waszczuk et al., 2015). Mindfulness is defined as attending to one's experience in the present moment (Baker et al., 2016), having a nonjudgmental demeanor (Kabat-Zinn, 2009), and possessing an intention for one's behavior (Weaver & Swank, 2019). Research identifies mindfulness as either a state (Lau et al., 2006) or a trait (Brown & Ryan, 2003). State mindfulness is the actual experience of being focused on the present moment that occurs during mindfulness practice (Lau et al., 2006). Trait mindfulness, on the other hand, is having the predisposition to attend to the present moment (Kiken et al., 2015). Kiken et al. (2015) found that engaging in mindfulness meditation (state mindfulness) can improve trait mindfulness and decrease distress. In general, increasing trait mindfulness can help improve attention (Baer, 2009; Valentine & Sweet, 1999) and decrease rumination (Cavanagh et al., 2013), stress (Strohmeier et al., 2021), judgmental attitudes (Zebroski, 2019), anxiety, and depression (Bögels et al., 2008; Klainin-Yobas et al., 2012; Shapiro et al., 2011).

Increased trait mindfulness is also related to lower depressive symptoms among college students (Falsafi, 2016). Elevated present-moment awareness results in individuals being oriented to the here and now and not being focused on the past or worrying about the future, which is associated with increased depressive symptoms (Kabat-Zin, 2003; Watkins & Teasdale, 2001). Those high on mindfulness are more present-focused and less likely to ruminate (Deyo et al., 2009; Hawley et al., 2014), which is a major risk factor for depression (Spasojević & Alloy, 2001). In addition, the non-judgmental component of mindfulness is associated with greater self-acceptance and increased self-esteem (Thompson & Waltz, 2008). This is especially important, as those with low self-esteem are more vulnerable to experiencing depressive symptoms (Orth & Robins, 2013). Lastly, the mindful intention of behavior helps maintain present-moment

awareness and is associated with self-regulation (Shapiro & Schwartz, 2000), which can lead to the use of positive coping strategies (De La Fuente et al., 2018) and protect against depression (Cong et al., 2019). Specifically, those high in mindfulness are more likely to use problem-focused coping strategies, that involve removing the source of distress, while those with low mindfulness are more likely to use emotion-focused coping strategies (i.e., having fantasies about how things will work out) that involve distracting away from negative emotions, without eliminating the source of the distress (Sriwilai & Charoensukmongkol, 2016). Research finds that relying on emotion-focused coping strategies can increase the risk of depression among adolescents and adults (Horwitz et al., 2011). Therefore, fostering increased attention to the present moment, intention for behavior, and a non-judgmental attitude can work as a preventative measure against experiencing depressive symptoms.

In addition to the mental health benefits of mindfulness, recent research suggests that more mindful individuals display healthier online (Gamez-Guadix & Calvate, 2016) and social networking behaviors (Apaolaza et al., 2019). Although no research to date has examined the relationship between mindfulness and passive social media use, decreased mindfulness has been found to be related to less compulsive or addictive social media use. Compulsive use is typically defined as excessive social media use that may result in a significant disturbance in one's life (e.g., insomnia, anxiety) (Apaolaza et al., 2019). One study examining the relationship between mindfulness, compulsive WhatsApp use, stress, self-esteem, and social anxiety among 346 college students (aged 17-26; 51.7% female) found that increased mindfulness was associated with lower compulsive WhatsApp use (Apaolaza et al., 2019). Similarly, Sriwilai and Charoensukmongkol (2016) found that social media addiction was related to decreased mindfulness and greater use of emotion-focused coping strategies among Thai adults. Given that passive use is the predominant behavior on social media (Verduyn et al., 2015), compulsive social media use is likely associated with increased passive social media use, as more time spent on social media has been found to be linked to greater passive use (Thorisdottir et al., 2019).

Therefore, as with compulsive use, mindfulness may also be associated with lower passive social media use, though this relationship has yet to be assessed.

Mindfulness has the potential to help decrease passive social media use among college students (Weaver & Swank, 2019). Mindfulness has been found to decrease self-judgment (Dijkstra, 2011; Langer et al., 2010), increase attention (Jha et al., 2007; Semple, 2010), and elicit more intentional behavior (Chatzisarantis & Hagger, 2007), which seem to be lacking among passive social media users. Passive social media use appears to be less intentional, as it involves scrolling and lurking behavior, without an overall goal (Weaver & Swank, 2019). Passive social media users have also been found to have attention deficits (Aalbers et al., 2018; Alloway & Alloway, 2012) and are more likely to make self-judgments, in the form of making comparisons to others (Burnell et al., 2019; Pang, 2021; Verduyn et al., 2021). In addition, it may be that passive social media users access social media as a coping mechanism to regulate their emotions (Gamez-Guadix & Calvate 2016), and increasing mindfulness may prompt more beneficial coping strategies. As noted above, there has been no research examining the relationship between mindfulness and passive social media use. The present study looks to fill this gap in the literature, by evaluating the relationship between mindfulness, passive social media use, and depression.

Social Comparisons

In addition to assessing the relationship between mindfulness and passive social media use, the current study looks to identify potential mediators of this association. Social comparisons may be an important factor to consider given that social media platforms provide an ideal setting for social comparisons to take place, as these sites have a seemingly never-ending supply of content (Verduyn et al., 2017). Festinger (1954), who popularized the notion of social comparisons and founded social comparison theory, argued that individuals have an inherent desire to compare themselves to others to make sense of their standing in the world. Social comparisons can be upwards or downwards (Gibbons & Gerrard, 1989). Upward social comparisons are when a person compares themselves to someone they perceive as superior in

some way (Pang, 2021), whereas downward social comparisons are when individuals compare themselves to someone perceived as inferior (Smith, 2000). Both upward and downward social comparisons on social media are associated with experiencing increased mental health symptoms (Vogel et al., 2015), but upward social comparisons have been found to occur more frequently (Vogel et al., 2014). In general, social comparisons on social media have been linked with negative outcomes, including feelings of inadequacy, decreased life satisfaction (Olivos et al., 2021), lower self-esteem (Jan et al., 2017; Midgley et al., 2020; Zuo, 2014), decreased self-compassion (Moran, 2017), decreased self-worth (Gowitzka, 2019), less perceived social acceptance, less perceived physical attractiveness (Burnell et al., 2019, Scully et al., 2020; Tiggeman & Anderberg, 2020) and increased depressive symptoms (Hunt et al, 2018; Wolniewicz et al., 2020). Moreover, these negative outcomes occur regardless of whether the person the user is comparing themselves to is viewed as superior or inferior in some way (Vogel et al., 2015).

Those who engage in more lurking behavior to pass the time or gather information about others on social media are especially vulnerable to making social comparisons (Verduyn et al., 2020; Yue et al., 2022). This may be due to the content that the passive social media user consumes. For instance, people on social media typically post idealistic representations of their lives, and being inundated with such content drives upward social comparisons (Appel et al., 2015). In addition, platforms like Facebook and Instagram, are designed to make popular posts more prominent in a user's news feed, which is more likely to be related to positive and exciting events happening in a friend's life (e.g., marriage proposals, job changes, vacations) (Voronin et al., 2018). The flood of only seemingly positive events happening in friends' lives may lead to upward comparisons, negative self-judgments (Gonzalez & Hancock, 2011; Pang, 2021), and lower life satisfaction (Giagkou, 2018). Additionally, one's tendency to make social comparisons may also drive how social media is used. Specifically, having a social comparison orientation (i.e., a tendency to make social comparisons) can increase passive social media use (Rozgonjuk et al., 2019). Therefore, the tendency to make social comparisons may increase vulnerability to

passive social media use. Passive social media use, in turn, may expose users to content that can lead individuals to engage in more social comparisons.

Individuals who use social media to gather information and keep tabs on others' lives are more likely to spend an excessive amount of time evaluating/judging the lives of others and negatively evaluating themselves in comparison (Verduyn et al., 2020), and thus, may be inherently less mindful (Weaver & Swank, 2019). Making social comparisons involves increased self-evaluation (Festinger, 1954) while mindfulness emphasizes the importance of having a non-judgmental demeanor (Langer et al., 2010). Therefore, increasing mindfulness may result in the social media user becoming less judgmental toward themselves and subsequently less likely to make social comparisons (Weaver & Swank, 2019). Increasing mindfulness will likely decrease social comparisons. However, research examining the association between social comparisons and mindfulness has been limited. One such study conducted with 1287 adult women (aged 19-80) found that low levels of mindfulness were associated with making increased social comparisons to others and being less satisfied with one's physical appearance (Dijkstra et al., 2011). Similarly, mindfulness intervention research has found that increasing mindfulness among adults can lead to decreased social comparisons (Langer et al., 2010) and improved body satisfaction (Fuller-Tyszkiewicz et al., 2019). Altogether, recent research suggests that increasing an individual's mindfulness may lead to them making fewer social comparisons on social media, which in turn, may lead to less passive use (Weaver & Swank, 2019).

FoMO

Another type of social comparison is having a fear of missing out (FoMO). Having FoMO on social media is the fear that others may be experiencing a good time that is being missed out on (Burnell et al., 2019), which results in a drive to maintain a constant social media presence online, in order to avoid missing out on pleasurable events (Przybylski et al., 2013) and prevent social ostracization (Abel et al., 2016). Increased FoMO is associated with elevated mental health symptoms, including negative affect, fatigue, stress, physical symptoms, decreased sleep (Milyavskaya et al., 2018), decreased social connection (Roberts & David, 2020), lower

self-esteem, less life satisfaction (Weaver & Swank, 2021), and depression (Baker et al., 2016; Burnell et al., 2019). Individuals with elevated FoMO are also more likely to spend a greater amount of time using social media (Hunt et al., 2018) and engage in more passive use (Burnell et al., 2019; Weaver & Swank, 2021). Adolescents and young adults may be especially vulnerable to experiencing FoMO (Milyavskaya et al., 2018; Rozgonjuk et al., 2021). For instance, Rozgonjuk et al. (2021) examined FoMO among a sample of 3510 German adolescents and adults (aged 12-75) and found FoMO to be negatively associated with age, with younger people being more likely to experience FoMO (Rozgonjuk et al., 2021). Thus, college students may be at increased risk of FoMO compared to older people.

Previous studies have found mindfulness to be negatively associated with FoMO (Baker et al., 2016; O'Connell, 2020; Weaver & Swank, 2021; Sa'id & Dewi, 2022). For example, Baker et al. (2016) examined the relationship between time spent on social media, FoMO, mindfulness, and depression among 386 adults (aged 18-64; 81% female) and found that FoMO was associated with more time spent on social media, less mindfulness, and increased depression. Similarly, Weaver and Swank (2021) conducted research on 278 undergraduate students (ages 18-53) to determine if FoMO was associated with mindful attention and compulsive social media use. They found that FoMO was positively associated with passive social media use (Weaver and Swank, 2021). They also found that FoMO was negatively associated with mindful attention, life satisfaction, and self-esteem (Weaver & Swank, 2021). Lastly, Weaver and Swank (2021) found that mindful attention mediated the relationship between FoMO and passive social media use. They suggest that college students experiencing FoMO and related negative effects (i.e., making social comparisons, lower self-esteem, etc.) may increase their social media use to attempt to alleviate these effects, thereby becoming less concerned with the present moment, resulting in users being less mindful and having a decreased ability to self-regulate (Weaver & Swank, 2021).

Mindfulness may be useful in decreasing FoMO, as it emphasizes present-moment awareness and having a non-judgmental attitude (Weaver & Swank, 2018). By orienting oneself

to the present moment, there may be less fixation on what may happen in the future on social media. In addition, increasing the ability to self-regulate and having an intention for behavior, may result in a decrease in FoMO, which may decrease passive social media use or limit its deleterious effects.

The Current Study

As noted above, various studies suggest that passive social media use may be a risk factor for depressive symptoms among college students, who are a population at increased risk for depression (Duffy et al., 2019). Yet, scant research to date has examined factors that have the potential to be leveraged to alter passive social media use, such as mindfulness. Thus, the current study aims to examine the association between social media use and mindfulness. Establishing that a relationship between mindfulness and passive social media use exists is an important first step in understanding whether a mindfulness intervention can be used to promote adaptive social media use among college students and reduce or prevent depressive symptoms. Furthermore, identifying the indirect relationship between mindfulness and passive use may reveal potential mechanisms of action, and identifying these mechanisms is a prerequisite for developing an intervention. Accordingly, given its association with compulsive social media use (Apaolaza et al., 2019), it is hypothesized that mindfulness will be negatively associated with passive social media use (Hypothesis 1). We also aim to examine whether social comparisons and FoMO mediate the relationship between mindfulness and passive social media use. Considering that social comparisons have been found to be related to lower levels of mindfulness (Langer et al., 2010) and greater passive use (Rousseau et al., 2017), it is hypothesized that increased mindfulness will be associated with decreased social comparisons, which in turn, will be associated with decreased passive use (Hypothesis 2). FoMO has also been linked to decreased mindfulness (Baker et al., 2016; O'Connell, 2020) and increased passive social media use (Burnell et al., 2019; Weaver & Swank, 2021). Thus, it is hypothesized that higher levels of mindfulness will be associated with less FoMO, which in turn, will be associated with lower passive social media use (Hypothesis 3; See Figure 1 for the hypothesized path model). We also

aim to examine whether increased mindfulness will be related to decreased depressive symptoms via its impact on social comparisons and passive social media use and whether increased mindfulness will also be related to decreased depressive symptoms via its impact on FoMO and passive social media use (See Figure 2 for the hypothesized path model). It is hypothesized that increased mindfulness will be indirectly related to decreased depressive symptoms via its association with decreased social comparisons and passive use (Hypothesis 4A) and that increased mindfulness will also be indirectly related to decreased depressive symptoms via its relationship with decreased FoMO and passive use (Hypothesis 4B).

Method

Participants

An online survey assessing the relationship between mindfulness, social comparisons, FoMO, passive social media use, and depressive symptoms in college students was conducted at Montclair State University. Although 591 students responded to the survey, 91 student responses were removed. Of these, 12 participants were removed for exceeding the age cutoff of 30, six participants were excluded for no longer being in college, and 11 participants were removed for completing the survey in less than five minutes (Leiner, 2015). Additionally, 62 participants were removed for not completing at least 90% of each of the surveys assessing the variables of interest (mindfulness, social comparisons, FoMO, passive social media use, depressive symptoms). The final analytic sample included 500 participants. One-way ANOVAs found no significant differences between those included and excluded from the analyses based on sex ($F=2.330, p=.465$), year in school ($F=3.298, p=.07$), gender ($F=1.80, p=.178$), or race/ethnicity ($F=.309, p=.580$).

Participant demographic characteristics are displayed in Table 1. Of the 500 participants, 82.4% ($n=412$) were female, with the majority of the sample (79.2%, $n=395$) self-identifying their gender as women. Participant ages ranged from 18-30 years, with a mean of 19.59 years

($SD= 1.958$). About 45% ($n=223$) of the sample self-identified as non-Latinx White, 31.2% ($n=156$) Latinx, 13.2% Non-Latinx Black ($n=66$), 7% Non-Latinx Asian ($n=35$) and 0.2% ($n=1$) Non-Latinx Native American/American Indian. With regard to year in school, 56.6% ($n=283$) were freshmen, 17.2% ($n=86$) were sophomores, 15.4% ($n=77$) were juniors and 8.2% ($n=41$) were seniors. Almost all participants reported owning a smartphone (99.6%, $n=498$).

Procedure

Participants were recruited via SONA, the university's Psychology department's subject pool, as well as through a recruitment email distributed to all university students. To be eligible for the study, participants needed to 1) be an undergraduate student at Montclair State University (MSU); 2) be between the ages of 18-30, and 3) have at least one active social media account. The survey was administered using Qualtrics from February 31, 2022, to May 3, 2022. The survey began with an online consent form. After providing informed consent, participants were asked to choose between receiving research credit or enrolling in a raffle for a \$50 Amazon gift card for completing the survey. Participants completed an online survey assessing demographic information, depression symptoms, passive social media use, social comparisons, FoMO, and mindfulness.

Measures

Demographics. Participants were asked to report their age, sex, gender identity, race/ethnicity, sexual orientation, marital status, religion, and year in school.

Depressive Symptoms. Depressive symptoms were measured using the Patient Health Questionnaire-8 (PHQ-8; Kroenke et al., 2001). The PHQ-8 is an eight-item measure that assesses the presence of depressive symptoms over the previous two weeks (e.g., "Little interest or pleasure in doing things"). Responses were made using a 4-point Likert scale, ranging from

zero (“Not at all”) to three (“Nearly every day”). Total scores range from 0-24, with scores of 10 or more suggesting major depression (Kroenke et al., 2001). Higher scores indicate increased depressive symptoms. A mean composite score of depressive symptoms was calculated.

Consistent with previous research on college students (Shin et al., 2019), the current study found the PHQ-8 to have good reliability ($\alpha=.88$).

Fear of Missing Out Scale (FoMOS). FoMO was measured via the Fear of Missing Out Scale (FoMOS; Przybylski et al., 2013). The FoMOS is a 10-item measure that assesses feelings about everyday experiences and rewarding situations (i.e., “It bothers me when I miss an opportunity to meet up with friends”; Przybylski et al., 2013). Responses were made using a 5-point Likert scale, ranging from one (“Not true of me”) to five (“Extremely true of me),” with higher scores indicating greater FoMO (Przybylski et al., 2013). A mean composite score for FoMO was calculated. The FoMOS was found to have good reliability with our sample ($\alpha = .88$), which mirrors previous research (Przybylski et al., 2013).

Social Comparisons. The Facebook Iowa-Netherlands Comparison Orientation Measure (F-INCOM; Steers et al., 2014) was adapted for this study to assess participants' social comparisons (See Appendix C). The original measure only assessed social comparisons on Facebook. In the current study, this measure was modified to ask about social comparisons on social media in general (see Appendix 1 for F-INCOM items used). The F-INCOM is an 11-item measure that assesses the degree to which participants make comparisons to others online (i.e., “When I am on social media, I always pay a lot of attention to how well I have done something compared to how others do things”; Steers et al., 2014). Responses were made using a 5-point Likert scale ranging from one (“I strongly disagree”) to five (“I strongly agree”). This measure assesses social comparisons on social media, with higher scores representing greater social

comparisons. A mean composite score of social comparisons was calculated. Consistent with past research on college students (Steers et al., 2014), the current study has found this measure to have good reliability ($\alpha=.83$).

Passive Social Media Use. Passive social media use was assessed by utilizing a modified version of the Multidimensional Scale of Facebook Use (MSFU; Frison & Eggermont, 2020). The original scale assessed passive use on Facebook. This measure was modified in the current study to assess the passive use of social media in general (See Appendix C). The MSFU scale is a 7-item measure that assesses both active and passive social media use (i.e., “How often do you visit a social media profile of a social media friend?”; Frison & Eggermont, 2020). The 4-items measuring passive social media use were used, with higher numbers denoting greater passive social media use. Responses were made on a 7-point scale ranging from one (“Never”) to seven (“Several times a day;” Frison & Eggermont, 2020). A composite score of passive social media use was calculated from the Multidimensional Scale of Facebook Use (Frison & Eggermont, 2020). As in previous research (Frison & Eggermont, 2020), the current study found this measure to have acceptable internal consistency among a diverse college sample ($\alpha=.79$).

Mindful Attention. Trait mindfulness was measured by administering The Mindful Attention Awareness Scale (MAAS; Brown & Ryan., 2003). The MAAS is a 15-item measure that assesses trait mindfulness (i.e., “I tend to walk quickly to get where I’m going without paying attention to what I experience along the way;” Brown & Ryan., 2003). Responses were made on a 6-point scale ranging from one (“Almost always”) to six (“Almost never,”) with higher scores representing greater mindfulness (Brown & Ryan., 2003). A mean composite score of MAAS was calculated. Consistent with previous research among college students (MacKillop

& Anderson., 2007), the current study found this measure to have excellent internal consistency ($\alpha=.92$).

Data Analysis

All analyses were conducted using IBM SPSS version 28. Descriptive statistics and frequencies were computed for all study variables. Missing data were excluded from analyses using listwise deletion. Prior to conducting regression and mediation analyses, assumptions tests were conducted to confirm normality, linearity, and multicollinearity. Analysis of histogram and probability plots (PP) suggested that the outcome variables (passive social media use and depressive symptoms) were normally distributed and that there was a linear relationship between all predictor variables. An evaluation of correlations revealed that no predictor variables were highly correlated. Moreover, the assumption of multicollinearity was met, as the collinearity statistics of the independent variables were all within acceptable limits (Passive Social Media Use Scores, Tolerance= .825, VIF= 1.212; Social Comparisons Scores, Tolerance=.576, VIF= 1.735; FoMO Scores, Tolerance=.558, VIF= 1.791; Mindfulness Scores, Tolerance= .748, VIF= 1.336). An examination of Cook's value indicated that no multivariate outliers were having an undue effect on the findings. In sum, the preliminary data analysis found that no assumptions were violated.

Prior to hypothesis testing, t-tests were conducted to examine demographic differences on the variables of interest (i.e., depression, mindfulness, social comparisons, passive social media use, and FoMO). To test whether mindfulness was negatively associated with passive social media use (Hypothesis 1) a bivariate correlation between passive social media use and mindfulness was conducted. A single path analysis was then conducted using PROCESS Model 4 (Hayes, 2012) to determine whether an indirect relationship between mindfulness and passive

social media use exists, with social comparisons (Hypothesis 2) and FoMO (Hypothesis 3) serving as the mediators. A single sequential path analysis was conducted using Process Model 6 (Hayes, 2012), to test whether increased mindfulness is indirectly related to decreased depressive symptoms via its association with decreased social comparisons and passive use (Hypothesis 4A) and whether increased mindfulness is indirectly related to decreased depressive symptoms via its relationship with decreased FoMO and passive use (Hypothesis 4B).

Path analyses allow for a better understanding of which variables are directly and indirectly associated with the outcome variables (passive social media use, depressive symptoms). Due to the study's cross-sectional nature, no causal inferences can be made. Accordingly, path analyses conducted on cross-sectional data should not be confused with mediational analyses determining causation by comparing data collected over multiple time points to establish temporal order (MacKinnon et al, 2012). Though the current study will examine the potential relationships between mindfulness, depressive symptoms, and potential intervening variables (i.e., social comparisons, FoMO), it will do so without adhering to the requirements for determining causality.

Power Analysis

A priori power analyses were conducted for each proposed analysis. G*Power version 3.1.9.7 (Faul et al., 2007) was used to determine the sample size needed to conduct a bivariate correlation. Using a significance criterion of .05, and power of .80, 67 people would be needed to have the power to find a medium effect. Monte Carlo simulation was used to determine the appropriate sample for the path analyses (Schoemann et al., 2017), based on the size of the path model, the distribution of the variables, and the strength of their relationship (Muthén & Muthén, 2002). At least 110 participants would be necessary to detect a medium effect at an alpha of .05

and power of .80 in the first set of path analyses. For the second set of path analyses, 290 participants would be necessary to detect a medium effect at an alpha of .05 and power of .80. Thus, the current study's sample of 500 participants is large enough to detect medium and large effects.

Results

Descriptive Statistics

As noted above, the analytic sample of 500 only included participants who completed at least 90% of each of the surveys assessing the variables of interest. No significant differences on demographic variables emerged between the analytic sample ($n=500$) and those excluded due to missing data ($n=62$). Of the 500 participants, approximately 46% met the cutoff for clinical depression ($\text{PHQ-8} \geq 10$). On average, participants scored in the moderate depression range ($M=1.19$, $SD=0.76$; Range=0-3) and in the average range for mindfulness ($M=3.79$, $SD=1.05$; Range= 1-5; See Figure 3 for distribution of mindfulness). Likewise, participant FoMO scores ($M= 1.3$, $SD= 0.88$; Range=0-4) indicated medium amounts of FoMO, while on average, participants made moderate amounts of social comparisons ($M=2.96$, $SD=0.79$; Range=1-4).

Male participants ($M=4.23$, $SD=0.98$) had significantly higher mindfulness scores than female participants ($M=3.72$, $SD=1.03$) [$t(492)=4.12$, $p<.001$]. Males ($M=0.82$, $SD=0.76$) also reported significantly lower levels of depressive symptoms relative to females ($M=1.25$, $SD=0.74$) [$t(492)= -4.89$, $p<.001$]. No other significant differences were found on participants' race/ethnicity, year in school, or age emerged across the variables of interest (i.e., depressive symptoms, mindfulness, passive social media use, social comparisons, and FoMO).

Bivariate Correlations

Table 2 displays the results of the bivariate correlation analyses. As hypothesized, mindfulness was negatively associated with social comparisons ($p <.001$), FoMO ($p <.001$),

passive social media use ($p < .001$), and depressive symptoms ($p < .001$). Additionally, consistent with the hypotheses, passive social media use was positively associated with social comparisons ($p < .001$), FoMO ($p < .001$), and depressive symptoms ($p = .001$). Social comparisons were also positively associated with FoMO ($p < .001$), and depressive symptoms ($p < .001$). Finally, FoMO was positively associated with depressive symptoms ($p < .001$).

Path Analyses

We hypothesized that increased mindfulness would be associated with decreased social comparisons, which in turn, would be associated with decreased passive social media use (Hypothesis 2). We also hypothesized that higher levels of mindfulness would be associated with less FoMO, which in turn, would be associated with lower passive social media use (Hypothesis 3). To test hypotheses 2 and 3, we used Process Model 4 (Hayes, 2012) to examine the indirect effect of the simple mediation model. A single model was run with FoMO and social comparisons serving as the mediators to examine the indirect relationship between mindfulness and passive social media use. Residual covariances between mediators were accounted for. We used the bootstrapping method to calculate the 95% confidence interval (CI) and set repeated sampling to 5000 times. The results of the mediation analysis supported hypothesis 2 and suggest that mindfulness is indirectly related to passive social media use via social comparisons, indirect=-.1109, $SE=.0321$, 95% CI [-.1772, -.0519]. The results of the mediation analysis are presented in Figure 4. More specifically, those who were more mindful made significantly fewer social comparisons (path a1). Making fewer social comparisons, in turn, was related to less passive social media use (path b1). The results also confirmed hypothesis 3 indicating that an indirect effect of mindfulness on passive social media use exists via its relationship with FoMO, indirect=-.1154, $SE=.0335$, 95% CI [-.1843, -.0539]. More specifically, those who were more

mindful had significantly less FoMO (path a2). Having less FoMO, in turn, was related to less passive social media use (path b2). (See Table 3 for full model results). Additionally, the relationship between mindfulness and passive social media use was no longer significantly associated with passive social media use (path c) when accounting for participants' social comparisons and FoMO.

A single path analysis was conducted using PROCESS model 6 (Hayes, 2012) to examine whether increased mindfulness was indirectly related to decreased depressive symptoms via its association with decreased social comparisons and passive use (Hypothesis 4A) and whether increased mindfulness was indirectly related to decreased depressive symptoms via its relationship with decreased FoMO and passive use (Hypothesis 4B), with all of the variables being run in the same model. We again used the bootstrapping method to calculate the 95% *CI* and set the repeated sampling to 5000. Residual covariances between mediators were accounted for. For hypothesis 4A, we found that the 95% *CI* for the effect size of mindfulness' association with depressive symptoms via social comparisons and passive social media use did not include 0, confirming that an indirect relationship exists, indirect=.0067 *SE*=.0033, 95% *CI* [.0008, .0137]. The results of the mediation analysis are presented in Figure 5. More specifically, those who were more mindful made significantly fewer social comparisons (path a1). Making fewer social comparisons, in turn, was related to less passive social media use (path b1), and less passive social media use was related to increased depression (path d). We also tested whether increased mindfulness was indirectly related to depressive symptoms via its relationship with FoMO and passive social media use. Again, the bootstrapping *CI* did not include 0, confirming that the relationship between mindfulness and depressive symptoms is mediated by FoMO and passive social media use, indirect=.0036, *SE*=.0021, 95% *CI* [.0004, .0084]. More specifically, those

who were more mindful had significantly less FoMO (path a2). Having less FoMO, in turn, was related to less passive social media use (path b2), and less passive social media use was related to increased depressive symptoms (path d; See Table 4 for the results). Finally, when accounting for participants' social comparisons and FoMO, mindfulness was negatively associated with depressive symptoms (path c).

Though a significant indirect relationship between mindfulness and depression was found, the nature of the relationship among some of the variables was not as hypothesized, therefore, hypotheses 4A and 4B were partially supported. More specifically, though bivariate correlations found that passive social media use was positively associated with depressive symptoms, path analysis found the inverse relationship between the two variables. More specifically, increased mindfulness was associated with decreased social comparisons and FoMO, which were associated with decreased passive social media use, which was in turn associated with increased depressive symptoms.

Exploratory Analyses

To examine why the relationship between passive social media use and depressive symptoms went from being positive (when conducting bivariate correlations) to negative (when conducting path analyses), a posteriori exploratory analyses were conducted. Two hierarchical linear regressions and two path analyses were conducted to help better understand how the relationship between passive social media use and depressive symptoms changes when accounting for other predictor variables.

Exploratory Hierarchical Linear Regressions

To examine the relationship more closely between passive social media use, social comparisons, FoMO, and depressive symptoms, two hierarchical linear regression models were

conducted. In the first hierarchical linear regression model for depressive symptoms, passive social media use was entered as a predictor in step one, social comparisons were entered as a predictor in step two, and mindfulness was entered in step three. At step one of the hierarchical linear regression, passive social media use was positively associated with depressive symptoms, accounting for 2.0% of the variance ($F(499) = 10.375, p = .001$). When social comparisons was added to the model in step 2 it explained an additional 13.7% of the variance of depression ($F(499) = 46.382, p = .001$), though the association between depressive symptoms and passive social media use was no longer significant. When mindfulness was added to the model at step 3, an additional 17% of the variance of depression was explained, ($F(499) = 80.636, p = .001$). However, the relationship between passive social media use and depressive symptoms remained non-significant (See Table 5 for the linear regression results).

In the second hierarchical linear regression model for depressive symptoms, passive social media use was entered as a predictor in step one, FoMO was entered as a predictor in step two, and mindfulness was entered in step three. At step one, passive social media use was positively associated with depressive symptoms and accounted for 2.0% of the variance ($F(499) = 10.375, p = .001$). When FoMO was added to the model in the next step it explained an additional 22.3% of the variance of depressive symptoms ($F(499) = 79.742, p = .001$). However, once FoMO was added to the model, the relationship between passive social media use and depressive symptoms became negative and non-significant. When mindfulness was added to the model at step 3, an additional 13% of the variance of depressive symptoms was explained ($F(499) = 98.189, p = .001$). After entering mindfulness in step 3, passive social media was a negative and significant predictor of depressive symptoms (See Table 6 for linear regression results). Given these results, we decided to run separate path analyses to determine whether the shift in the relationship

between passive social media use and depressive symptoms is being driven by having social comparisons or FoMO in the model.

Exploratory Path Analyses

Based upon the results of the exploratory linear regression analyses, two separate path analyses were conducted using PROCESS model 6 (Hayes, 2012), to examine how accounting for FoMO and social comparisons independently may change the relationship between passive social media use and depressive symptoms. These path analyses mirror those run to examine hypotheses 4A and 4B, though we conducted separate models for social comparisons and FoMO.

The first path analysis tested the indirect relationship between mindfulness and depressive symptoms via social comparisons and passive social media use. Again, the bootstrapping method was used to calculate the 95% *CI* and set the repeated sampling to 5000. The results suggest that this indirect relationship is not significant, indirect=-.0044, *SE*=.0152, 95% *CI* [-.0025, .0149]. More specifically, those higher in mindfulness made significantly fewer social comparisons (path a1), which in turn was associated with less passive social media use (path b1), which in turn, resulted in a non-significant relationship between passive social media use and depressive symptoms (path d1). See Figure 6 for the model.

The next path analysis was conducted to test the indirect relationship between mindfulness and depressive symptoms via FoMO and passive social media use. The results suggest that this indirect relationship was significant, indirect=.0094, *SE*=.0049, 95% *CI* [.0005, .0199], such that an increase in mindfulness is associated with a decrease in FoMO (path a1), which is associated with a decrease in passive social media use (path b1), which is associated with an increase in depressive symptoms (path d1). See Figure 7 for the model. These findings are consistent with the exploratory stepwise regressions and suggest that when accounting for

participants' mindfulness and FoMO, the relationship between passive social media use and depressive symptoms changes from a positive to a negative association.

Discussion

The primary objectives of the current study were to evaluate the relationship between mindfulness and passive social media use and examine the indirect relationship between mindfulness and passive social media use via social comparisons and FoMO among college students. We also aimed to assess the indirect relationship between mindfulness and depressive symptoms via college students' social comparisons, FoMO, and passive social media use. Mindfulness was expected to be inversely related to passive social media use, social comparisons, FoMO, and depressive symptoms. We also hypothesized that the indirect relationship between mindfulness and passive social media use would be explained via social comparisons and FoMO. Finally, we predicted that the indirect relationship between mindfulness and depressive symptoms would be explained via social comparisons, FoMO, and passive social media use.

As hypothesized, mindfulness was negatively associated with passive social media use. These findings are consistent with those of Sriwilai and Charoensukmongkol (2016) who found that lower levels of mindfulness were associated with increased social media use. To the authors' knowledge, the current study is the first to find a negative relationship between mindfulness and passive social media use. Passive social media use tends to involve less intentional behavior (i.e., scrolling without a goal) and individuals who are lower on mindfulness may be more prone to engaging with social media less consciously. This finding is especially important for interventions aimed at changing social media use patterns among young adults, as improving an individual's mindfulness may help reduce passive social media use.

As expected from previous research, bivariate correlation analyses revealed that depressive symptoms were positively associated with FoMO. This relationship may exist on social networking platforms because those high in FoMO feel the need to maintain a constant presence to avoid social ostracization (Abel et al., 2016), which is associated with the feeling of being socially disconnected from others (Roberts & David, 2020), having decreased self-esteem (Weaver & Swank, 2021), and increased depression (Baker et al., 2016; Burnell et al., 2019). Consistent with previous research (Hunt et al., 2018; Wolniewicz et al., 2020), we also found that depressive symptoms were positively associated with social comparisons. Comparing oneself to others has been linked with increased rumination (Feinstein et al., 2013), which is associated with decreased life satisfaction (Eldeleklioglu, 2015), and lower self-esteem (Wang et al., 2018), known risk factors for depression (Koivumaa-Honkanen, et al., 2004; Moksnes et al., 2016; Sowislo & Orth, 2013).

Consistent with previous research, we found that social comparisons (Verduyn et al., 2020; Yue et al., 2022) and FoMO (Burnell et al., 2019; Weaver & Swank, 2021) were positively related to passive social media use. Those high in FoMO are likely to engage in passive social media use, as they are driven to maintain a constant social presence to avoid missing out on enjoyable experiences (Przybylski et al., 2013); while those high in social comparisons may use social media passively because they are inundated with a never-ending stream of attractive posts (Gonzalez & Hancock, 2011; Pang, 2021). Bivariate correlation analyses also found that increased mindfulness was associated with a decrease in social comparisons, FoMO, and depressive symptoms. These findings also mirror past research finding a negative relationship between mindfulness and social comparisons (Langer et al., 2010), FoMO (Baker et al., 2016; O'Connell, 2020; Weaver & Swank, 2021; Sa'id & Dewi, 2022), and depression (Carpenter et

al., 2019; Pearson et al., 2015; Waszczuk et al., 2015). Moreover, these results are especially important, as past research has focused on increasing mindfulness to improve mental health. More specifically, mindfulness-based cognitive therapy has been found to decrease depression by increasing non-judgmental awareness of thoughts, emotions, and physical sensations (Hofmann & Gomez, 2017). As with passive use, mindfulness can be a potential target to decrease social comparisons and FoMO by increasing intentions and non-judgmental awareness (Weaver & Swank, 2019; Chan et al., 2022).

Passive social media use was positively associated with depressive symptoms at the bivariate level, which adds to the cross-sectional (Escobar-Viera et al., 2018; Thorisdottir, 2019; Wang et al., 2019; Burnell et al., 2019), longitudinal (Aalbers et al., 2018; Wang et al., 2019), and experimental research (Verduyn et al., 2018) linking passive social media use to increased depression. Passive social media use may be associated with increased depressive symptoms because it is a less activating behavior that may make an individual feel socially isolated, as passive users consume content without any social interaction. This behavior may also make individuals more prone to making social comparisons. Passive social media use often involves scrolling through news feeds and other users' profiles (Escobar-Viera et al., 2018; Thorisdottir et al., 2019; Verduyn et al., 2015), which may result in an individual being inundated with posts of others leading idealistic lives. As noted above, social media platforms use algorithms to make popular posts more conspicuous in a user's news feed (Voronin et al., 2018). These posts tend to focus on positive and exciting events, such as vacations and career milestones. The constant stream of only positive events happening to friends and family members may lead an individual to make negative self-evaluations and comparisons of themselves to others (Gonzalez & Hancock, 2011; Pang, 2021).

We hypothesized that mindfulness would be indirectly related to passive social media use via social comparisons. Our hypothesis was supported, as we found that increased mindfulness was associated with decreased social comparisons, which in turn, was related to decreased passive social media use. To the author's knowledge, this is the first study to find an indirect relationship between mindfulness and passive social media use via social comparisons. These findings build on previous research that identifies a negative relationship between mindfulness and social comparisons (Dijkstra et al., 2011), and a positive association between social comparisons and passive social media use (Rozgonjuk et al., 2019). Increasing an individual's mindfulness may lead them to reduce negative self-judgment of their lives and experiences and be less likely to compare themselves to others. Social comparisons have been found to be related to increased passive social media use in previous research (Verduyn et al., 2020; Yue et al., 2022) as well as in the current study. Therefore, improving mindfulness to reduce social comparisons can be another avenue for altering social media engagement.

We also wanted to understand whether FoMO could explain the indirect relationship between mindfulness and passive social media use. Consistent with our hypothesis, FoMO mediated the relationship between mindfulness and passive social media use. To the author's knowledge, this is also the first study to find an indirect relationship between mindfulness and passive social media use via FoMO. Our finding is supported by research suggesting that mindfulness is negatively related to FoMO (Baker et al., 2016; O'Connell, 2020; Weaver & Swank, 2021) and that FoMO is positively associated with using social media passively (Weaver and Swank, 2021). As noted above, increasing mindfulness has been found to increase non-judgmental attitudes, present-focused attention (Jha et al., 2007; Semple, 2010), and behaving intentionally (Chatzisarantis & Hagger, 2007). Accordingly, those high in FoMO exhibit less

intentional and present-focused behavior (Weaver & Swank, 2021), as they are driven to maintain a social media presence to avoid missing out on events that may occur. They may also be higher in self-focused judgment, as they feel the need to maintain a constant presence on social media to avoid social ostracization (Abel et al., 2016). Because those high in mindfulness are more intentional about the behavior they engage in, they may be less likely to experience FoMO, (Burnell et al., 2019; Weaver & Swank, 2021). As with social comparisons, improving mindfulness to reduce FoMO can be another way to promote healthy social media use.

Finally, we expected to find that the indirect relationship between mindfulness and depressive symptoms could be explained by social comparisons, FoMO, and passive social media use. Our hypotheses were partially supported, with increased mindfulness being associated with decreased FoMO and social comparisons, which in turn were associated with decreased passive social media use. Contrary to the hypothesized relationship and past research (Escobar-Viera et al., 2018; Thorisdottir, 2019; Wang et al., 2019; Burnell et al., 2019), a decrease in passive social media use was associated with an increase in depressive symptoms.

Given these contradictory findings, we decided to conduct additional exploratory analyses to further probe the relationship between the variables in our model. A posteriori hierarchical linear regressions and path analyses were conducted to examine why the relationship between passive social media use and depressive symptoms may have changed. The linear regression analyses revealed that the direction of the relationship between passive social media use and depressive symptoms only changed when accounting for participants' FoMO and mindfulness. This pattern of results was not observed when accounting for social comparisons. These results were further confirmed by the path models that examined the indirect relationship between mindfulness and depressive symptoms via FoMO and passive social media use. Similar

to the regression analysis, the relationship between passive social media use and depressive symptoms went from positive to negative once mindfulness and FoMO were included in the path model.

It is unclear whether this finding is spurious. Given that mindfulness, social comparisons, and FoMO were stronger predictors of depressive symptoms than passive social media use, accounting for these variables may have rendered the relationship between passive social media and depressive symptoms non-significant. More specifically, the addition of mindfulness and FoMO in the model may have suppressed the relationship between passive social media use and depression, leading to unexpected findings and partial support of the hypothesis. This finding also runs counter to multiple studies finding a positive relationship between passive social media use and depression. Alternatively, if this finding is valid, one potential explanation is that for individuals who rely on social media use for social support and connection, increasing mindfulness and FoMO and reducing passive social media use may lead to increased social isolation, which can increase the risk for depressive symptoms (Matthews et al., 2016).

Limitations and Future Directions

The current research has various limitations. The study's cross-sectional design limits our ability to make inferences regarding causality or the temporal ordering of variables. For example, although mindfulness was associated with passive use, the analysis cannot establish the temporal order of variables and therefore cannot confirm that mindfulness always precedes passive social media use. However, it is worth noting that our proposed hypotheses and path analyses were based on previous research and a strong theoretical rationale for why mindfulness would be associated with passive social media use and depressive symptoms. It will be important to assess these relationships across time.

Another limitation is that only passive social media use was assessed. We did not account for active use or total time spent on social media. Greater time spent on social media has been linked to increased depression (ref). More active social media use, in turn, has been found to be associated with less depression (ref). Including these variables in our models may have helped explain some of the variation we found regarding the relationship between passive social media use and depression. It is possible that increasing mindfulness might have led to greater active use as well as more passive use, which could help explain why increased passive use was related to decreased depression in our final model. Future research examining the role of passive social media use on depression should account for different types of social media use (e.g., total time spent, active use) to get a more complete understanding of these relationships.

In the current study, passive social media use was assumed to be homogenous across social media platforms. It may be that passive social media use has a greater impact on mental health outcomes depending on how the content is delivered. More specifically, social media platforms that rely on more visual content (i.e., Instagram, Snapchat, and TikTok) may have a greater impact on participants' depressive symptoms, FoMO, and social comparisons compared to social media platforms that traditionally rely more on text (i.e., Facebook and Twitter). Therefore, future research should examine the impact of passive social media use specific to platforms and how content is delivered. This will allow for a better understanding of the platform-specific effects of passive social media on mental health symptoms.

While our sample was racially and ethnically diverse, participants were obtained from a single public university in NJ and our results may not generalize to other college students or non-college-going emerging adults. Previous research suggests that non-college/non-working emerging adults may have higher rates of mental health issues (Kovess-Masfety et al., 2016) and

are twice as likely as those working in college to be hospitalized for depression (Sellstrom et al., 2011). Given that most of the participants were also female, it may limit the generalizability to males. Our sample also had a low proportion of LGBTQ+ students (fewer than 20%), which have been found to have high rates of depressive symptoms (Russell & Fish, 2016). To address these limitations, future research should focus on larger and more representative samples of college students, as well as young adults not currently enrolled in college.

Although we included validated and widely used measures, the use of self-report assessment is also limited in that participants may have misinterpreted questions or responded in a socially desirable manner. In addition, common method bias in survey items may inflate observed relationships, and thus, it will be important for future research to employ multi-method assessment (Donaldson & Vallone, 2002). For example, future research could use data gathered directly from social media platforms to assess passive social media use as well as mental health assessments made by trained clinicians in addition to participant self-reports of mindfulness, social comparisons, and FoMO. Lastly, multiple measures were modified for the current study. The modification of these measures may have impacted their validity and reliability. Future research studies should examine the reliability and validity of these modified measures or rely on unmodified measures.

Future Directions and Clinical Implications

Though the current study identified a relationship between mindfulness and passive social media use, as well as potential mechanisms explaining this relationship (social comparisons and FoMO), it is unclear whether a mindfulness intervention could be leveraged to promote healthy social media engagement among college students. Future research should examine whether experimentally increasing mindfulness results in less passive social media use,

as well as whether social comparisons and FoMO continue to mediate this relationship. Future research should also consider including potential covariates, such as time spent on social media, that may impact the relationship between mindfulness, social media use, and depression.

Our findings also have implications for clinicians working with college students. Given that making social comparisons and having FoMO are positively associated with increased passive social media use, clinicians should assess and provide psychoeducation to their college-aged patients on the potential relationship between these variables. As mindfulness was found to be negatively associated with making social comparisons, having FoMO, passive social media use, and depression, clinicians working with young people should assess their mindfulness early in treatment and focus on skills to increase their present-moment attention. Increasing patients' non-judgmental awareness and urging them to be more intentional with their behavior, may result in a decrease in the likelihood of them making social comparisons and having FoMO, and may decrease the amount of time they spend passively using social media.

Conclusion

In sum, the current study is among the first to find a direct and indirect relationship between mindfulness and passive social media use. Overall, the results suggest that improving college students' mindfulness may help promote healthy social media engagement by reducing passive use. We also identified social comparisons and FoMO as potential mechanisms through which mindfulness may exert its effect on passive social media use. The current study's goal of identifying the relationship between mindfulness and passive social media use, as well as its potential mechanisms, is consistent with the National Institute of Mental Health's experimental therapeutic approach to intervention development, where the first step to developing an intervention is to demonstrate that an intervention exerts a measurable effect on a hypothesized

mechanism of action, rather than focusing on clinical symptom change (Hillefors, 2020). These findings lay the groundwork for future clinical research focused on adapting existing mindfulness interventions to reduce passive social media use among college students, and experimentally test whether a mindfulness intervention leads to a decrease in college students' social comparisons, FoMO, and passive social media use.

References

- Aalbers, G., McNally, R. J., Heeren, A., De Wit, S., & Fried, E. I. (2019). Social media and depression symptoms: A network perspective. *Journal of Experimental Psychology: General, 148*(8), 1454.
- Abel, J. P., Buff, C. L., & Burr, S. A. (2016). Social media and the fear of missing out: Scale development and assessment. *Journal of Business & Economics Research (JBER), 14*(1), 33-44.
- Alloway, T. P., & Alloway, R. G. (2012). The impact of engagement with social networking sites (SNSs) on cognitive skills. *Computers in Human Behavior, 28*(5), 1748-1754.
- Apaolaza, V., Hartmann, P., D'Souza, C., & Gilsanz, A. (2019). Mindfulness, compulsive mobile social media use, and derived stress: The mediating roles of self-esteem and social anxiety. *Cyberpsychology, Behavior, and Social Networking, 22*(6), 388-396.
- Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology, 34*(4), 277-289.
- Auxier, B., & Anderson, M. (2021). Social media use in 2021. *Pew Research Center*.
- Baer, R. A. (2009). Self-focused attention and mechanisms of change in mindfulness-based treatment. *Cognitive behaviour therapy, 38*(S1), 15-20.
- Baker, Z. G., Krieger, H., & LeRoy, A. S. (2016). Fear of missing out: Relationships with depression, mindfulness, and physical symptoms. *Translational Issues in Psychological Science, 2*(3), 275.
- Beyens, I., Pouwels, J. L., van Driel, I. I., Keijsers, L., & Valkenburg, P. M. (2020). The effect of

- social media on well-being differs from adolescent to adolescent. *Scientific Reports*, 10(1), 10763.
- Beyens, I., Pouwels, J. L., van Driel, I. I., Keijsers, L., & Valkenburg, P. M. (2021). Social media use and adolescents' well-being: Developing a typology of person-specific effect patterns. *Communication Research*, 00936502211038196.
- Bögels, S., Hoogstad, B., van Dun, L., de Schutter, S., & Restifo, K. (2008). Mindfulness training for adolescents with externalizing disorders and their parents. *Behavioural and cognitive psychotherapy*, 36(2), 193-209.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of personality and social psychology*, 84(4), 822.
- Brown, K. W., & Ryan, R. M. (2003). Mindful attention awareness scale. *Journal of Personality and Social Psychology*.
- Burke, M., Marlow, C., & Lento, T. (2010, April). Social network activity and social well-being. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1909-1912).
- Burnell, K., George, M. J., Vollet, J. W., Ehrenreich, S. E., & Underwood, M. K. (2019). Passive social networking site use and well-being: The mediating roles of social comparison and the fear of missing out. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 13(3), 5.
- Carpenter, J. K., Conroy, K., Gomez, A. F., Curren, L. C., & Hofmann, S. G. (2019). The relationship between trait mindfulness and affective symptoms: A meta-analysis of the Five Facet Mindfulness Questionnaire (FFMQ). *Clinical psychology review*, 74, 101785.

- Cavanagh, K., Strauss, C., Cicconi, F., Griffiths, N., Wyper, A., & Jones, F. (2013). A randomized controlled trial of a brief online mindfulness-based intervention. *Behaviour research and therapy*, *51*(9), 573-578.
- Chan, S. S., Van Solt, M., Cruz, R. E., Philp, M., Bahl, S., Serin, N., ... & Canbulut, M. (2022). Social media and mindfulness: From the fear of missing out (FOMO) to the joy of missing out (JOMO). *Journal of Consumer Affairs*, *56*(3), 1312-1331.
- Charoensukmongkol, P. (2016). Mindful Facebooking: The moderating role of mindfulness on the relationship between social media use intensity at work and burnout. *Journal of health psychology*, *21*(9), 1966-1980.
- Chatzisarantis, N. L., & Hagger, M. S. (2007). Mindfulness and the intention-behavior relationship within the theory of planned behavior. *Personality and Social Psychology Bulletin*, *33*(5), 663-676.
- Chen, H. T., Chan, M., & Lee, F. L. (2016). Social media use and democratic engagement: A comparative study of Hong Kong, Taiwan, and China. *Chinese Journal of Communication*, *9*(4), 348-366.
- Clement, J. (2020). Share of US adults who use social media 2019, by age.
- Cong, C. W., Ling, W. S., & Aun, T. S. (2019). Problem-focused coping and depression among adolescents: Mediating effect of self-esteem. *Current Psychology*, 1-8.
- De la Fuente, J., Mañas, I., Franco, C., Cangas, A. J., & Soriano, E. (2018). Differential effect of level of self-regulation and mindfulness training on coping strategies used by university students. *International journal of environmental research and public health*, *15*(10), 2230.
- Deyo, M., Wilson, K. A., Ong, J., & Koopman, C. (2009). Mindfulness and rumination: does mindfulness training lead to reductions in the ruminative thinking associated with

- depression?. *Explore*, 5(5), 265-271.
- Dijkstra, P., & Barelds, D. P. (2011). Examining a model of dispositional mindfulness, body comparison, and body satisfaction. *Body Image*, 8(4), 419-422.
- Donaldson, S. I., & Grant-Vallone, E. J. (2002). Understanding self-report bias in organizational behavior research. *Journal of business and Psychology*, 17, 245-260.
- Duffy, M. E., Twenge, J. M., & Joiner, T. E. (2019). Trends in mood and anxiety symptoms and suicide-related outcomes among US undergraduates, 2007–2018: Evidence from two national surveys. *Journal of Adolescent Health*, 65(5), 590-598.
- Eldeleklioglu, J. (2015). Predictive effects of subjective happiness, forgiveness, and rumination on life satisfaction. *Social Behavior and Personality: an international journal*, 43(9), 1563-1574.
- Escobar-Viera, C. G., Shensa, A., Bowman, N. D., Sidani, J. E., Knight, J., James, A. E., & Primack, B. A. (2018). Passive and active social media use and depressive symptoms among United States adults. *Cyberpsychology, Behavior, and Social Networking*, 21(7), 437-443.
- Falsafi, N. (2016). A randomized controlled trial of mindfulness versus yoga: effects on depression and/or anxiety in college students. *Journal of the American Psychiatric Nurses Association*, 22(6), 483-497.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, 39(2), 175-191.
- Feinstein, B. A., Hershenberg, R., Bhatia, V., Latack, J. A., Meuwly, N., & Davila, J. (2013).

- Negative social comparison on Facebook and depressive symptoms: Rumination as a mechanism. *Psychology of Popular Media Culture*, 2(3), 161.
- Festinger, L. (1954). A theory of social comparison processes. *Human relations*, 7(2), 117-140.
- Frison, E., & Eggermont, S. (2016). Exploring the relationships between different types of Facebook use, perceived online social support, and adolescents' depressed mood. *Social Science Computer Review*, 34(2), 153-171.
- Frison, E., & Eggermont, S. (2020). Toward an integrated and differential approach to the relationships between loneliness, different types of Facebook use, and adolescents' depressed mood. *Communication Research*, 47(5), 701-728.
- Fuller-Tyszkiewicz, M., Richardson, B., Lewis, V., Linardon, J., Mills, J., Juknaitis, K., ... & Krug, I. (2019). A randomized trial exploring mindfulness and gratitude exercises as eHealth-based micro-interventions for improving body satisfaction. *Computers in Human Behavior*, 95, 58-65.
- Gómez-Guadix, M., & Calvete, E. (2016). Assessing the relationship between mindful awareness and problematic Internet use among adolescents. *Mindfulness*, 7(6), 1281-1288.
- Giagkou, S., Hussain, Z., & Pontes, H. (2018). Exploring the interplay between passive following on Facebook, fear of missing out, self-esteem, social comparison, age, and life satisfaction in a community-based sample. *International Journal of Psychology & Behavior Analysis*, 4(2).
- Gibbons, F. X., & Gerrard, M. (1989). Effects of upward and downward social comparison on mood states. *Journal of Social and Clinical Psychology*, 8(1), 14.
- Gonzales, A. L., & Hancock, J. T. (2011). Mirror, mirror on my Facebook wall: Effects of exposure to Facebook on self-esteem. *Cyberpsychology, behavior, and social networking*,

14(1-2), 79-83.

Gowitzka, S. B. (2019). The Impact of Social Media on Self-Worth and Social Comparison.

Hall, J. A. (2018). When is social media use social interaction? Defining mediated social interaction. *New Media & Society*, 20(1), 162-179.

Han, B. (2020). Key substance use and mental health indicators in the United States: results from the 2019 National Survey on Drug Use and Health. *Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration*.

Hawley, L. L., Schwartz, D., Bieling, P. J., Irving, J., Corcoran, K., Farb, N. A., ... & Segal, Z. V. (2014). Mindfulness practice, rumination and clinical outcome in mindfulness-based treatment. *Cognitive Therapy and Research*, 38(1), 1-9.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling.

Heffer, T., Good, M., Daly, O., MacDonell, E., & Willoughby, T. (2019). The longitudinal association between social-media use and depressive symptoms among adolescents and young adults: An empirical reply to Twenge et al.(2018). *Clinical Psychological Science*, 7(3), 462-470.

Henderson, G. (2020). How much time does the average person spend on social media. *Digital Marketing*. Retrieved August 28, 2021.

Hillefors, M. (2020). NIMH support for clinical trials research. Retrieved from: <https://www.nimh.nih.gov/funding/grant-writing-and-application-process/concept-clearances/2020/nimh-support-for-clinical-trials-research>

Hofmann, S. G., & Gómez, A. F. (2017). Mindfulness-based interventions for anxiety and depression. *Psychiatric clinics*, 40(4), 739-749.

- Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of consulting and clinical psychology, 78*(2), 169.
- Horwitz, A. G., Hill, R. M., & King, C. A. (2011). Specific coping behaviors in relation to adolescent depression and suicidal ideation. *Journal of adolescence, 34*(5), 1077-1085.
- Hunt, M., All, K., Burns, B., & Li, K. (2021). Too much of a good thing: Who we follow, what we do, and how much time we spend on social media affects well-being. *Journal of Social and Clinical Psychology, 40*(1), 46-68.
- Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No more FOMO: Limiting social media decreases loneliness and depression. *Journal of Social and Clinical Psychology, 37*(10), 751-768.
- Jan, M., Soomro, S., & Ahmad, N. (2017). Impact of social media on self-esteem. *European Scientific Journal, 13*(23), 329-341.
- Jelenchick, L. A., Eickhoff, J. C., & Moreno, M. A. (2013). "Facebook depression?" Social networking site use and depression in older adolescents. *Journal of Adolescent Health, 52*(1), 128-130.
- Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience, 7*(2), 109-119.
- Jónsdóttir, L. *The mediating role of social comparison in passive and active social media use and the relationship with self-esteem and loneliness in girls and boys* (Doctoral dissertation).
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future.
- Kabat-Zinn, J. (2009). Wherever you go, there you are: Mindfulness meditation in everyday life.

Hachette Books.

- Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual Differences, 81*, 41-46.
- Klainin-Yobas, P., Cho, M. A. A., & Creed, D. (2012). Efficacy of mindfulness-based interventions on depressive symptoms among people with mental disorders: A meta-analysis. *International journal of nursing studies, 49*(1), 109-121.
- Koivumaa-Honkanen, H., Kaprio, J., Honkanen, R., Viinamäki, H., & Koskenvuo, M. (2004). Life satisfaction and depression in a 15-year follow-up of healthy adults. *Social psychiatry and psychiatric epidemiology, 39*, 994-999.
- Kovess-Masfety, V., Leray, E., Denis, L., Husky, M., Pitrou, I., & Bodeau-Livinec, F. (2016). Mental health of college students and their non-college-attending peers: results from a large French cross-sectional survey. *BMC psychology, 4*, 1-9.
- Krasnova, H., Wenninger, H., Widjaja, T., & Buxmann, P. (2013). Envy on Facebook: a hidden threat to users' life satisfaction?.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine, 16*(9), 606-613.
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., ... & Ybarra, O. (2013). Facebook use predicts declines in subjective well-being in young adults. *PloS one, 8*(8), e69841.
- Langer, E., Pirson, M., & Delizonna, L. (2010). The mindlessness of social comparisons. *Psychology of Aesthetics, Creativity, and the Arts, 4*(2), 68.
- Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., ... & Devins, G.

- (2006). The Toronto mindfulness scale: Development and validation. *Journal of clinical psychology*, 62(12), 1445-1467.
- Leiner, D. J. (2019, December). Too fast, too straight, too weird: Non-reactive indicators for meaningless data in internet surveys. In *Survey Research Methods* (Vol. 13, No. 3, pp. 229-248).
- Lin, L. Y., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., ... & Primack, B. A. (2016). Association between social media use and depression among US young adults. *Depression and anxiety*, 33(4), 323-331.
- Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased rates of mental health service utilization by US college students: 10-year population-level trends (2007–2017). *Psychiatric Services*, 70(1), 60-63.
- MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the mindful attention awareness scale (MAAS). *Journal of Psychopathology and Behavioral Assessment*, 29(4), 289-293.
- MacKinnon, D. P., Cheong, J., & Pirlott, A. G. (2012). Statistical mediation analysis. In APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological. (pp. 313–331). Washington, DC, US: American Psychological Association.
- Matthews, T., Danese, A., Wertz, J., Odgers, C. L., Ambler, A., Moffitt, T. E., & Arseneault, L. (2016). Social isolation, loneliness and depression in young adulthood: a behavioural genetic analysis. *Social psychiatry and psychiatric epidemiology*, 51, 339-348.
- Midgley, C., Thai, S., Lockwood, P., Kovacheff, C., & Page-Gould, E. (2020). When

- every day is a high school reunion: Social media comparisons and self-esteem. *Journal of Personality and Social Psychology*.
- Milyavskaya, M., Saffran, M., Hope, N., & Koestner, R. (2018). Fear of missing out: prevalence, dynamics, and consequences of experiencing FOMO. *Motivation and Emotion, 42*(5), 725-737.
- Moksnes, U. K., Løhre, A., Lillefjell, M., Byrne, D. G., & Haugan, G. (2016). The association between school stress, life satisfaction, and depressive symptoms in adolescents: Life satisfaction as a potential mediator. *Social Indicators Research, 125*(1), 339-357.
- Moran, B. (2017). Self-Compassion, Body Image Dissatisfaction, and Negative Social Comparisons in Adolescents Utilizing Social Networking Sites.
- Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural equation modeling, 9*(4), 599-620.
- National Institute of Mental Health. (2017). Major Depression. Retrieved from: <https://www.nimh.nih.gov/health/statistics/major-depression>
- O'Connell, C. (2020). How FOMO (Fear of Missing Out), the smartphone, and social media may be affecting university students in the Middle East. *North American Journal of Psychology, 22*(1), 83-102.
- Olivos, F., Olivos-Jara, P., & Browne, M. (2021). Asymmetric social comparison and life satisfaction in social networks. *Journal of Happiness Studies, 22*(1), 363-384.
- Orth, U., & Robins, R. W. (2013). Understanding the link between low self-esteem and depression. *Current directions in psychological science, 22*(6), 455-460.
- Pang, H. (2021). Unraveling the influence of passive and active WeChat interactions on upward

- social comparison and negative psychological consequences among university students. *Telematics and Informatics*, 57, 101510.
- Pearson, M. R., Brown, D. B., Bravo, A. J., & Witkiewitz, K. (2015). Staying in the moment and finding purpose: The associations of trait mindfulness, decentering, and purpose in life with depressive symptoms, anxiety symptoms, and alcohol-related problems. *Mindfulness*, 6(3), 645-653.
- Pennington, N. (2021). Communication outside of the home through social media during COVID-19. *Computers in Human Behavior Reports*, 100118.
- Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior*, 62, 155-167.
- Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in human behavior*, 29(4), 1841-1848.
- Puukko, K., Hietajärvi, L., Maksniemi, E., Alho, K., & Salmela-Aro, K. (2020). Social media use and depressive symptoms—A longitudinal study from early to late adolescence. *International journal of environmental research and public health*, 17(16), 5921.
- Roberts, J. A., & David, M. E. (2020). The Social media party: fear of missing out (FoMO), social media intensity, connection, and well-being. *International Journal of Human–Computer Interaction*, 36(4), 386-392.
- Rousseau, A., Eggermont, S., & Frison, E. (2017). The reciprocal and indirect relationships between passive Facebook use, comparison on Facebook, and adolescents' body dissatisfaction. *Computers in Human Behavior*, 73, 336-344.

- Rozgonjuk, D., Elhai, J. D., Ryan, T., & Scott, G. G. (2019). Fear of missing out is associated with disrupted activities from receiving smartphone notifications and surface learning in college students. *Computers & Education, 140*, 103590.
- Rozgonjuk, D., Sindermann, C., Elhai, J. D., & Montag, C. (2021). Individual differences in Fear of Missing Out (FoMO): Age, gender, and the Big Five personality trait domains, facets, and items. *Personality and Individual Differences, 171*, 110546.
- Russell, S. T., & Fish, J. N. (2016). Mental health in lesbian, gay, bisexual, and transgender (LGBT) youth. *Annual review of clinical psychology, 12*, 465-487.
- Sa'id, M., & Dewi, D. C. S. (2022). Mindfulness and Fear of Missing Out in Final Year Undergraduate Students. *KnE Social Sciences, 125-136*.
- Schoemann, A. M., Boulton, A. J., & Short, S. D. (2017). Determining power and sample size for simple and complex mediation models. *Social Psychological and Personality Science, 8*(4), 379-386.
- Scully, M., Swords, L., & Nixon, E. (2020). Social comparisons on social media: online appearance-related activity and body dissatisfaction in adolescent girls. *Irish Journal of Psychological Medicine, 1-12*.
- Sellström, E., Bremberg, S., & O'campo, P. (2011). Yearly incidence of mental disorders in economically inactive young adults. *The European Journal of Public Health, 21*(6), 812-814.
- Semple, R. J. (2010). Does mindfulness meditation enhance attention? A randomized controlled trial. *Mindfulness, 1*(2), 121-130.
- Shapiro, S. L., Brown, K. W., Thoresen, C., & Plante, T. G. (2011). The moderation of

- mindfulness-based stress reduction effects by trait mindfulness: results from a randomized controlled trial. *Journal of clinical psychology*, 67(3), 267-277.
- Shapiro, S. L., & Schwartz, G. E. (2000). The role of intention in self-regulation: Toward intentional systemic mindfulness. In *Handbook of self-regulation* (pp. 253-273). Academic Press.
- Shin, C., Lee, S. H., Han, K. M., Yoon, H. K., & Han, C. (2019). Comparison of the usefulness of the PHQ-8 and PHQ-9 for screening for major depressive disorder: analysis of psychiatric outpatient data. *Psychiatry investigation*, 16(4), 300.
- Smith, R. H. (2000). Assimilative and contrastive emotional reactions to upward and downward social comparisons. In *Handbook of social comparison* (pp. 173-200). Springer, Boston, MA.
- Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological bulletin*, 139(1), 213.
- Spasojević, J., & Alloy, L. B. (2001). Rumination as a common mechanism relating depressive risk factors to depression. *Emotion*, 1(1), 25.
- Sriwilai, K., & Charoensukmongkol, P. (2016). Face it, don't Facebook it: impacts of social media addiction on mindfulness, coping strategies and the consequence on emotional exhaustion. *Stress and Health*, 32(4), 427-434.
- Steers, M. L. N., Wickham, R. E., & Acitelli, L. K. (2014). Seeing everyone else's highlight reels: How Facebook usage is linked to depressive symptoms. *Journal of Social and Clinical Psychology*, 33(8), 701-731.
- Strohmaier, S., Jones, F. W., & Cane, J. E. (2021). Effects of length of mindfulness

- practice on mindfulness, depression, anxiety, and stress: A randomized controlled experiment. *Mindfulness*, 12(1), 198-214.
- Subrahmanyam, K., & Smahel, D. (2010). *Digital youth: The role of media in development*. Springer Science & Business Media.
- Tiggemann, M., & Anderberg, I. (2020). Social media is not real: The effect of ‘Instagram vs reality’ images on women’s social comparison and body image. *New Media & Society*, 22(12), 2183-2199.
- Thompson, B. L., & Waltz, J. A. (2008). Mindfulness, self-esteem, and unconditional self-acceptance. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 26(2), 119-126.
- Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P., & Sigfusdottir, I. D. (2019). Active and passive social media use and symptoms of anxiety and depressed mood among Icelandic adolescents. *Cyberpsychology, Behavior, and Social Networking*, 22(8), 535-542.
- Tobin, S. J., Vanman, E. J., Verreynne, M., & Saeri, A. K. (2015). Threats to belonging on Facebook: Lurking and ostracism. *Social Influence*, 10(1), 31-42.
- Valentine, E. R., & Sweet, P. L. (1999). Meditation and attention: A comparison of the effects of concentrative and mindfulness meditation on sustained attention. *Mental health, religion & culture*, 2(1), 59-70.
- Valkenburg, P. M., Beyens, I., Pouwels, J. L., van Driel, I. I., & Keijsers, L. (2022). Social media browsing and adolescent well-being: Challenging the “Passive Social Media Use Hypothesis”. *Journal of Computer-Mediated Communication*, 27(1), zmab015.
- Valkenburg, P. M., Meier, A., & Beyens, I. (2022). Social media use and its impact on

- adolescent mental health: An umbrella review of the evidence. *Current opinion in psychology*, 44, 58-68.
- Valkenburg, P. M., van Driel, I. I., & Beyens, I. (2022). The associations of active and passive social media use with well-being: A critical scoping review. *New media & society*, 24(2), 530-549.
- Verduyn, P., Gugushvili, N., & Kross, E. (2021). The impact of social network sites on mental health: distinguishing active from passive use. *World Psychiatry*, 20(1), 133.
- 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.
- Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review.
- Villarroel, M. A., & Terlizzi, E. P. (2019). Key findings Data from the National Health Interview Survey.
- Vogel, E. A., Rose, J. P., Okdie, B. M., Eckles, K., & Franz, B. (2015). Who compares and despairs? The effect of social comparison orientation on social media use and its outcomes. *Personality and Individual Differences*, 86, 249-256.
- Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social comparison, social media, and self-esteem. *Psychology of popular media culture*, 3(4), 206.
- Voronin, G., Baumann, A., & Lessmann, S. (2018). Crowdturfing on Instagram-The Influence of Profile Characteristics on The Engagement of Others. In *Twenty-Sixth European Conference on Information Systems 2016*.
- Wang, H. Z., Yang, T. T., Gaskin, J., & Wang, J. L. (2019). The longitudinal association

- between passive social networking site usage and depressive symptoms: The mediating role of envy and moderating role of life satisfaction. *Journal of Social and Clinical Psychology, 38*(3), 181-199.
- Wang, P., Wang, X., Wu, Y., Xie, X., Wang, X., Zhao, F., ... & Lei, L. (2018). Social networking sites addiction and adolescent depression: A moderated mediation model of rumination and self-esteem. *Personality and Individual Differences, 127*, 162-167.
- Waszczuk, M. A., Zavos, H. M., Antonova, E., Haworth, C. M., Plomin, R., & Eley, T. C. (2015). A multivariate twin study of trait mindfulness, depressive symptoms, and anxiety sensitivity. *Depression and anxiety, 32*(4), 254-261.
- Watkins, E. D., & Teasdale, J. D. (2001). Rumination and over general memory in depression: effects of self-focus and analytic thinking. *Journal of abnormal psychology, 110*(2), 353.
- Weaver, J. L., & Swank, J. M. (2019). Mindful connections: A mindfulness-based intervention for adolescent social media users. *Journal of Child and Adolescent Counseling, 5*(2), 103-112.
- Weaver, J. L., & Swank, J. M. (2021). An Examination of College Students' Social Media Use, Fear of Missing Out, and Mindful Attention. *Journal of College Counseling, 24*(2), 132-145.
- Wolniewicz, C. A., Rozgonjuk, D., & Elhai, J. D. (2020). Boredom proneness and fear of missing out mediate relations between depression and anxiety with problematic smartphone use. *Human Behavior and Emerging Technologies, 2*(1), 61-70.
- Yue, Z., Zhang, R., & Xiao, J. (2022). Passive social media use and psychological well-being during the COVID-19 pandemic: The role of social comparison and emotion regulation. *Computers in Human Behavior, 127*, 107050.

Zebroski, M. (2019). The Effects of Mindful Instagram Use on Social Comparison and College Life Satisfaction.

Zuo, A. (2014). *Measuring up: Social comparisons on Facebook and contributions to self-esteem and mental health* (Doctoral dissertation).

Appendix A. Tables

Table 1. Participant Demographics

| Demographic Characteristics | N (%) |
|---|-------------------|
| Age | |
| Mean \pm SD | 19.59 \pm 1.958 |
| Median, Range | 19, 18-30 |
| Sex | |
| Female | 412 (82.4%) |
| Male | 82 (16.4%) |
| Other | 1 (.2%) |
| Prefer not to disclose | 5 (1%) |
| Race/Ethnicity | |
| Non-Latinx Black | 66 (13.2%) |
| Non-Latinx White | 223 (44.6%) |
| Latinx | 156 (31.2%) |
| Non-Latinx Asian or Pacific Islander | 35 (7%) |
| Non-Latinx American Indian or Alaska Native | 1 (0.2%) |
| Prefer Not to Disclose | 19 (3.8%) |
| Sexual Orientation | |

| | |
|-------------------------------------|-------------|
| Heterosexual | 381 (76.2%) |
| Gay | 8 (1.6%) |
| Lesbian | 8 (1.6%) |
| Bisexual | 71 (14.2%) |
| Prefer to Self-Identify | 22 (4.4%) |
| Prefer Not to Disclose | 10 (2%) |
| Class Year as of Spring 2022 | |
| Freshman | 283 (56.6%) |
| Sophomore | 86 (17.2%) |
| Junior | 77 (15.4%) |
| Senior | 41 (8.2%) |
| Prefer Not to Disclose | 13 (2.6%) |
| Has a SMART Phone | |
| No | 0 (0%) |
| Yes | 498 (99.6%) |
| Not Sure | 1 (.2%) |
| Prefer Not to Disclose | 1 (.2%) |

Table 2. Correlations among study variables

| | 1 | 2 | 3 | 4 | 5 |
|-----------------------------|----------|---------|---------|---------|---|
| 1. Mindfulness | 1 | | | | |
| 2. Social Comparisons | -.431*** | 1 | | | |
| 3. FoMO | -.462*** | .614*** | 1 | | |
| 4. Passive Social Media Use | -.261*** | .372*** | .371*** | 1 | |
| 5. Depressive Symptoms | -.540*** | .397*** | .491*** | .143*** | 1 |

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

Table 3. Indirect Effect of Mindfulness on Passive Social Media Use via Social Comparisons, and FoMO

| Path | Coefficient | SE | 95% CI | |
|--|-------------|-------|--------|--------|
| | | | LL | UL |
| Mindfulness → Social Comparisons → Passive Social Media Use | -.1109 | .0326 | -.1772 | -.0519 |
| Mindfulness → FoMO → Passive Social Media Use | -.1154 | .0332 | -.1843 | -.0539 |
| Mindfulness → Passive Social Media Use | -.0889 | .0569 | -.2007 | .0228 |
| Total Indirect Effect | -.2263 | .0351 | -.2978 | -.1623 |

CI confidence interval, *LL* lower limit, *UL* upper limit

Table 4. Indirect Effect of Mindfulness on Depressive Symptoms via Social Comparisons, FoMO, and Passive Social Media Use

| Path | Coefficient | SE | 95% CI | |
|---|-------------|-------|--------|-------|
| | | | LL | UL |
| Mindfulness → Social Comparisons → Passive Social Media Use → Depression | .0067 | .0034 | .0008 | .0137 |
| Mindfulness → FoMO → Passive Social Media Use → Depression | .0036 | .0021 | .0004 | .0084 |
| Mindfulness → Depressive Symptoms | -.29 | .0298 | -.34 | -.23 |
| Total Indirect Effect | -.11 | .0182 | -.14 | -.07 |

CI confidence interval, *LL* lower limit, *UL* upper limit

Table 5. Stepwise Regression between Passive Social Media Use, Social Comparisons, Mindfulness, and Depressive Symptoms

| Step | Predictor Variables | <i>B</i> | <i>SE</i> | <i>p</i> | <i>R</i> ² |
|------|--------------------------|----------|-----------|----------|-----------------------|
| 1 | Passive Social Media Use | .086 | .027 | <.001 | .020*** |
| 2 | Passive Social Media Use | -.003 | .027 | .907 | .157*** |
| | Social Comparisons | .386 | .043 | <.001 | |
| 3 | Passive Social Media Use | -.035 | .024 | .140 | .324*** |
| | Social Comparisons | .213 | .041 | <.001 | |
| | Mindfulness | -.334 | .030 | <.001 | |

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

Table 6. Stepwise Regression between Passive Social Media Use, FoMO, Mindfulness, and Depressive Symptoms

| Step | Predictor Variables | <i>B</i> | <i>SE</i> | <i>p</i> | <i>R</i> ² |
|------|--------------------------|----------|-----------|----------|-----------------------|
| 1 | Passive Social Media Use | .086 | .027 | .001 | .020*** |
| 2 | Passive Social Media Use | -.028 | .025 | .276 | .243*** |
| | FoMO | .439 | .036 | <.001 | |
| 3 | Passive Social Media Use | -.053 | .023 | .023 | .373*** |
| | FoMO | .289 | .036 | <.001 | |
| | Mindfulness | -.296 | .029 | <.001 | |

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

Appendix B. Figures

Figure 1. The Hypothesized indirect relationship between mindfulness and passive social media use via social comparisons and FoMO

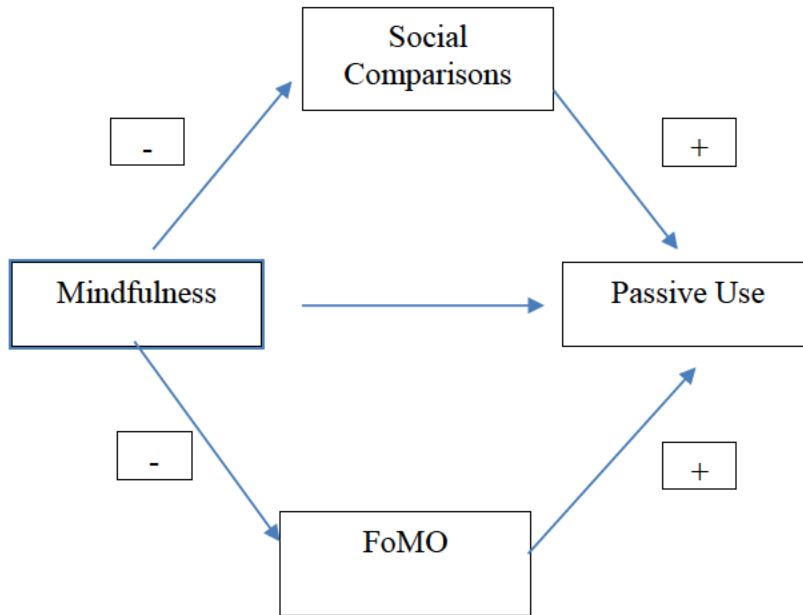


Figure 2. The hypothesized indirect relationship between mindfulness and depression via social comparisons, FoMO, and passive social media use

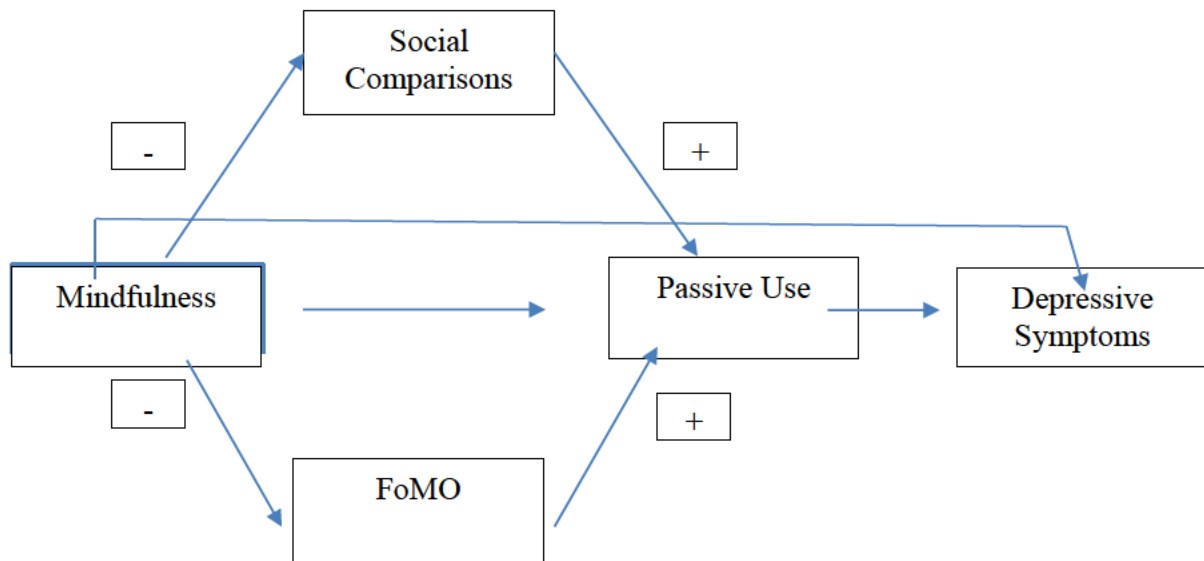


Figure 3. Distribution of Participant Mindfulness

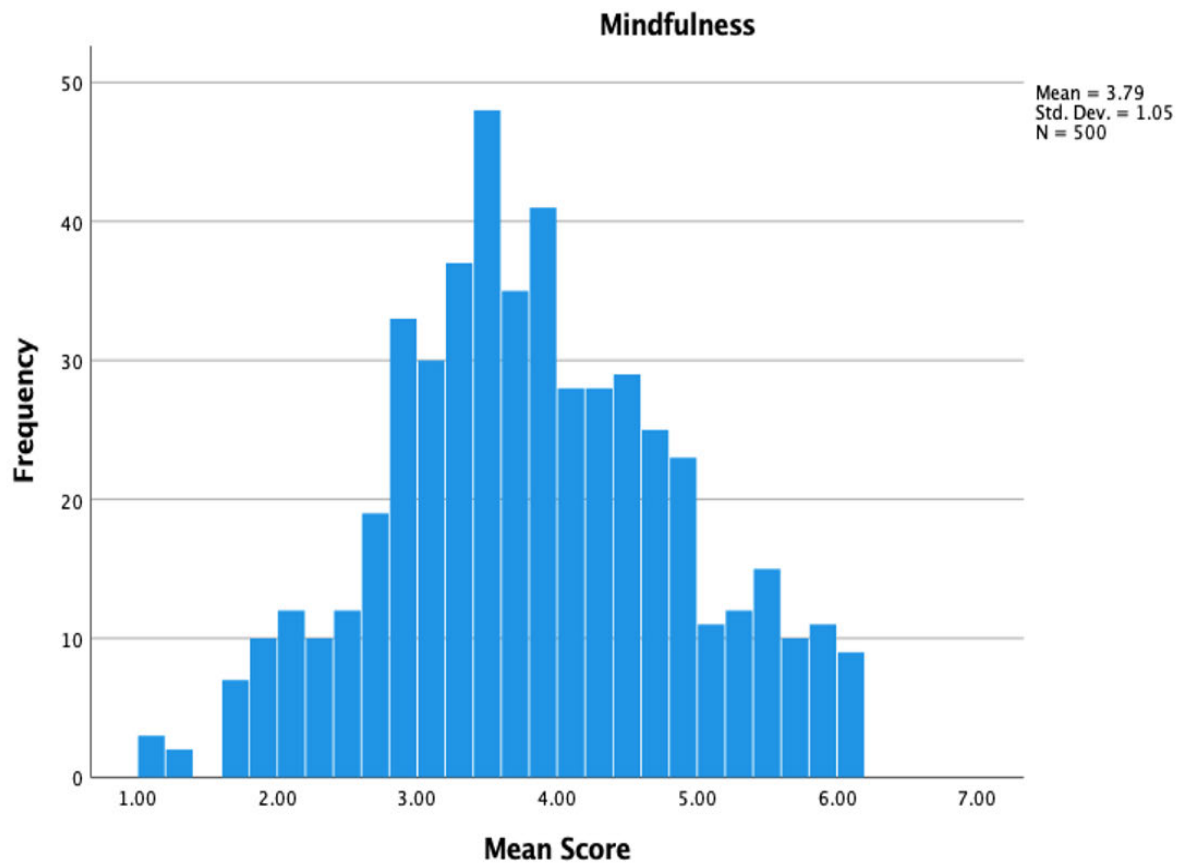
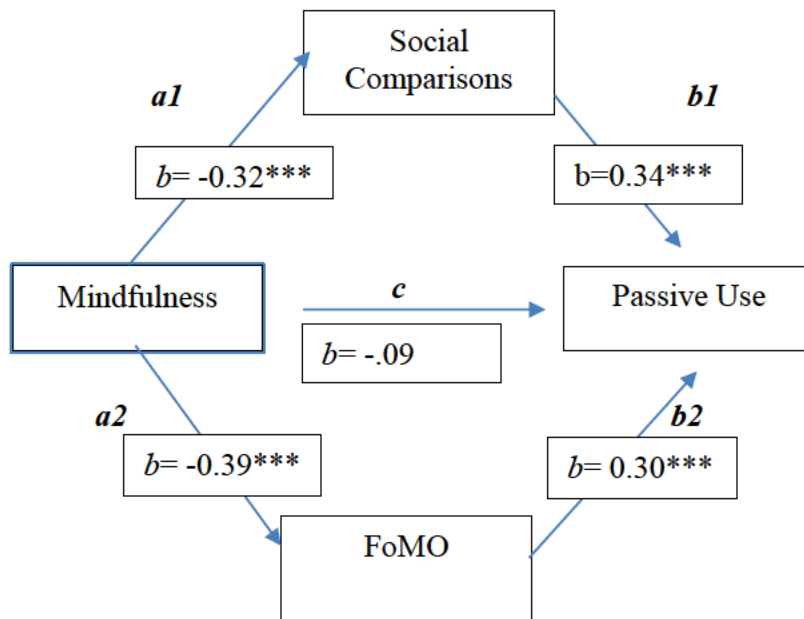
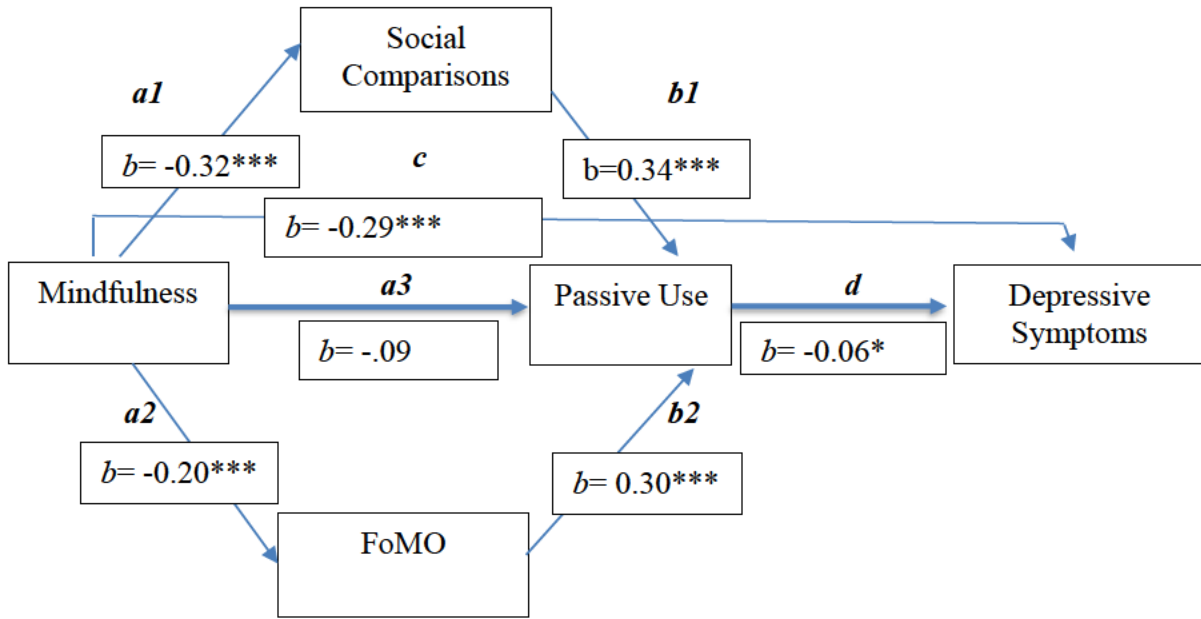


Figure 4. The indirect relationship between mindfulness and passive social media use via social comparisons and passive social media use and an indirect relationship between mindfulness and passive social media use via FoMO



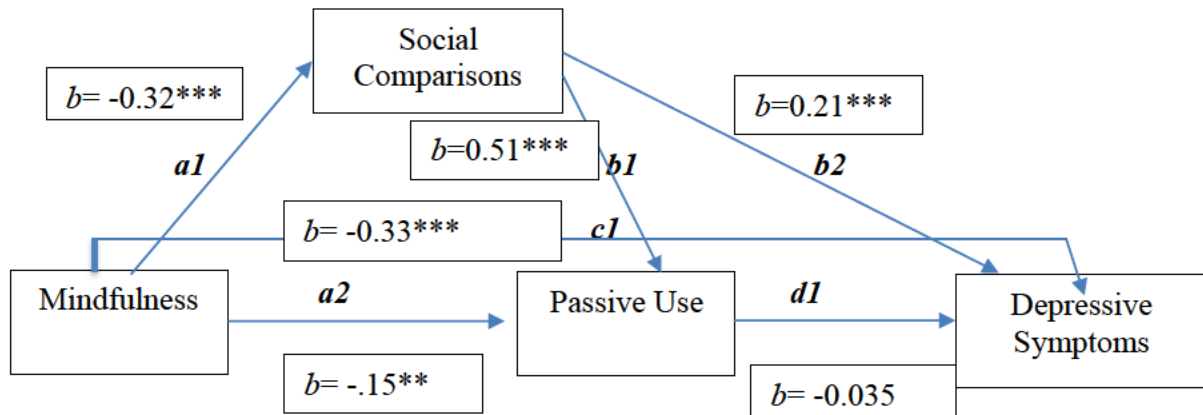
*= $p < .05$, **= $p < .01$, ***= $p < .001$

Figure 5 The indirect relationship between mindfulness and depression via social comparisons and passive social media use and an indirect relationship between mindfulness and depressive symptoms via FoMO and passive social media use



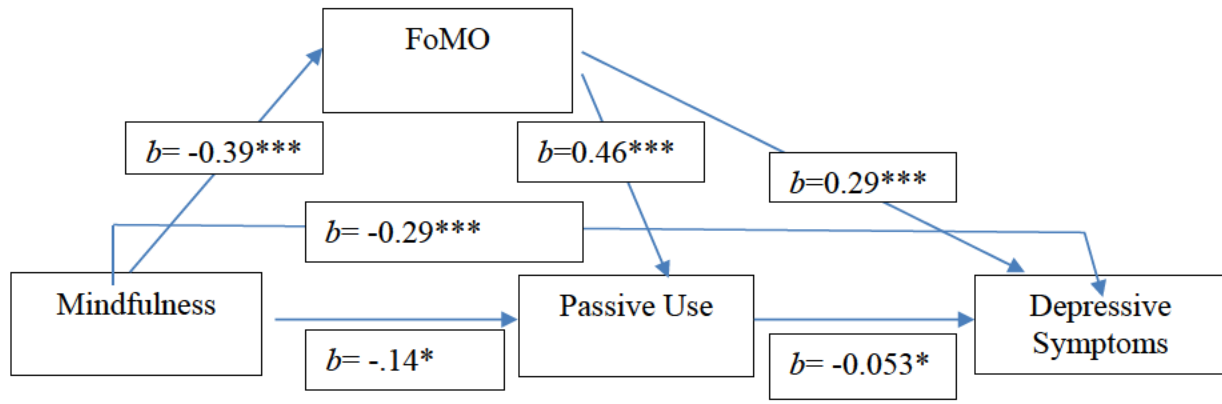
*= $p < .05$, **= $p < .01$, ***= $p < .001$

Figure 6 The indirect relationship between mindfulness and depressive symptoms via social comparisons and Passive Social Media use



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

Figure 7. The indirect relationship between mindfulness and depressive symptoms via FoMO and Passive Social Media use



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

Appendix C. Study Materials

Social Comparisons

Directions: Listed below are a number of statements concerning to what extent you compare yourself to others. Please read each statement carefully and consider the extent to which you think it is like you. There are no right or wrong answers, so please answer as honestly as you can.

Indicate the extent to which each statement is true of you according to the following scale: (1= disagree strongly; 2=disagree; 3 = neither agree nor disagree; 4 = agree; 5 = agree strongly)

1. When I am on social media, I compare how my loved ones (boy or girlfriend, family members, etc.) are doing with how others are doing.
2. When I am on social media, I always pay a lot of attention to how I do things compared to how others do things.
3. When I am on social media, if I want to find out how well I have done something, I compare what I have done to what others have done.
4. When I am on social media, I compare how I am doing socially (e.g. social skills, popularity) with other people.
5. When I am on social media, I don't compare myself with others.
6. When I am on social media, I compare myself with others with respect to what I have accomplished in life.
7. When I am on social media, I like to interact (chat, message, post on wall, etc.) with others about mutual opinions and experiences.
8. When I am on social media, I try to find out what others think who face similar problems as I face.
9. When I am on social media, I like to know what others in a similar situation would do.
10. When I am on social media, if I want to learn more about something, I try to find out what others think about it.

11. When I am on social media, I don't compare my situation in life relative to that of other people.

Passive Social Media Use

Directions: Below is a collection of statements about your social media use. Using the scale provided please indicate how frequently you engage in the following experiences (1=never, 7=several times per day).

1. How often do you visit a social media profile of a social media friend?
2. How often do you visit a social media profile of someone that does not belong to your friends list?
3. How often do you watch photos/posts of a social media friend?
4. How often do you watch photos/posts of a non-social media friend (someone not followed/friended)?