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Mindfulness as a mediator in the relationship between social media engagement and depression in young adults

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ABSTRACT

Social media engagement has been inconsistently linked to depression and it is important to determine whether specific motivations for engagement are linked to depression and what the mechanisms may be. This study investigated five factors of mindfulness as potential mediators between behavioral, affective, and cognitive social media engagement and depression. Participants (between 17 and 24 years old) at a university or found through social media (Reddit, Facebook, and Instagram; $N = 371$) were given the Five Factor Mindfulness Questionnaire (FFMQ), the Social Media Engagement Scale for Adolescents (SMES-A), and the Patient Health Questionnaire (PHQ-8), which measured depression. The awareness facet of mindfulness significantly mediated the relationship between all three social media engagement subscales (behavioral, affective, and cognitive) and depression. Additionally, there was a significant mediation between the affective engagement subscale and depression by the nonjudge, nonreact, and describe facets of mindfulness. Our results suggest that mindfulness is an important mechanism of the relationship between social media engagement and depression. The implementation of mindfulness-based interventions (MBIs) may be useful to help teach how to engage in social media mindfully and positively.

There is widespread public concern that social media use is linked to negative psychological effects, particularly depression (Twenge, Joiner, Rogers, & Martin, 2017). However, the research presents a more complex picture. Some correlational research has directly linked social media use and depression, including research that has examined these patterns over time (Lin et al., 2016; Twenge et al., 2017). Furthermore, another study found that reduced social media use decreased depression, indicating a potential causal connection (Hunt, Marx, Lipson, & Young, 2018). However, a meta-analysis by Seabrook, Kern, and Rickard (2016) revealed mixed results on the association between social media use and depression. They found that the relationship between problematic social media use and depression varied and depended on the quality of social media interactions. Another recent study showed no relationship between screen time and adolescent well-being (Orben & Przybylski, 2019). Furthermore, Davila et al. (2012) found that the quality of social media interactions was associated with depression, rather than simply quantity of social media use. Therefore, how people spend their time on social media, their motivation and type of engagement, and their mindset while engaging with it may be more important than use alone. These are particularly important issues to examine today because social media use has increased dramatically during the past year due to the coronavirus pandemic (Singh, Dixit, & Joshi, 2020; Singh, Singh, Mahato, & Hambour, 2020).

People may be motivated to engage with social media for different reasons. For example, they may engage because of behavioral reasons (i.e. habitually, to relax), cognitive reasons (i.e. connecting with friends, feeling support), or affective ones (i.e. they feel happier on social media, feel bored when cannot use social media; Ni et al., 2020). Recently, a social media engagement scale (Ni et al., 2020) operationalized these motivations. However, no research has been conducted on whether each type of social media engagement has different relationships with depression.

Several studies have attempted to identify mechanisms by which social media use may lead to depression. Such mechanisms include fear of missing out (FOMO) and social-comparison (Dempsey, O'Brien, Tiamiyu, & Elhai, 2019; Reer, Tang, & Quandt, 2019). For example, Dempsey et al. (2019) found that while Facebook use was not related to depression, Facebook addiction was related through the mediating variable of FOMO. In addition, Reer et al. (2019) found that both social comparison and FOMO mediated the relationship between reduced well-

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being and social media engagement. These studies suggest that people may judge themselves through FOMO and social comparison which leads to compulsive social media use.

Mindfulness is another variable that might mediate the relationship between social media use and engagement and depression. Mindfulness can be viewed as a combination of awareness of the environment with a nonjudgmental attitude to one's thoughts and sensations (Keng, Smoski, & Robins, 2011). Mindfulness has been found to lower levels of depression, as well as increase levels of well-being (Kircaburun, Griffiths, & Billieux, 2019). Being highly engaged with social media may act to distract individuals from being aware of their daily surroundings, thereby decreasing mindful awareness. Furthermore, high engagement in social media may increase self-judgment because of its impact on social comparison and FOMO. Indeed, higher levels of FOMO have been linked to lower levels of mindfulness (Baker, Krieger, & LeRoy, 2016).

However, while we view social media use and engagement as potentially decreasing mindfulness, the limited research on social media and mindfulness has viewed lack of mindfulness as a predictor of compulsive social media or mobile phone use, rather than a consequence. For example, one study found that low levels of mindfulness predicted decreased well-being which, in turn, predicted increased mobile phone use (Volkmer & Lermer, 2019). Another study found that mindful awareness was a mediator between anxious or avoidant attachment styles and the fear of being without a cellphone (Arpaci, Baloglu, Özteke Kozan, & Kesici, 2017). A third study found that mindful awareness lowered a participants' likelihood of compulsive social media use through increasing self-esteem and decreasing social anxiety (Apal'oza, Hartmann, D'Souza, & Gilsanz, 2019). In another study with Turkish participants, the relationship between psychological symptoms and Facebook addiction was mediated indirectly by mindful awareness (Eşkisu, Zekeriya, Gelibolu, & Rasmussen, 2020). All of these studies looked at low levels of mindfulness as a predictor of obsessive social media use or phone addiction. While lack of mindfulness could certainly predict social media addiction, we view mindfulness as a mechanism by which social media use may work to increase depression. To our knowledge, only one study has built a model in that direction, finding that social media addiction predicted emotional exhaustion through the mediating variable of mindfulness (Sriwilai & Charoensukmongkol, 2015).

Furthermore, while previous research has mainly focused on the awareness aspect of mindfulness, mindfulness is multifaceted. Mindfulness can be divided into five facets, such as in the Five Factor Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). In addition to the awareness facet, there are nonreact, describe, observe, and nonjudge facets. Nonreactivity and nonjudgement focus on internal feelings and experiences, observing focuses on external sensations and thoughts or feelings, and describe focuses on labeling feelings. While we expect the awareness factor to be a significant mediator as that is the most frequently investigated factor, other factors may influence depression as well. For example, the research on the negative effects of social comparison (e.g., Feinstein et al., 2013; Reer et al., 2019) points to the possible role of the nonjudgement facet, although nonjudgement is more about not judging one's own thoughts rather than refraining from judgment about how one is compared to other people. The role of other facets such as nonreactivity, describing emotions and observing are more exploratory. It is unclear which specific facets of mindfulness would act as mediators between social media engagement and depression.

Overall, previous literature on social media and depression has shown mixed results, which identifies a need for more research and a better understanding of the mechanisms by which social media use and engagement may predict depression. Previous research on mindfulness has focused on social media use as the outcome variable, not as the predictor (Apal'oza et al., 2019; Arpaci et al., 2017; Dempsey et al., 2019). Additionally, this research has typically focused solely on the awareness facet of mindfulness (Apal'oza et al., 2019). In our study, we plan to look at all five facets of mindfulness since research has not examined which mindfulness facet may be most negatively influenced by engagement with social media. Overall, we hypothesize that social media engagement will be negatively correlated with all five mindfulness facets and positively correlated with depression in young adults. Furthermore, we hypothesize that the facets of mindfulness will mediate the relationship between social media engagement and depression.

1. Method

1.1. Participants

Our goal sample size was 400 participants since at this sample size, small and medium effects are detected at 0.8 power (Fritz & Mackinnon, 2007). In order to reach this goal, we enlisted participants through a general psychology participant pool at a public liberal arts college in the Southeast United States ($N = 271$). We chose to use this data collection method because students in the general psychology class at this school are encouraged to participate in research studies by receiving partial course credit for their participation. As we did not recruit sufficient participants to reach our goal through the participant pool, we supplemented this recruitment method by posting the survey link on social media (Facebook, Instagram, and Reddit, $N = 100$). Our final sample was 371 which fell short of the goal of 400 because responses had plateaued and the time constraints of the academic year necessitated that we complete our data collection.

Participants' ages ranged from 17 to 24 ($M = 19.33$, $SD = 1.59$). The majority, ($n = 266$; 71.7%), of our participants identified as White, followed by 8.6% ($n = 32$) identified as Latinx, 7.5% ($n = 28$) identified as African American/Black, 5.7% ($n = 21$) identified as Multiracial, 1.9% ($n = 7$) identified as South Asian, 1.6% ($n = 6$) identified as East Asian, 1.6% ($n = 6$) identified as other, 0.5% ($n = 2$) identified as Middle Eastern, and 0.3% ($n = 1$) identified as Native Hawaiian or other Pacific Islander. Two participants (0.5%) chose not to identify. A large majority, 78.7% ($n = 292$), of our participants identified as female; 18.6% ($n = 69$) identified as male, and 2.2% ($n = 8$) identified in a different way.

1.2. Procedures and measures

As noted above, participants recruited via the participant pool were granted partial credit through their general psychology class for their participation in the study; participants recruited online were not compensated for their participation. The age range for this study was 17–24 and participants over the age of 25 were excluded. Participants who were 17 years old were only able to participate if they were recruited through the participant pool and parental consent was on file with the Department of Psychological Science. Other than the age restriction, no other inclusion or exclusion criteria were used. Participants completed an online anonymous survey through Qualtrics. After reading an informed consent form and giving consent they completed the following measures, and then reported the demographic information described above.

1.3. Mindfulness

The Five Factor Mindfulness Questionnaire (FFMQ) is a 39-item questionnaire created by Baer et al. (2006) to measure the five facets of mindfulness on a scale from 1 (never/rarely true of me) to 5 (very often/always true of me). The five facets of mindfulness are nonreact (e.g., “Usually when I have distressing thoughts or images, I am able just to notice them without reacting.”), observe (e.g., “When I'm walking, I deliberately notice the sensations of my body moving.”), aware (e.g., “I do jobs or tasks automatically, without being aware of what I'm doing.” – reverse coded), describe (e.g., “I'm good at finding the words to describe my feelings.”), and nonjudge (e.g., “I make judgments about whether my thoughts are good or bad.” – reverse coded). Each facet of mindfulness

had good internal reliability in the original study: nonreact (α = 0.75), observe (α = 0.83), aware (α = 0.87), describe (α = 0.91), and nonjudge (α = 0.87). In the current study, the reliability for each of the five facets was good: nonreact (α = 0.76), observe (α = 0.71), aware (α = 0.87), describe (α = 0.90), and nonjudge (α = 0.91). Each facet of mindfulness was scored such that higher scores indicated higher levels of mindfulness.

1.4. Social Media Engagement

The Social Media Engagement Scale (SMES-A; Ni et al., 2020) is an 11-item measure which assesses the level of social media engagement in adolescents. The questionnaire looks at social media engagement through three subscales: affective engagement (e.g., "I feel bored when I can't use social media"), behavioral engagement (e.g., "Using social media is my daily habit"), and cognitive engagement (e.g., "The support and encouragement of others on social media is very important to me"). Responses to all items were scored on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). In the original investigation, each subscale, affective engagement (α = 0.80), behavioral engagement (α = 0.80), and cognitive engagement (α = 0.71), had good reliability. In the current study, the alphas were: affective engagement (α = 0.80), behavioral engagement (α = 0.87), and cognitive engagement (α = 0.71).

1.5. Depression

The Patient Health Questionnaire (PHQ-8) consists of eight items that measure symptoms of depression (Kroenke et al., 2009). The items are rated on a scale from (0) "not at all" to (3) "nearly every day" over the last two weeks. This measure includes questions like "feeling down, depressed, or hopeless?" and "Trouble concentrating on things, such as reading the newspaper or watching television?" Participants' scores on these items were summed and interpreted as the higher scores having more symptoms of depression. This measure has consistently high reliability in previous research; in this current study, the reliability of the PHQ-8 was (α = 0.90).

2. Results

The means, standard deviations, and ranges for our study are listed in Table 1, while the correlations are depicted in Table 2. In our sample, according to cutoff scores determined by Kroenke et al. (2009), 30.3% of young adults had scores of minimal depression on the PHQ-8, 28.7% had mild depression, 19.5% had moderate depression, 10.8% had moderately severe depression, and 10.6% had severe depression.

The behavioral and cognitive subscales of the SMESA were significantly negatively correlated with only one facet of mindfulness, awareness. The affective subscale was significantly negatively correlated with the awareness, nonjudgement, describe, and nonreactivity facets of mindfulness. Both the behavioral and affective subscales were significantly positively correlated with depression. Depression was significantly negatively correlated with all of the mindfulness scales, except for the observe subscale.

Table 1
Descriptive statistics.

Measures	*M*	*SD*	Actual range	Possible range
1. SMESA	3.03	0.79	1–5	1–5
2. Behavioral	3.93	1.02	1–5	1–5
3. Cognitive	2.87	1.00	1–5	1–5
4. Affective	2.26	0.87	1–5	1–5
5. Awareness	2.76	0.84	1–5	1–8
6. Nonjudge	2.74	0.98	1–5	1–8
7. Nonreact	2.80	0.67	1.14–4.29	1–7
8. Observe	3.40	0.68	1.50–5.00	1–8
9. Describe	3.00	0.91	1–5	1–8
10. Depression (PHQ-8)	9.12	6.70	0–24	0–24

Note. n = 368.

We tested the possible mediation of each facet of mindfulness between the relationship of the SMESA subscales and depression (Hayes, 2018; Model 4). Completely standardized indirect effects, simple effect, and upper and lower confidence intervals are listed in Table 3. The awareness facet mediated the relationship between the cognitive subscale and depression. This explained 34.98% of the variance in the depression scores, $F(2, 366) = 105.87$, $p < .001$. It also mediated the relationship between the behavioral subscale and depression. This explained 34.98% of the variance in the depression scores, $F(2, 366) = 107.26$, $p < .001$.

The awareness facet mediated the relationship between the affective subscale and depression, explaining 35.55% of the variance in the depression scores, $F(2, 365) = 113.29$, $p < .001$. The nonjudgement facet mediated the relationship between the affective subscale and depression. This explained 31.28% of the variance in the depression scores, $F(2, 365) = 93.72$, $p < .001$. The nonreactivity facet mediated the relationship between the affective subscale and depression, which explained 12.01% of the variance in the depression scores, $F(2, 365) = 27.20$, $p < .001$. Finally, the describe facet mediated the relationship between the affective subscale and depression. This explained 14.48% of the variance in the depression scores, $F(2, 365) = 33.42$, $p < .001$. No other mediation was significant and all mediation analyses can be viewed in Figs. 1, 2 and 3.

3. Discussion

The purpose of this study was to investigate mindfulness as a mediator in the relationship between social media engagement and depression. We hypothesized that increased social media engagement would predict decreased mindfulness, which, in turn, would predict increased depression in young adults. Our hypothesis was partially supported; mindful awareness mediated the relationship between all three subscales of social media engagement and depression. Furthermore, the nonjudgement, nonreactivity, and describe facets also mediated the relationship between the affective subscale and depression. Our findings are consistent with previous research that investigated a similar model, mindfulness as a mediator in the relationship between social media addiction and emotional exhaustion (Sriwilai & Charoensukmongkol, 2015), but extends this model to address social media engagement rather than addiction, and depression rather than emotional exhaustion.

The relationship between behavioral, cognitive, and affective social media engagement and depression was significantly mediated by mindful awareness. Despite how one may engage with social media, if they are focused on social media they are less likely to be aware of their surroundings and the present moment, which could lead to increased depressive symptomatology. Engaging in social media may often be done mindlessly which may make individuals feel out of touch with the here and now, which may contribute to depression. This finding is consistent with previous literature that has linked lack of mindful awareness to greater social media use and addiction (Apal'oza et al., 2019; Eşkisu et al., 2020). The current findings contribute to our understanding as it conceptualizes lowered awareness as a consequence of social media use rather than as a factor that may predict increased social media use and addiction.

The relationship between the affective social media engagement subscale and depression was mediated by the awareness, nonjudgement, nonreactivity, and describe facets of mindfulness. Increased affective engagement with social media means engaging with social media to cope with emotions. When individuals do this, they appear to be more likely to notice and react to their negative emotions (lower scores on nonreactivity), which may contribute to symptoms of depression. Seeking out social media for emotion management was also related to greater negative judgment of one's thoughts of emotions (lower scores

Table 2
Correlations.

Measures	Correlation									
	1	2	3	4	5	6	7	8	9	10
1. SMESA	–									
2. Behavioral	0.848**	–								
3. Cognitive	0.797**	0.522**	–							
4. Affective	0.817**	0.500**	0.522**	–						
5. Aware	−0.260**	−0.208**	−0.141**	−0.271**	–					
6. Nonjudgement	−0.142**	−0.070	−0.079	−0.204**	0.443**	–				
7. Nonreactivity	−0.088	−0.063	−0.039	−0.110*	0.223**	0.298**	–			
8. Observe	−0.008	0.006	0.020	−0.047	−0.013	−0.079	0.257**	–		
9. Describe	−0.076	−0.008	−0.010	−0.175**	0.336**	0.331**	0.289**	0.139**	–	
10. Depression (PHQ-8)	0.196**	0.163**	0.047	0.250**	−0.590**	−0.535**	−0.267**	0.082	−0.326**	–

Note. $n = 368$.
** $p < .01$.
* $p < .05$.

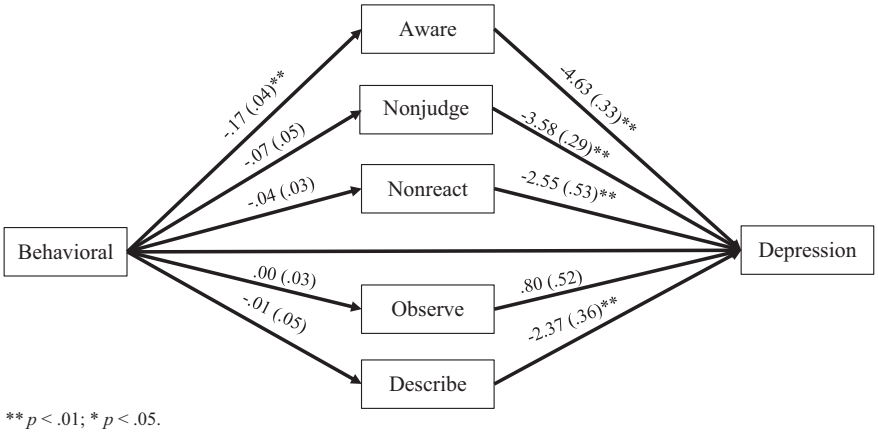
Table 3
Confidence intervals (CI) for mediation analyses.

	Effect	SE	BootLLCI	BootULCI
Cognitive SME				
→ aware → depression	0.0877	0.0331	0.0245	0.1542
→ non-judge → depression	0.0406	0.0281	−0.0141	0.0961
→ non-react → depression	0.0111	0.0153	−0.0171	0.0434
→ observe → depression	0.0019	0.0052	−0.0078	0.0138
→ describe → depression	0.0024	0.0180	−0.0324	0.0377
Behavioral SME				
→ aware → depression	0.1217	0.0313	0.0610	0.1829
→ non-judge → depression	0.0369	0.0268	−0.0145	0.0889
→ non-react → depression	0.0163	0.0141	−0.0087	0.0463
→ observe → depression	0.0005	0.0049	−0.0098	0.0112
→ describe → depression	0.0026	0.0166	−0.0301	0.0358
Affective SME				
→ aware → depression	0.1547	0.0292	0.0981	0.2115
→ non-judge → depression	0.1024	0.0265	0.0510	0.1543
→ non-react → depression	0.0270	0.0145	0.0016	0.0583
→ observe → depression	−0.0042	0.0059	−0.0185	0.0049
→ describe → depression	0.0506	0.0168	0.0197	0.0851

on non-judgment) which was, in turn, related to increased symptoms of depression. However, it is important to note that the relationships between social media engagement and both non-judgment and non-reactivity were relatively small; in fact despite the significant mediation with nonreactivity, social media engagement did not have any significant bivariate relationships with nonreactivity and only affective engagement had a significant bivariate relationship to nonjudgment.

It is possible that the role of nonjudgment and nonreactivity to affective engagement may be influenced by how individuals feel about their tendency to use social media as a substitute for in-person relationships. Individuals may be self-critical of their tendency to rely on social media for social support instead of using in person interaction. Leaning on social media for emotional support may lead the user to withdraw from in person socialization and isolate themselves, which may be related to increased judgment about one's thoughts and self. This withdrawal and isolation may increase depression; indeed, previous research has found that social support was significantly associated with greater mindfulness and lower depression (Wilson, Weiss, & Shook, 2020). Other research has found that social anxiety has been related to lower levels of mindfulness, (Singh et al., 2020). The ways in which these variables relate to decreased in-person social support, especially in the time of COVID-19, merits further investigation.

Using social media as emotional support was also related to a reduced ability to describe one's emotions, which also, in turn, predicted symptoms of depression. This may be because using social media for emotional support undermines the potential for deep conversation that is typically facilitated in-person. Social media use has been linked to alexithymia - or the inability to recognize and describe feelings (Mersin, İbrahimoğlu, Kılıç, & Kahraman, 2019). Additionally, alexithymia has been associated with depression (Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamäki, 2000). Furthermore, the use of emojis as a means to express emotions may interfere with the ability to articulate emotions in words. When people use a crying face icon to depict feeling upset rather than writing out their feelings, they may start to lose their ability to properly describe their emotions, which then may be related to increased depressive symptoms. Research has indicated that individuals, especially those who are lower in emotional intelligence, often over-interpret emojis, giving them more meaning than may have been



** $p < .01$; * $p < .05$.

Fig. 1. SMESA subscale behavioral mediation analysis ** $p < .01$; * $p < .05$.

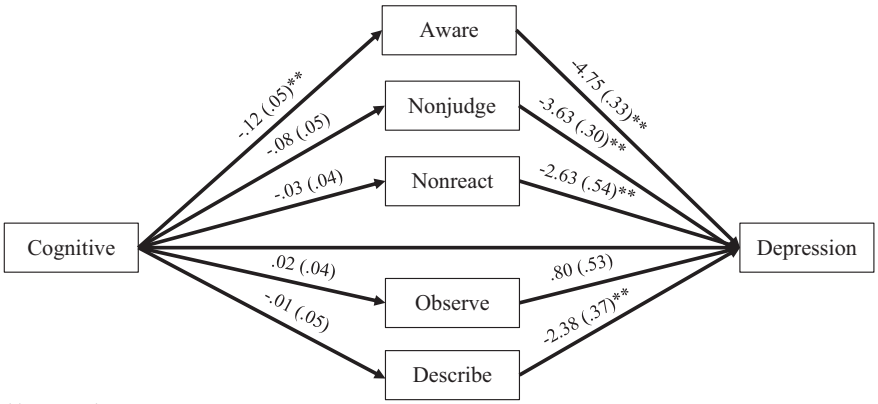


Fig. 2. SMESA subscale cognitive mediation analysis ** $p < .01$; * $p < .05$.

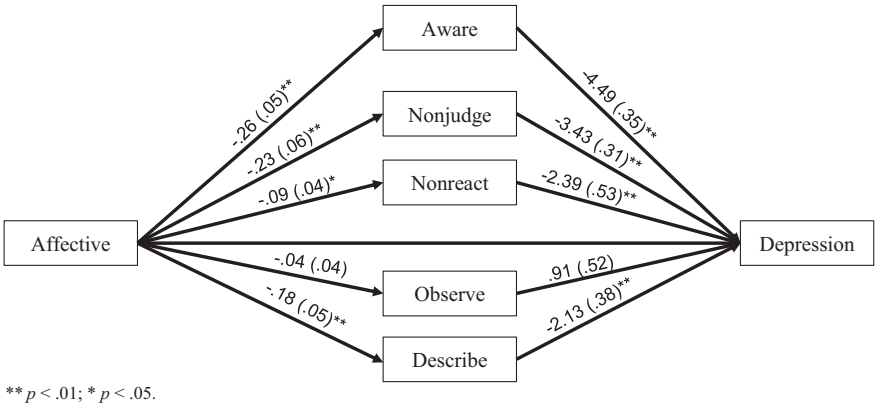


Fig. 3. SMESA subscale affective mediation analysis ** $p < .01$; * $p < .05$.

intended (Völker & Mannheim, 2021). Overall, using social media for emotion management may be harming our desire and ability to have sophisticated and deep conversations with others. How these factors specifically relate to emoji use would be useful to study in future research.

4. Limitations and future research

One limitation of our study is that our participant pool was homogeneous, consisting largely of white females. This limits the generalizability of our study; future research should attempt to replicate these findings in a more diverse sample. Additionally, we were limited in our recruitment within the University participant pool to general psychology course students because they gained course credit for their participation; therefore, we were unable to recruit from other departments within the University. However, students from all disciplines take general psychology as it is a widely enrolled general education course. Additionally, we did not ask whether they had an academic background or knowledge about the topics of depression or mindfulness. However, the general psychology students were recruited early in the semester and in most general psychology classes, mental health is covered later in the semester. Furthermore, while we did not reach the goal sample size of 400, due to plateau of new responses and time constraints of the school semester, we did reach a sample size of 371. While our study may have been slightly under powered to detect small effects at 0.8 power, we still found many significant effects.

A final limitation is that the direction of this relationship between social media engagement, mindfulness, and depression may also be reversed. While we found that social media engagement predicted decreased mindfulness and increased depression, it is possible that this could also work in the opposite direction. While it is well established that lower mindfulness may increase social media use and addiction (Apal'oza et al., 2019; Eşkisu et al., 2020), it is also possible that depression may increase social media engagement by decreasing levels of mindfulness. Despite the limitations, our study contributes to the small body of literature that studies the relationship between social media and mindfulness. Our study finds that decreased mindfulness may be a negative effect of social media engagement, particularly engagement designed for emotion management. The coronavirus pandemic may be magnifying this phenomenon, forcing people to rely on social media to engage with friends rather than having in-person interactions.

Our study also suggests that mindfulness interventions can help individuals be more aware of their surroundings, feelings, or thoughts while engaging in social media. As mindfulness based interventions may help people use and engage with social media in a positive way (Weaver & Swank, 2019), the use of mindfulness techniques (e.g. grounding activities) may be beneficial to an individual after engaging in social media in order to refocus their attention. Therefore, future research should specifically investigate whether mindfulness interventions could be targeted to help individuals use social media in a more mindful manner, which could potentially decrease its negative effects.

CRediT authorship contribution statement

All of the authors worked on the conceptualization and development of this manuscript under the supervision of Dr. Miriam Liss, the last and corresponding author. Amelia Jones, the first author, did the bulk of the writing of the initial drafts. All of the other authors contributed to the

editing and writing equally to each other.

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