

**Mindfulness as a Mediator in the Relationship between Social Media Engagement and  
Covid-19 related Distress**

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### **Abstract**

As in times of the Covid-19 pandemic many personal and societal variables change, such as the time spent online, it creates a need to investigate whether negative consequences result from this. This study sought to examine the relationship between social media engagement, mindfulness, and Covid-19 related distress. Based on previous research, it was hypothesized that mindfulness would mediate the relationship between social media engagement and Covid-related distress in negative direction (hypothesis 1). Therein contained, it was expected to find a negative association between mindfulness and social media engagement; a negative association between mindfulness and Covid-19 related distress, and a positive relationship between social media engagement and Covid-19 related distress. Further, it was hypothesized that Covid-19 related perceived information overload (PIO, hypothesis 2a) and fear of missing out (FOMO, hypothesis 2b) would strengthen the relationship between social media engagement and Covid-19 related distress. The current study is characterized by a cross-sectional design which included 140 participants that were recruited via Amazon Mechanical Turk (male = 83, *M age* = 36.42, *SD* = 11.89). The results support hypothesis 1 and hypothesis 2b. The finding that mindfulness indeed acts as a mediator, points in the direction of developing mindfulness-based interventions that may effectively guide the way how social media should be approached to face less aversive affective outcomes. Further practical implications are to consider FOMO as a possible warning signal of subsequent Covid-19 related distress.

*Keywords: social media engagement, mindfulness, Covid-19 related distress, perceived information overload, fear of missing out, mediation*

### **Mindfulness as a Mediator in the Relationship between Social Media Engagement and Covid-19 related Distress**

The world was recently in a state of a health crisis. Never in human history has a virus infected the entire world so uniformly (World Health Organization, 2020). The impacts on a physical and psychological level of this pandemic are manifold and far-reaching. Many countries experience an all-time high prevalence of negative affect disorders, such as anxiety or depression (Cullen et al., 2020; Ettman et al., 2020). In addition to increases in mental health problems, the Covid-19 pandemic also represents a major disruption of functioning in various aspects of daily living. Great societal and economic impacts are challenging populations (Kabadayi et al., 2020). During such circumstances, many lifestyle factors change, such as the time spent on virtual platforms. People tend to engage more in various media, but especially in social media (Luo et al., 2021). As there lie benefits (Latikka et al., 2021; Wu et al., 2022) and disadvantages (Liang et al., 2022) in social media engagement during times of a health crisis, this research aims to disentangle the relationship further.

There is an emerging link in the literature indicating that increased social media use correlates with heightened Covid-19 distress (Bazán, et al., 2020; Hammad & Alqarni, 2021) as well as with the prevalence of anxiety and depression or a combination of both (Gao et al., 2020). This research intends to investigate the relationship between social media engagement and Covid-19 related distress. In addition, as trait mindfulness could mitigate various negative affective outcomes (Sharma & Kumar, 2021), this research aims to investigate whether trait mindfulness may decrease Covid-19 related distress to some extent.

### **Social Media, Mental Health, and Global Crisis**

The implications of social media engagement need to be considered in the light of a global crisis as potential changes may result from this, such as a different manner or frequency of using social media. The Covid-19 pandemic exemplifies a global crisis in that it disrupts areas of functioning on a societal and economic level (Kabadayi et al., 2020), which

creates a widespread loss of human, economic, material, and environmental resources. The impacts are catastrophic in that they are long-lasting and exceed the ability of the community to recover without complications (Azer et al., 2021). During times of crisis, generally, an increase in communication can be most often seen (Arens, 2020; Fraustino et al., 2012; Han & Wang, 2019). This manifests in various communicational channels, such as in-person communication, media consumption, communication on social media, and others. This increased pattern of communication functions as a means of conveying information, allocating resources, and articulating solutions to problems (SDR.gov, 2005; Wang & Yang, 2020). During times of the pandemic which includes prolonged periods under quarantines, especially virtual communication tends to increase (Luo et al., 2021). Since the start of the pandemic, platforms, such as Twitter or Instagram had an increase in usage of 61% (Singh et al., 2020). Hence, the crisis pattern of increased communication was reflected on various social media platforms.

There are advantages and disadvantages in the context of high social media use in the light of a pandemic. One positive effect lies in the distribution of news. During the Covid-19 pandemic, social media platforms became a major supplier of news on recent developments all around the world (Wang & Yang, 2020). Social media channels, such as Instagram or Facebook whose main purpose is not the providing of information, but to connect individuals, transitioned into a public source of news supply (Niknam et al., 2021). Due to social media's high usage (Wolfers & Utz, 2022), information can reach many people quickly. Hence, it can contribute to the wider spanning of news networks, thereby keeping large amounts of people informed about updates and new regulations regarding pandemic policies (Garfin et al., 2020).

Additionally, social media can provide a feeling of connectedness, which many individuals felt deprived of during the pandemic (De Souza et al., 2020). Since humans are considered highly social beings (Fiske, 2018), the orientation toward an alternative way of connecting to others is likely to occur (Usher et al., 2020). Underlying this may be the finding

that a lack of interpersonal attachment is linked to poor physical and mental health (Baumeister & Leary, 1992). Hence, many individuals sought to compensate for this vacuum of social proximity by spending more time online (Nabity-Grover et al., 2021). There, a virtual feeling of closeness can be pursued. The intrinsic psycho-social motivations to engage in social media platforms include emotional needs, self-reassurance, support seeking, humor, coping, maintaining a feeling of connectedness, or altruism (CDC.gov, 2019; Procopio & Procopio, 2017). Thereby, social media can also counteract the perceived distance to others as a result of the pandemic, and the various regulations, such as lockdowns (Latikka et al., 2021). Hence, social media fulfils some crucial functions in times of a pandemic. These are mainly emphasized in reducing the perceived social distance to others and informing great amounts of people about recent pandemic-related developments.

Albeit, it is important to consider the potential adverse effects of social media engagement during the pandemic. There is a vivid debate about the negative effects social media can have on mental health. Nevertheless, the literature is composed of mixed results concerning a consistent link between mental health complaints and increased social media engagement (Coyne et al., 2020). Since the start of the pandemic an increase in the prevalence of anxiety, depression, and distress could be observed (Gao et al., 2021; Lakhan et al., 2020). Hence, it may be useful to examine the link between these three constructs and social media engagement. While some studies indicate a strong association between social media engagement and levels of depression and anxiety (Lin et al., 2016; Twenge et al., 2017), others demonstrate this association depends on the nature of the virtual social interactions, namely, quality over quantity that matters (Davila et al., 2012; Seabrook et al., 2016). In contrast, another study showed no relationship neither to depression nor anxiety (Orben & Przybylski, 2019). Another study linked increased anxiety to high social media engagement (Phillips & Wisniewski, 2021). However, a recent meta-analysis by Seabrook and colleagues (2017) is in favor of the hypothesis that the quality of interactions is crucial regarding

depression (Luo et al., 2021). According to their findings, it matters how people invest their time online as opposed to how much time people invest, namely, the motivation to engage in and the mindset they have while spending time on social media. This means active engagement in social media rather than passive, may lead to more positive affective outcomes (Verduyn et al., 2021). In sum, the associations between social media engagement and depression, and anxiety are mixed but a link between them is recurrent in the literature also in combination with distress (Keles et al., 2020).

Regarding social media use during times of a pandemic, there are two main domains in which distress can arise. First, the social domain (Kamoshida et al., 2022), in which individuals might feel challenged by deprivation of social needs. Second, the information-level domain (Hwang et al., 2020), in which individuals can feel overwhelmed by the wealth of information regarding the pandemic. The social domain concerns circumstances in which people might have undergone social isolation, quarantines, and prolonged reduced contact with other people. To still maintain a feeling of a community, many people engage in increased social media use (Singh et al., 2020). Here they encounter other people's lives while being restricted due to the pandemic. This can become troublesome when individuals display their lives, such as through Instagram stories while others are restricted. This then can evoke fear of missing out (FOMO; Drempey et al., 2019). It is defined as the awareness of the potential miss-out on social events or information of their social network (Przybylski et al., 2013) thereby creating distress due to the creation of an unmet social need. To satisfy this unmet need, many people tend to engage in more media use as a response, thereby fuelling a self-perpetuating cycle (Dhir et al., 2018). FOMO has been linked by previous research to internet addiction and psychological distress (Beyens et al., 2016; Lian et al., 2022). In this vein, it is also interesting to mention that the tendency to self-disclose changed during the pandemic (Nabity-Grover et al., 2021). Individuals tend to share more personal things on social media compared to pre-pandemic. This may potentially strengthen the occurrence of

FOMO. It can be assumed that the more detailed and personal online representations of other people's lives are, the greater may be the impact on the feeling of missing out on something. This follows the logic that the recipient of this social media input may perceive the discrepancy between their life and the online person's life as even greater if there is more detailed input available.

Regarding the information-level domain, potential challenges lie within the phenomenon of perceived information overload (PIO). Previous literature identified potential drawbacks of high social media use characterized by too much information available which is not comprehended adequately (Lui, et al., 2021). PIO has been linked to online social anxiety, fatigue, and depression (Hwang et al., 2020; Tandon et al., 2021; Torales et al., 2022). In this context, the term "infodemic" has been brought forward by the WHO (2021). It is defined as news concerning the Covid-19 pandemic, that are too high in numbers, and oftentimes false. It takes place when the individual threshold for information that is comprehensible, is surpassed (Torales et al., 2022). It can occur whenever an individual engages in social media without the intention of receiving Covid-19 news but is confronted, nevertheless. This contributes to the overwhelming of users and may impact their psychological well-being (Islam et al., 2020) since it can make individuals feel fearful of the future (Torales et al., 2022).

The perceptual state of individuals during the pandemic by which social media input is received is partially different than during normal times. During the Covid-19 pandemic primarily an increase of negative affective factors is present in individuals (Addo et al., 2020; Cullen et al., 2020; Ettman et al., 2020). Negative factors include increased fear, anxiety, uncertainty, panic, hopelessness, and denial. The sum of these factors may influence an individual's state of mind. In turn, this may change the processing of information, which may lead to a different satisfaction of the beforementioned psycho-social motivations to engage (CDC.gov., 2019). For instance, consuming pandemic-related news while having increased fear, may strengthen the fearful state. Or engaging in social media for proximity seeking



while feeling anxious due to the pandemic, might make individuals more anxious than usual since actual interaction is absent (Wang et al., 2019). Quintessentially, the more individuals check the more nervous they may get instead of the opposite intended effect. This applies to concerns within the social and information domain. Meaning, more frequent checking may lead to a more negative prospect toward the future due to the prevalence of negative Covid-19 related news available. Then PIO can be the consequence. Additionally, frequent checking may foster the perceived discrepancy between the online person's life and their own life, potentially leading to an increase in FOMO. Thus, motives to engage will oftentimes be pursued with a different, more negative valence compared to non-crisis situations (Ado et al., 2020). Thereby, social media engagement can also lead to detrimental effects in the face of a health crisis manifesting in an intensification of negative affective states. Hence, the advantageous aspects of social media, such as arranging social interaction and the providing of news, may also backfire in times of a pandemic.

In sum, since the beginning of the pandemic, the use of social media increased drastically. Further, the content on social media has changed greatly too, in that pandemic-related content has become more prevalent. Further, the perceptual state by which individuals perceive this input differs as well, manifesting in an increase in negative processing factors leading to a different satisfaction of psycho-social motivations to engage in social media. Considering these changes, the societal implications may be potentially great. Covid-19 related distress is a widespread complaint (Kessler, et al., 2021). Looking at the current insights, it might be attributable to some extent to the relation between high social media use and the burdens of the pandemic. Hence, there seems to be a demand to research ways of reducing distress that results from high social media consumption, and possibly, look at potential factors that might influence an individual's susceptibility to media distress

### **Mindfulness**

One method which can help individuals cope with various negative affects (i.e., stress, depression, anxiety; Bishop et al., 2004; Sharma & Kumar, 2021) related to social media use could be mindfulness. Mindfulness may work as a filter for navigating social media input in a healthier manner (Jones et al., 2021). In short, “Mindfulness can be thought of as an open-hearted, moment-to-moment, non-judgmental awareness.” (Kabat-Zinn, 2005, p.27). Further, the definition contains a combination of different attitudes towards an individual’s sensations and thoughts. These are to be non-reactive, non-judgemental, and aware (Keng et al., 2011). For the purpose of this research, these three attitudes will be referred to throughout, these are non-react, non-judge and to be aware, respectively. Overall, previous research associated mindfulness with high levels of well-being and low levels of depression (Kircaburum et al., 2019). In the context of the current Covid-19 pandemic, mindfulness has been linked to decreased levels of Covid-19 related distress compared to less mindful individuals (Dillard & Meier, 2019; Simonsson et al., 2021). Hence, mindfulness seems to be effective in reducing a variety of negative affects, such as lowering levels of depression and distress in different contexts, such as during the pandemic and before.

Regarding social media engagement, mindful behavior can be advantageous since it can assist the process of distancing oneself from the input of the media. This may be emphasized by perceiving media input as more external and less personally affecting when acting according to the mindful attitudes of non-react, non-judge, and aware. Individuals may be more able to process media content and the accompanying thoughts in a more mindful manner. Multiple prior studies linked mindfulness to healthier social media engagement (Jones et al., 2021; Sriwalai & Charoensukmongkol, 2015). For instance, seeing displays of other people’s life on Instagram while being quarantined can result in feelings of frustration. Having a mindful attitude internalized through repeated practice, first, might make people aware that it is natural to experience feelings of frustration in this regard, second, make people less judgmental towards these kinds of emotions, and third, people less reactive to these

feelings. Thereby, aversive thought patterns can be perceived as more detached from the self and easier to let go of. Overall, compared to less mindful individuals it is assumed that mindful individuals will be able to navigate media input in a more positive, healthier manner, which is referred to as mindful use (Jones et al., 2021).

Seemingly, there have been two investigations examining the role of mindfulness in social media engagement. The first investigation suggested that mindfulness mediates the relationship between social media addiction and emotional exhaustion (Sriwalai & Charoensukmongkol, 2015). That is, less mindful individuals experienced higher levels of emotional exhaustion compared to individuals scoring high on trait mindfulness. Additionally, their results indicated that less mindful people were more prone to become addicted to social media. A second investigation by Jones and colleagues (2021) is in accord with this. They replaced emotional exhaustion with depression and found that mindfulness mediated the relationship between social media engagement and depression. That is, social media engagement decreased mindfulness, which in turn, increased depression. More specifically, their results imply that regardless of how an individual engages in social media, if they focus strongly on social media, their attention may drift away from the present moment. Losing awareness of the present moment can have aversive mental health consequences as a result (Kabat-Zinn, 2005). When falling into automaticity, such as when engaging in social media to a high extent, mindlessness can be the consequence. It is associated with, for instance, the decline of relationship quality (Kabat-Zinn, 2005). Since the pandemic has led to an increase in social media usage, now more than ever may there be a need to investigate the specific downsides of this. As the evidence suggests there may lie great harm in high social media engagement. At this point, evidence is sparse for the specific benefits that mindfulness can bring regarding social media engagement during the pandemic. Validating the benefits of mindfulness in the context of social media engagement and, further, in times of a pandemic, is therefore imperative. The merits of this could lead to the development of mindfulness-based

interventions that may effectively guide the way how we should approach social media to be at the lowest risk of facing adverse outcomes, such as increased anxiety, depression, and distress (Lakhan et al., 2020).

### **The Present Study**

The current research aims to investigate the relationship between social media engagement, mindfulness, Covid-19 related distress, PIO, and FOMO. The research question is whether mindfulness mediates the relationship between social media engagement and Covid-19 related distress. Based on the evidence, we postulated the following hypotheses:

*Hypothesis 1:* Mindfulness mediates the relationship between social media engagement and Covid-19 related distress. Therein contained, we expect to find a positive association between social media engagement and Covid-19 related distress; a negative association between mindfulness and Covid-19 related distress; and a negative association between mindfulness and social media engagement.

*Hypothesis 2a:* Perceived Covid-19 information overload moderates the relationship between social media engagement and Covid-19 related distress.

*Hypothesis 2b:* Perceived fear of missing out during the pandemic moderates the relationship between social media engagement and Covid-19 related distress.

## **Method**

### **Participants**

To participate in the present study, participants needed to meet three criteria. First, they needed to be at least the age of 18. Second, they needed to have an account with the recruitment website Amazon Mechanical Turk, and third, they needed to possess sufficient English skills. The sample consisted of 140 participants of which 53 were females and 86 males and one “prefer not to say”. Furthermore, participants ranged in their age from 21 to 70 ( $M = 36.42$ ,  $SD = 11.89$ ). The sample included 11 different nationalities, whereby American (79.92%) and German (10%), were the nationalities with the largest representation.

**Design**

The current research is a cross-sectional study assessing correlations between the independent variable social media engagement, the mediating variable trait mindfulness, and the dependent variable Covid-19 related distress. Further, perceived information overload and fear of missing out were included as moderating variables.

**Materials**

Several scales were used to measure the various constructs in this study.

**Social media engagement.** Social media engagement was measured using The Social Media Engagement Scale for Adolescents (SMES-A; Ni et al., 2020). It contains three subscales with 10 items in total. These items seemed applicable irrespective of age since no item uses age-specific language or content. Subscales represent three different motivations to engage: affective, behavioral, and cognitive. The affective engagement subscale includes items, such as “When I can’t use social media, I feel bored.”. The behavioral engagement subscale includes items, such as “Using social media is my daily habit.”. The cognitive engagement subscale includes items, such as “The support and encouragement of others on social media is very important to me.”. Agreement to questions was rated on a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree).

**Covid-19 related distress.** Perceived Covid-19 related distress was measured using the Pandemic-Related Perceived Stress Scale of COVID-19 (PSS-10-C; Campo-Arias et al., 2020). It consists of 10 items and includes items, such as “During the last 7 days, I have felt I have everything under control in relation to the epidemic.”. Agreement to questions was rated on a 5-point Likert scale ranging from 1 (never) to 5 (always).

**Mindfulness.** Trait mindfulness was assessed using the trait measure Mindfulness Attention Awareness Scale (MAAS; Conversano et al. 2020). It consists of 15 items and includes items, such as “I find it difficult to focus on what is happening in the present”. Agreement to questions was rated on a 5-point Likert scale ranging from 1 (never) to 5 (always).

**Fear of missing out.** Fear of missing out during the pandemic was assessed using the three-item FOMO scale (Dhir, Yossatorn, Kaur & Chen, 2018). It includes items, such as “I fear others are having a more rewarding experience than me during the lockdown.”. Participants rate their agreement with the questions on a 7-point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree).

**Perceived Covid-19 information overload on social media.** Perceived Covid-19 information overload was assessed using the two-item measure for Perceived COVID-19 Information Overload on Social Media (PIO; Swar et al., 2017). It includes items, such as “I cannot handle all the COVID-19-related information on social media effectively.”. Agreement to questions was rated on a 7-point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree).

### **Procedure**

The present study was designed as an online survey via Qualtrics (Qualtrics, Provo, UT). Participants were recruited via Amazon Mechanical Turk (formerly TurkPrime; see Litman et al., 2017) where the study was named ‘Social media engagement, mindfulness, and Covid-19 related distress’. They were then redirected to the online survey to partake in the study. Participants could fill out the study on their computer or their mobile phone.

Concerning the purpose, participants were briefed that the study investigates how social media engagement affects the individual during times of a pandemic. As a first assessment step, participants were provided with an informed consent including the possibility to leave the study at any point. Next, participants were asked to indicate their demographics (i.e., age, nationality, gender, level of education). In addition, it was mentioned that the data is processed anonymously. As variable measurements participants were asked to fill out questionnaires measuring their social media engagement, trait mindfulness, Covid-19 related distress, PIO, and FOMO. Participation in the study took around 15 minutes and was honored

by a financial compensation of \$1.00. Furthermore, the research was approved by the Ethics Committee of Psychology at the Utrecht University

### Results

Within the preliminary analysis, 26 participants were excluded from the study due to incomplete data, and 24 participants were removed due to a failed attention check. Hence, from the original data set that included 190 participants, 140 remained. Further, regression assumptions have been checked using SPSS. The normality assumption was checked using QQ-plots and did not seem to exhibit strong violations. Further, homoscedasticity was investigated by plotting residuals against predicted values and seemed to hold as well. Moreover, the linearity assumption was tested using the same plot and did not exhibit strong deviations either. Further, the Durbin-Watson test for independence indicated no violation either ( $x = 1.522$ ).

### Reliability

All scales and their subscales used in the current study were found internally consistent by prior research. The Cronbach's alphas for the variables are for social media engagement, affective  $\alpha = .80$ , behavioral  $\alpha = .87$ , cognitive  $\alpha = .71$ ; for Covid-19 related distress  $\alpha = .86$ ; for trait mindfulness  $\alpha = .83$ ; for fear of missing out during the pandemic  $\alpha = .87$ ; and for perceived Covid-19 information overload on social media  $\alpha = .85$ .

### Correlational matrix

A correlational matrix was calculated to examine interrelations between the variables of interest social media engagement (SME), mindfulness, Covid-19 related distress (COV-Stress), perceived information overload (PIO), and fear of missing out (FOMO).

**Table 1**

*Correlational Matrix of all Variables*

	SME	Mindfulness	COV-stress
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SME	1	-	-
Mindfulness	-.48**	1	-
COV-Stress	.61**	-.59**	1
PIO	.41**	-.54	-.53
FOMO	.55**	-.68**	-.58

*Note:* The unstandardized Pearson correlation coefficients are reported for each variable, \* $p < 0.05$ , \*\* $p > 0.001$ .

### Mediation Analysis

This research aimed to test the relationship between social media engagement, mindfulness, Covid-19 related distress, PIO, and FOMO. The first hypothesis was that mindfulness mediates the relationship between social media engagement and Covid-related distress in negative direction. A Process mediation analysis (Model 4; Preacher & Hayes, 2004) was conducted to check this. The analysis was constituted of three regressions for each of the pathways. The overall proposed mediation model was found to be significant. In total, 49.37% of the variance in the outcome variable Covid-19 related distress could be explained by the summed power of the predictors ( $F(1,138) = 66.78, p < .001$ ). Multiple regression analyses were conducted to examine each component of the proposed mediation model.

First, it was shown that social media engagement was significantly positively related to Covid-19 related distress ( $B = .61, t = 9.051, p < .001$ ; depicted as path *c* in Figure 1). Second, it was found that social media engagement was negatively associated with mindfulness ( $B = -.48, t = -6.45, p < .01$ ; depicted as path *a* in Figure 1). Third, the relationship between the mediating variable mindfulness and the outcome variable Covid-19 related distress was found to be significant ( $B = -.59, t = -8.79, p < .001$ ; depicted as path *b* in Figure 1).

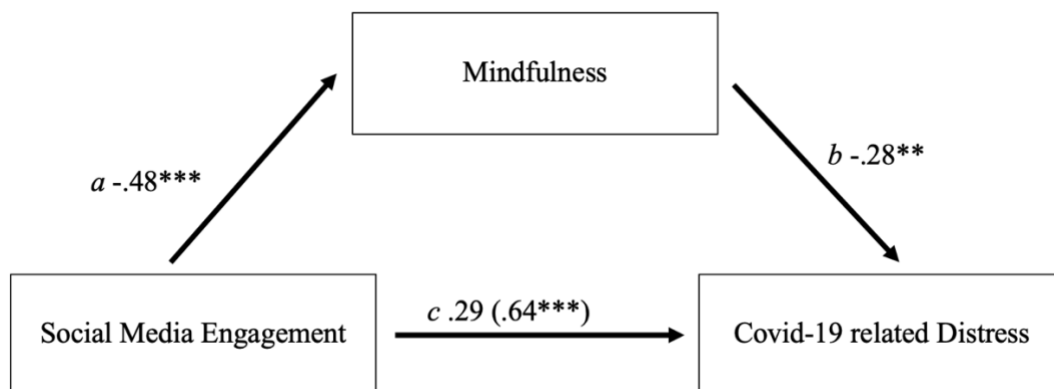


Subsequently, a mediation analysis was conducted using bootstrapping method with bias-corrected confidence estimates (MacKinnon, Lockwood & Williams, 2014; Preacher & Hayes, 2004). In the present study, the 95% confidence interval of the indirect effect of mindfulness was assessed using 5000 bootstrap resamples (Preacher & Hayes, 2008). The result provided evidence for the mediating role of mindfulness since zero is not contained within the bootstrap confidence interval ( $B = .64$ ,  $CI = [25.17, 46.63]$ ). The effect size is .29 ( $SE = .07$ ) for the indirect effect of social media engagement on Covid-19 related distress. Furthermore, it can be stated that a partial mediation is present. This is indicated by the  $c'$  pathway, which remained significant after controlling for mindfulness ( $B = .64$ ,  $t(138) = 6.04$ ,  $p < .001$ ). Consequently, this research found supporting evidence for hypothesis 1 since the postulated mediation model is consistent with the data. Mindfulness appears to mediate the relationship between social media engagement and Covid-19 related distress. In other words, the more an individual engages in social media, the less mindful they tend to be, and consequently, the more Covid-19 related distress they tend to experience.

*Figure 1. The proposed mediation model.* Displayed is the indirect effect of social media engagement through mindfulness on Covid-19 related distress.

**Figure 1**

*The proposed Mediation Model*



*Note:* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

**Exploratory Moderation Analysis**

For hypothesis 2a and 2b, the relationship between the predictor social media engagement and Covid-19 related distress was further explored. Two moderation analyses were conducted to examine whether PIO and FOMO would moderate the relationship. In this vein, additional multiple regression analyses were carried out. Each analysis included one of the hypothesized moderators separately. Both analyses were performed using Process Macro (Model 1; Preacher & Hayes, 2008).

For hypothesis 2a, the independent variable was social media engagement, the dependent variable was Covid-19 related distress, and the moderator variable was PIO. Results showed that the interaction term was statistically non-significant ( $B = .07$ ,  $R^2 = .01$ ,  $SE = .04$ ,  $p = .098$ ). Further, the main effect of PIO on the outcome Covid-19 related distress was non-significant ( $B = -.39$ ,  $SE = 1.4$ ,  $p = .791$ ) and the main effect of social media engagement on Covid-19 related distress was non-significant ( $B = .32$ ,  $SE = .26$ ,  $p = .215$ ). Overall, the proposed model explained 47,9% of variance in the outcome ( $R^2 = .47$ ,  $F(3,136) = 41,70$ ,  $p < 0.01$ ). Given these results, hypothesis 2a, which postulated that PIO would moderate the relationship between social media engagement and Covid-19 related distress, is rejected.

For hypothesis 2b, the same predictor and dependent variable were used but the moderating variable was FOMO. The interaction term was statistically significant ( $B = .03$ ,  $R^2 = .02$ ,  $SE = .0166$ ,  $p < 0.05$ ), indicating that FOMO moderates the relationship between social media engagement and Covid-19 related distress. Meaning, FOMO amplifies the relationship between social media engagement and Covid-19 related distress. The more FOMO an individual perceives while engaging in social media, the greater their potential Covid-19 related distress may be. Moreover, the main effect of FOMO on Covid-19 related distress was not significant ( $B = -.59$ ,  $SE = .63$ ,  $p = .356$ ). Lastly, the main effect of social media engagement on Covid-19 related distress was non-significant ( $B = -.19$ ,  $SE = .22$ ,  $p = .372$ ).

The overall model explained 47.8% of variance in the outcome Covid-19 related distress ( $R^2 = .47$ ,  $F(3,136)$ ,  $p < 0.01$ ). These findings lend support to Hypothesis 2b, that FOMO moderates the relationship between social media engagement and Covid-19 related distress in positive direction.

### Discussion

The purpose of this study was to gain a better understanding of the relationship between social media engagement, mindfulness, and Covid-19 related distress. It was hypothesized that mindfulness mediates the relationship between social media engagement and Covid-19 related distress (hypothesis 1). Further, it was postulated that PIO (hypothesis 2a) and FOMO (hypothesis 2b) would act as moderators in the relationship between social media engagement and Covid-19 related distress.

It was expected that individuals who are more mindful than others, tend to be less engaged in social media. This negative association was confirmed by the present findings. It is in line with previous research (Jones et al., 2021), which demonstrated that mindfulness reduced the use of social media. The mindfulness attitude of awareness may lead individuals to focus more on their surroundings in the present moment, thereby reducing their perceived need to engage digitally (Oeldorf-Hirsch & Chen, 2022). Also, this association could be supported by the finding that trait mindfulness is associated with the facilitation of healthy habits (Roberts & Danoff-Burg, 2010; Soriano-Ayala, et al., 2020). Healthy habits, in turn, are linked to decreased social media use (Moreno et al., 2013).

Moreover, it was expected that individuals who engage frequently in social media are at increased risk to experience Covid-related distress. This association has been confirmed by the present data and was already brought forward by multiple prior studies (Chao et al., 2020; Gao et al., 2022). Previous works linked social media use with Covid-19 related distress (Wolfers & Utz, 2022). This effect seems to be robust across diverse populations as a review indicates (Wolfers & Utz, 2022).

The findings further demonstrate that mindfulness mediates the associations between social media engagement and Covid-19 related distress, thereby supporting the first hypothesis. This finding is in line with previous research (Dillard & Meier, 2020; Jones et al., 2021), which showed that trait mindfulness was associated with low levels of pandemic stress. Also, a mediation effect of mindfulness between social media engagement and depression is represented in previous research (Jones et al., 2021). The mediation may be explained by some of the characteristics that trait mindfulness is associated with. Especially the facet of non-judgment and non-reactance toward external events and occurring emotions seem beneficial in the context of the Covid-19 pandemic (Baer et al., 2006; Jones et al., 2021). Research showed that a great portion Covid-19 related media distress may result from intrusive thinking (Wang et al., 2021). Intrusive thinking might, for instance, concern a negative perspective on the future due to the dominance of the pandemic-related information on social media (Looi et al., 2021; Marin, 2021; Schillinger et al., 2020). Having a mindful attitude internalized may reduce the negative affect, such as pandemic-related distress, following those intrusive thinking patterns (Thompson et al., 2011). Thereby, mental processes may be perceived as more depersonalized from the self and short-lived rather than credible reflections of reality (Brown et al., 2007; Thompson et al., 2011). This would be referred to as mindful use (Weaver & Swank, 2019). Therein, mindfulness may be conceptualized to work as a mental shield enabling the recipient of social media to digest the pieces of information in a less aversive manner. This conceptualization would support the notion that mindfulness has a protective effect when being in touch with social media altering an individual's conduct toward a less personal, less reactive, and more conscious manner (Charoensukmongkol, 2016; Eskisu, Cam, Gelibolu & Rasmussen, 2020).

Another possible explanation could be that mindfulness has a preventive effect which makes individuals less inclined to engage with social media to a high extent in the first place. This explanation is in line with previous research too, indicating that trait mindfulness

predisposes to regulating an individual's media consumption better (Calvete et al., 2017; Kuss & Griffiths, 2011). Arguably, the direction of the effect is difficult to determine given the current cross-sectional design. The preventive and protective effect of mindfulness could as well be described in a circular function, wherein they both exhibit mutual influence on each other which prior research has already suggested (Eskisu et al., 2020). Irrespective of the directionality of the effect, previous research, and the current research emphasized that mindfulness seems to be highly advantageous in the context of social media engagement. The main advantage lies in the reduction of pandemic-related distress. May that be caused by a reduced engagement or by an alteration toward healthier engagement. Given the current data and prior research's insights, a mix of the protective and preventive function of mindfulness seems most likely to be the case but further scientific exploration is warranted.

Moreover, this study could not find evidence for the moderating effect of PIO in the relationship between social media engagement and Covid-19 related distress (hypothesis 2a). As previous research has repeatedly linked PIO to distress, social media fatigue, and emotional exhaustion, this is an unexpected finding (Liu et al., 2021). It may be that PIO is merely correlated with social media engagement instead of interacting with each other. Another possibility for the inability of detecting a moderation effect may be that a false negative is present in the data due to the moderate power of the sample (Button et al., 2013). Nevertheless, given these prior insights and the increase of PIO during the pandemic (Islam et al., 2020), future examinations of its relationship to various constructs should be fostered.

Finally, the data revealed that fear of missing out (FOMO) strengthened the relationship between social media engagement and Covid-19 related distress (hypothesis 2b). Meaning, the amount of Covid-19 related distress that an individual experiences, is conditional upon how much FOMO that individual perceives. And further, the more an individual engages in social media, the more FOMO they tend to experience. The application of FOMO as a moderator in the relationship between social media engagement and Covid-19

related distress is a novum within the literature. There has been one investigation which demonstrated that FOMO mediated the relationship between problematic Facebook use and psychological distress. (Dempsey et al., 2019). The important feature of the finding that FOMO moderates the relationship, is expressed in its aversive effect on one hand, and in its driving effect in fueling social media use on the other hand (Dhir et al., 2018). It is considered as one of the key drivers of social media engagement as it creates a self-perpetuating cycle (Przybylski et al., 2013). Yet it is strongly associated with high levels media distress (Liang et al., 2022). Its apparent double-edged nature should be considered when engaging in social media to a high extent. This insight may be used to further define interventions that target the reduction media distress. They should include elements that specifically aim to counteract FOMO.

### **Limitations**

The current study exhibits some notable limitations. First, the cross-sectional design precludes any causal inferences that could be made. Also, the current study found only a partial mediation of mindfulness. To investigate whether mindfulness acts as a true mediator in the relationship between social media engagement and Covid-19 related distress, an experimental design is warranted. Second, the use of self-report measures may impact the validity of the study as these can be prone to self-enhancement and misjudgment (Dunning et al., 2004; Kruger & Dunning, 1999;). Though, feasible alternatives to self-assessment are sparse (Griffith et al., 2016). To counteract this, the current study only used psychometric tests that proved to be reliable and commonly used within their respective field. Third, the measure of mindfulness is a trait measure. Previous literature identified weak associations between state and trait measures regarding mindfulness (Kiken et al., 2015; Bravo et al., 2018). It may bias the data in that there could be a discrepancy between individuals scoring high on trait mindfulness and their actual conduct when engaging in social media, which may not be as mindful. Future research should aim to also include state measures of mindfulness.

Though, for the current cross-sectional study, the trait measure seemed most appropriate as it attempts to capture behavioral tendencies regarding mindfulness rather than an in-the-moment assessment of such. Fourth, the study was done in an online setup. While in recent years, this has become a trend due to many advantages, such as providing easy access to participants, research also shows that it comes at a cost (Clifford & Jerit, 2014). The disadvantages lie in low perceived commitment of the participants and limited control over third variables, such as environmental distractions (Clifford & Jerit, 2014). Hence, the reliability of the data may be impaired to some extent. Nevertheless, the current study was conducted during the pandemic, during which in-person collecting of data is arguably difficult.

### **Practical Implications**

In consideration of the findings of the present study, some practical implications can be drawn. The role of mindfulness has been emphasized in reducing Covid-19 related distress when engaging in social media to a high extent. The results showed that the more mindful an individual is, the less Covid-19 related distress they tend to experience. This finding points in the direction of developing mindfulness-based interventions that may effectively alter the way social media should be approached to face less aversive consequences regarding pandemic distress. As highlighted by the current study, guidelines regarding social media could be valuable. According to prior work, social media use has generally increased during the pandemic (Luo et al., 2021). The present study confirmed that there is a negative relationship between high social media engagement and distress, a relationship that is well-established within the literature (Chen & Lee, 2012; Brailovskaia et al., 2021; Wolfers & Utz, 2016). Given this relevance, future research should test specific mindfulness-based interventions on their efficacy in reducing Covid-19 related distress as this research showed that it is associated with lowered pandemic-related distress. The need for mindfulness-based interventions to be implemented may be potentially great. It could hold a promising effect for navigating social media in a healthier, more mindful manner.

Such mindfulness-based interventions that guide the healthy navigation of social media already exist. Weaver and Swank (2019) developed a clinician-administered intervention for adolescents that teaches awareness about the potentially harmful implications of high social media engagement. These manifests in form of FOMO, upward-social comparisons, and certain developmental role conflicts (Weaver & Swank, 2019). The intervention makes use of the so-called three axioms of mindfulness which are constituted of intention, attention, and attitude (Shapiro et al., 2006). Thereby, it is supposed to make individuals on one hand conscious of their online conduct, for instance, regarding their critical thinking abilities, and on the other hand, better at regulating their engagement. Thereby, it is the goal to avoid automaticity on social media. Nevertheless, has this intervention not yet been validated on a large-scale level across different age groups. Also, the intervention is conducted by a clinician. Given the apparent prevalence of media distress, it should be modified to a version that does not require external assistance, such as a computer-based training.

In addition, it may be worth an investigation to determine the direction of mindfulness' effect on social media engagement and Covid-19 related distress. Does mindfulness restrict an individual's social media use (i.e., the preventive effect), or does it lead to a more positive use of social media (i.e., the protective effect)? Interventions could profit from such insights. Ideally, this would be examined in an experimental approach. An experiment could be designed in two parts. One experiment could aim to research whether mindfulness reduces social media engagement over a longer period. For instance, participants could receive the task of performing a quick mindfulness exercise (Bultas et al., 2021) once a day for two weeks or more. Meanwhile, they would be asked to indicate their social media use daily. Comparing participants' social media time to a control group performing a control exercise each day for the same amount of time would give an indication of mindfulness' efficacy in reducing social media engagement. This would test mindfulness' preventive effect.



In a second experiment, it could be tested whether mindfulness leads to a mindful use of social media, thereby reducing negative affect from social media engagement. Here, some stress-inducing media input could be presented, such as a Covid-19 news video. At first, one group performs an intervention for mindful media use (Weaver & Swank, 2019) while the other group performs a control task of similar length. After the Covid-19 stress induction, the scores of both groups on perceived Covid-19 related distress will be compared. This would lend evidence to mindfulness' protective effect. Insights from such experiments could help to build a theoretical foundation for mindfulness-based social media use interventions. With sufficient theoretical insight, these can be then modified to make them as efficacious as possible.

Furthermore, this study emphasized the aversiveness of FOMO and PIO regarding high social media engagement and Covid-19 distress. The current study indicated a moderating effect of FOMO leading to more Covid-19 related distress. A practical implication deducted from this would be to make individuals aware that they should carefully monitor the occurrence of such emotions or cognitions. The feeling of missing out on an event due to being in a lockdown and engaging highly in social media regardless may be a warning sign for a subsequent accumulation of distress. Mindfulness training may help individuals to become more aware that their social media usage may be causing them distress. Awareness is considered one of the mindful attitudes. Making individuals conscious of the aversiveness of these cognitions and feelings may already change their conduct to some extent (Weaver & Swank, 2019). It may incline individuals to take the third-person perspective and foster non-reactance to certain pandemic-related inputs instead of falling into automaticity and mindless behavior on social media.

In conclusion, since the start of the pandemic many societal and personal changes could be observed. Above all, the drift to an increased social media use has been a striking feature of the pandemic (Luo et al., 2021). Prior literature and the current study emphasized

the potential risks that lie in heightened engagement. Namely, to be more prone to experience distress related to the pandemic. In addition, the ambivalent nature of FOMO has been emphasized in fueling social media use as well as leading to more negative outcomes of social media use. This should be kept in mind when engaging to a high extent as the experience of FOMO could potentially represent a precursor of impending pandemic-related distress and possibly exacerbate the occurrence of mental health complaints. Further, through the present study, the usefulness of mindfulness was supported in reducing Covid-19 related distress following high social media engagement. The results provided support that mindfulness works as a mechanism through which negative affective outcomes can be attenuated since it mediates the relationship between social media engagement and Covid-19 related distress. The current study, therefore, highlights the importance of further developing mindfulness-based interventions. With the goal in mind of teaching ways on how to approach social media and regulate social media use, such interventions may hold some promising potential for reducing the widespread Covid-19 related distress that many are experiencing.

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## Appendix

*Items used for the measurements of social media engagement, mindfulness, Covid-19 related distress, fear of missing out during the pandemic (FOMO), and perceived Covid-19 information overload (PIO).*

### Scale 1: Social Media Engagement

*Below you will find several statements regarding social media use. Please indicate on a scale of 1 (strongly disagree) to 5 (strongly agree) how much you agree with the following statements:*

- 
1. I feel anxious when I can't use social media.
  2. Compared world, I am happier when I socialize on social media.
  3. I feel bored when I can't use social media.
  4. Compared to the real world, social media makes me feel comfortable.
  5. The support and encouragement of others on social media is very important to me.
  6. Using social media, I am satisfied with the relationship between myself and my friends.
  7. I get fulfilled from the attention and comments of others on social media.
  8. I often use social media to relax in habit.
  9. Even if it's late, I will take a look on social media before sleep.
  10. I browse social media whenever I have time.
  11. Using social media is my daily habit.
- 

### Scale 2: Perceived Information Overload

*The following questions will be on COVID-19 related experiences. Please indicate on a scale of 1 (strongly disagree) to 5 (strongly agree) how much you agree with the following statements:*

- 
1. I cannot handle all the Covid-19 related information on social media effectively.
  2. I am not certain that the information about Covid-19 on social media fits my needs well to make better decisions (e.g., measures applied, health advice and psychological well-being).
- 

### Scale 3: Fear of Missing Out

*The following questions will be on COVID-19 related experiences. Please indicate on a scale of 1 (strongly disagree) to 7 (strongly agree) how much you agree with the following statements:*

- 
1. I fear others are having a more rewarding experience than me during lockdown.
  2. I fear my friends are having a more rewarding experience than me during lockdown
  3. I get worried when I find out my friends are having fun without me during lockdown.
- 

### Scale 4: Trait Mindfulness

*Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.*

- 
1. I could be experiencing some emotion and not be conscious of it until sometime later.

2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in the present moment.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend to not notice feelings of physical tension or discomfort until they grab my attention.
6. I forget a person's name as soon as I've been told it for the first time.
7. It seems I am "running on automatic" without much awareness of what I'm doing.
8. I rush through activities without being really attentive of them.
9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
10. I do jobs or tasks without being aware of what I'm doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I find myself preoccupied with the future of the past.
13. I drive places on "automatic pilot" and then wonder why I went there.
14. I find myself doing things without paying attention.
15. I snack without being aware that I'm eating.

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Scale 5: Covid-19 related Distress

*The following questions will be on COVID-19 related experiences. Please indicate on a scale of 1 (strongly disagree) to 5 (strongly agree) how much you agree with the statement RIGHT NOW.*

---

1. If I were infected from COVID-19, I might be not able to recover from it.
  2. When talking to strangers, I would suspect that (s)he might be infected with it.
  3. I am afraid to travel to place hard-hi by COVID-19.
  4. When I see an increase in number of COVID-19 patients on the news, I feel anxious.
  5. When I see someone sneeze, I suspect (s)he might be infected with COVID-19.
  6. I think frequently hospital visits would make it easier to get infected with COVID-19.
  7. I fear to see doctors or nurses who have worked in COVID-19 isolation wards.
  8. I think frequent use of air, train, bus or other public transport would make it easier to get infected with COVID-19.
  9. When I notice someone running a fever, I suspect (s)he of being infected with COVID-19.
  10. When I see someone vomiting, I suspect (s)he of being infected with COVID-19.
  11. I fear to live nearby a COVID-19 isolation hospital.
  12. When I see someone coughing, I suspect (s)he of being infected with COVID-19.
  13. When see someone without a mask, I suspect (s)he of being infected with COVID-19.
  14. I suspect there were novel coronavirus in the air when there were people around.
-

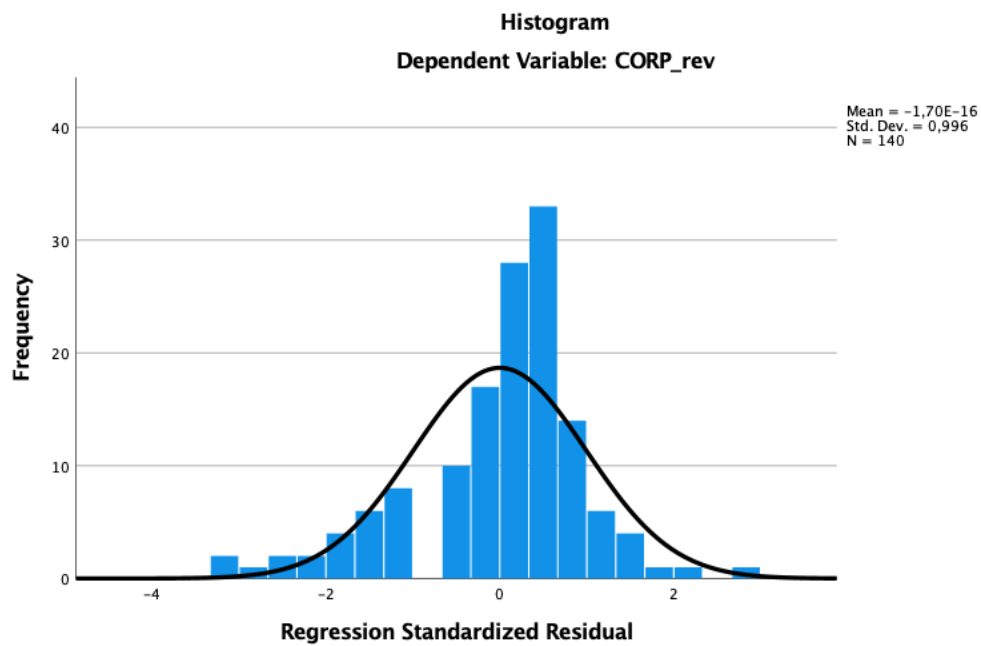
**Table 1**

Displays the descriptive statistics for the variables of interest social media engagement (SME), mindfulness, Covid-19 related distress (COV-stress), (PIO) and fear of missing out (FOMO).

	SME	Mindfulness	COV-stress	PIO	FOMO
Mean	38.31	54.35	46.03	6.37	13.32
SD	8.27	17.85	12.58	2.13	5.51
Minimum	13.00	17.00	14.00	2.00	3.00
Maximum	53.00	90.00	70.00	10.00	21.00

**Figure 2**

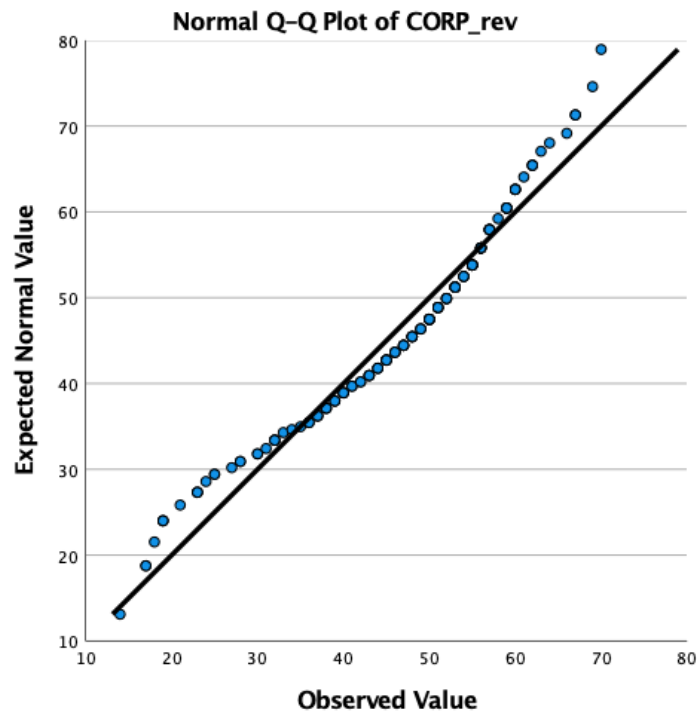
*Histogram for checking the assumption of normality.*





**Figure 3**

*QQ-plot for further checking the assumption of normality*



**Figure 4**

*Scatterplot for checking the assumption of equal variances*

