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Zhiying Yue [a], David S. Lee [a], Jun Xiao[b] and Renwen Zhang [c]

[a]Department of Communication, University at Buffalo, The State University of New York, Buffalo, NY, USA; [b]Center for Studies of Media Development, Wuhan University, Wuhan, China; [c]Department of Communication and New Media, National University of Singapore, Singapore, Singapore

ABSTRACT

In efforts to curb the spread of COVID-19, many countries have implemented a variety of lockdown and quarantine measures. With substantially reduced face-to-face interactions, many people may have relied heavily on social media for connection, information, and entertainment. However, little is known about the psychological and physical health implications of social media use during strict lockdown. The current study investigates the associations of social media use with psychological well-being and physical health among Wuhan residents ($N = 1214$). Our findings showed that non-COVID related self-disclosure was positively associated with psychological well-being, while COVID related information consumption and sharing were negatively associated with psychological well-being. Further, more generic use of social media was associated with lower psychological well-being, which in turn related to more somatic symptoms. Quarantined people used social media more frequently than non-quarantined people. Importantly, the negative association between social media use and psychological well-being was significantly stronger for quarantined people than unquarantined people.

On December 31, 2019, the first case of COVID-19 was identified in Wuhan, China (WHO, 2020). To mitigate local transmission and global spread, Chinese government imposed a range of strict, unprecedented quarantine measures in Wuhan to reduce in-person gatherings and interactions. Starting January 23rd, all forms of public transportation were shut down and the use of private vehicles were banned. Soon after, all residential communities were sealed off and people were ordered to stay home (i.e., quarantined), except for those who were working at essential businesses (e.g., healthcare providers, food delivery workforce, etc.; Pan et al., 2020). Although these measures effectively controlled the spread of virus (Kraemer et al., 2020), there have been considerable concerns about the mental and physical health issues during lockdown.

Specifically, living under a strict and prolonged quarantine has been associated with both mental health issues (Chen et al., 2021; Hossain et al., 2020) and physical health issues (e.g., Garfin et al., 2020). A series of studies have highlighted the association of

internet use, especially social media use, with mental health issues during the pandemic (e.g., Chen et al., 2020a; Gao et al., 2020). For example, Chen et al. (2021) found that schoolchildren spent significantly more time on social media during school suspension, which was positively associated with distress level. During the outbreak of the pandemic, time spent on social media was positively associated with depressive symptoms and anxiety (Gao et al., 2020).

Indeed, extant research on generic social media use and psychological well-being has produced inconsistent findings (e.g., see Appel et al., 2019; Clark et al., 2017; Kross et al., 2021 for a review). A large body of research has highlighted the needs to not only focus on generic social media use, but also to examine *how* users engage with social media (Clark et al., 2017; Ellison et al., 2020). A representative perspective is the active–passive dichotomy framework, which posits that active social use may promote well-being through enhanced social connectedness, whereas passive use is likely to undermine well-being through social comparison and envy (Appel et al., 2019; Krasnova et al., 2015; Lu & Hampton, 2016; Verduyn et al., 2017). Yet, emerging research has challenged this dichotomous view (e.g., Ellison et al., 2020; Meier & Reinecke, 2020; Valkenburg et al., 2021), urging more nuanced examinations of social media activities and their relationship with well-being (Kross et al., 2021).

In this study, we aim to extend the active–passive dichotomy by taking into account the content of information that people consume and share on social media. We focus on both specific social media activities and generic social media use, as well as how they relate to psychological well-being. Compared to previous conceptualizations that draw sharp distinction between active and passive use, our approach enables a more nuanced, yet holistic understanding of social media use and well-being in the lockdown context.

Furthermore, prior work has shown that situational factors may account for the associations between technology use and well-being (Diener et al., 1999; Quinn, 2016). Given that quarantined people and unquarantined people (e.g., essential workers) may differ in terms of their lifestyles, informational and emotional needs and risk perceptions, we explore the possibility that individuals' quarantine status may moderate the relationship between social media use and psychological well-being. In addition, we aim to contribute to the existing literature by exploring potential physical health implications of social media use during lockdown.

This study surveys 1214 Wuhan residents about their quarantine status, social media use, psychological well-being, and physical health during the COVID-19 lockdown in March 2020. Our goals are threefold. First, to examine how and how much Wuhan residents use social media during the lockdown. Second, to assess the associations among social media use, psychological well-being, and physical health. Third, to explore whether and how individuals' quarantine status may moderate the relationship between social media use and psychological well-being.

Literature review

Social media use during lockdown

Social media is generally defined as a 'group of internet-based applications that allow the creation and exchange of user generated content' (Kaplan & Haenlein, 2010, p. 61). A

plethora of research has differentiated between active and passive social media use (Kross et al., 2021; Verduyn et al., 2017). In general, active usage of social media refers to activities that facilitate direct exchanges with others (Verduyn et al., 2017). People can develop and maintain relationships by sharing ideas, interacting socially, and creating and managing social images (Ellison et al., 2007). Therefore, social media is often viewed as a supplemental way to offline communication to fulfill a fundamental need for social connection (Baumeister & Leary, 1995; Hall et al., 2019). However, during lockdown where in-person interactions are largely prohibited, using social media may serve as a 'psychological necessity' to weather social isolation and combat loneliness.

Passive social media use refers to browsing or consuming information online without engaging in direct social exchanges (Verduyn et al., 2017). During global health crisis, people tend to rely more on social media to fulfill information need (Zhong et al., 2021). Especially in the early stage of COVID-19, people were in a dire need of information to understand the risks and mitigate their uncertainties. Those who were quarantined may have even more limited access to information compared to those who were unquarantined. To understand how people use social media during lockdown, we propose a research question:

RQ1: How and how much do people use social media during COVID-19 lockdown?

Social media use and psychological well-being

Given the ubiquitous and transformational nature of social media, a number of studies have investigated how social media use is related to individuals' psychological well-being. Psychological well-being is a broad category which concerns 'optimal psychological functioning and experience' (Ryan & Deci, 2001). The definition and operationalization of well-being is not consistent in previous studies (e.g., Clark et al., 2017; Kross et al., 2021; Liu et al., 2019). It has been measured with various indicators including affect (Verduyn et al., 2015), life satisfaction (Orben et al., 2019), stress (Chen et al., 2020a), depression (Huang, 2017) and body image (Fardouly & Vartanian, 2016). These indicators can be generally classified into *hedonic* and *eudaimonic* well-being, with the former focusing on pleasure and happiness, and the latter focusing on life meaning and self-realization (Ryan & Deci, 2001). In this study, we follow the theoretical approach of hedonic well-being and operationalized this construct as minimal negative affect, low perceived stress and low symptoms of depression (Ryan & Deci, 2001).

A recurring theme in the literature of social media and well-being is the active–passive dichotomy framework (Verduyn et al., 2017). On the one hand, active social media use may promote well-being by creating social capital and stimulating feelings of social connectedness (Verduyn et al., 2017). For example, direct chatting on social media that mimics features of face-to-face communication can facilitate a sense of connectedness (Hall, 2016). Self-disclosure may also help users to build intimacy, as people can provide social support through commenting or 'liking' online (Jiang et al., 2010). Even time spent on online gaming and other entertainment activities with others may help maintain a large and diverse network of weak ties (Baym, 2015).

On the other hand, passive social media use can be detrimental for individuals' psychological well-being (e.g., Verduyn et al., 2017). Possible mechanisms include

upward social comparison and envy, cyberbullying, and displacement of activities that are more beneficial to well-being, such as having meaningful conversations with strong ties and close relationship partners (Huang, 2017; Krasnova et al., 2015; Lin et al., 2020; Liu et al., 2019). Excessive and addictive social media use is also viewed as a threat to well-being, as they can trigger stress, reduce sleep quality, and inhibit active hobbies and exercise (Chen et al., 2020b; Wong et al., 2020). This negative ramification can be more salient during crises such as a global pandemic. As people tend to engage in constant information seeking and consumption in crisis to manage uncertainties and anxiety (Zhong et al., 2021), fear and anxiety triggered by misinformation and rumors on social media may further undermine well-being (Chang et al., 2020; Lin et al., 2020).

However, emerging research has challenged the active–passive dichotomy framework (e.g., Ellison et al., 2020; Trifiro & Gerson, 2019; Meier & Reinecke, 2020; Valkenburg et al., 2021). Some critiques relate to the lack of valid measures of active and passive social media use (Trifiro & Gerson, 2019). Some argue that researchers should go beyond the nominal distinction to examine *subtypes* of active and passive social media use (Kross et al., 2021). For example, actively using social media to cyberbully or spread moral outrage may undermine well-being, while passive use may benefit well-being by enhancing users' autonomy and sense of control over information selection, processing and interpretation (Meier & Reinecke, 2020).

Taking together, existing literature paints an ambiguous picture regarding how social media use may be associated with well-being during strict lockdown, when people have minimal to no direct face-to-face social interactions. In this study, we extend the framework of active–passive dichotomy by examining both specific social media activities and generic social media use, as well as how they relate to psychological well-being. Given the mixed findings in the literature, we propose a research question as follows:

> *RQ2*: How are specific social media activities associated with psychological well-being during COVID-19 lockdown?

As certain social media activities may have different associations with well-being, it is not clear how generic social media use relates to well-being. With more time spent on social media, people are likely to engage in more passive activities (Hall, 2016). Supporting this notion, previous studies document associations between increased generic use of social media and lower well-being (e.g., Verduyn et al., 2017). For example, a longitudinal study shows that the more frequently people used Facebook, the lower psychological well-being they reported over time (Kross et al., 2013). Experimental studies also showed that participants who were instructed to spend more time on Facebook experienced more depression and loneliness compared to those who abstained or limited their Facebook use (Hunt et al., 2018).

However, some studies using experience sampling methods did not find an association between social media use and depression (Orben & Przybylski, 2019). A large-scale study of British youth ($n = 120,115$) identified a non-linear relationship between digital media use and psychological well-being, suggesting that 'smartphone and social media use is not intrinsically harmful and may even be advantageous in a connected world' (Przybylski & Weinstein, 2017). During lockdown, while increased use of social media may help people seek connections and fulfill social needs, it can also backfire through a range of mechanisms such as excessive consumption of negative information. Thus, we propose a research

question to address how generic social media use may be associated with psychological well-being:

> *RQ3:* How is generic social media use related to individuals' psychological well-being during COVID-19 lockdown?

The role of quarantine status

Importantly, contextual and situational factors may help explain the association between social media use and psychological well-being (Diener et al., 1999; Quinn, 2016). Specifically, in the context of lockdown, the above relationship may be contingent on individuals' quarantine status. Although most citizens in Wuhan were ordered to stay at home (i.e., quarantined), a number of essential workers were not under quarantine and still working frontline.

Notably, quarantined individuals are likely to experience certain physical and psychological challenges. For example, being confined at home may be associated with increased boredom and more time spent on social media. The prolonged inactivity and increased screen time may negatively influence psychological well-being (e.g., Huang, 2017). In contrast, unquarantined people bear greater risks to infection, but nevertheless may have better access to pandemic-related information (e.g., material/supply preparedness) (Pan et al., 2020). We suspect that quarantined and unquarantined people may have differed in terms of their psychological states, informational and emotional needs, as well as the way they use social media. Thus, our goal is to take advantage of this unique situation to examine if quarantine status may influence the link between social media and psychological well-being:

> *RQ4:* Does quarantine status moderate the relationship between generic social media use and psychological well-being?

Physical health implications

Despite the growing number of studies examining the association between social media use and psychological well-being, less is known about how physical health correlates with social media use (e.g., Lee et al., in press; Merolli et al., 2013). Given the extensive findings on social media and psychological well-being, we explore whether generic social media use can be associated with physical health through psychological well-being.

Physical strain measures have ranged from measuring relatively minor somatic symptoms (e.g., headache, dizziness, feeling of heart pound/race) to life-threatening conditions such as elevated blood pressure and coronary heart disease (See Schat et al., 2005 for a review). In this study, we assessed individuals' somatic symptoms as physical health indicator (Kroenke et al., 2002). Somatic symptoms account for more than half of all general medical visits and also correspond to a range of medical conditions such as physical dysfunction, disability status, and clinical visits (Kroenke et al., 2002). Overall, somatic symptoms are demonstrated as a valid instrument to assess physical strain (Steinbrecher et al., 2011).

Indeed, prior work shows a strong link between psychological well-being and somatic symptoms (e.g., Simon et al., 1999). For example, negative emotions correlate with more

somatic complaints (Tyrer & Baldwin, 2006). Depressive symptoms are associated with symptoms such as headache, constipation and back pain (Simon et al., 1999). Further, psychological stress is found to be associated with unexplained dizziness, tinnitus and blurry vision (Gupta, 2013). Previous studies showed that adolescents who recently experienced family disruption (e.g., parental divorce) were more likely to experience tension-type headache or frequent back pain (Karwautz et al., 1999).

In light of the association between psychological well-being and physical health (Hernandez et al., 2017), and between social media use and psychological well-being (Kross et al., 2021), we speculate that psychological well-being may mediate the link between social media use and physical health. This mechanism may be especially salient during the pandemic when other health-promoting behaviors (e.g., outdoor exercises and physical activities) are limited. Given the scant research on the relationship between social media and physical health, we ask a research question as follows:

> RQ5: Does psychological well-being mediate the relationship between social media use and physical health?

Method

Sample

Our data collection took place through a Qualtrics online survey from 2 March to 10 March 2020 in Wuhan, China. Most participants were under strict home quarantine except for those working at essential businesses (Pan et al., 2020). The questionnaire was translated from English to Chinese and pilot tested. We obtained informed consent from participants, and all procedures were approved by the Institutional Review Board at the authors' institution. All participants were offered an incentive of 5 RMB (0.77 USD).

Participants were recruited through convenience sampling and snowball sampling. We posted the recruitment announcement through social media accounts of researchers in our team and the Research Center at XX University in China (anonymized for review). To access unquarantined people, we also reached out to managers at essential businesses (e.g., grocery stores and food delivery companies) to help distribute the survey to their employees.

Among the 2320 participants who accessed the survey, a total of 1214 valid responses were collected over 8 days. We excluded participants whose locations were not in Wuhan and those who quit the survey at the very beginning. Participants' ages ranged from 18 to 81 years ($M = 39.07$, $SD = 11.01$). Our final sample included 68.9% female ($n = 620$). A total of 68.6% ($n = 613$) were under strict quarantine, and the rest 31.4% ($n = 280$) were not under quarantine. Table 1 summarizes correlations for key variables described below.

Measures

Quarantine status was measured with one item and validated with multiple items. Participants were asked whether they had been quarantined at home or other places since Wuhan was locked down. Those who were not under quarantine at all were coded as '1' and those who were quarantined at home were coded as '0'. For those unquarantined

Table 1. Zero-order bivariate correlations among key variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1.Interaction	–											
2.COVID info sharing	.44***	–										
3.Non-covid self-disclosure	.38***	.38***	–									
4.COVID info consumption	.44***	.47***	.23***	–								
5.Non-COVID info consumption	.33***	.30***	.26***	.57***	–							
6.Information seeking	.43***	.46***	.33***	.56***	.47***	–						
7.Entertainment	.30***	.15***	.26***	.26***	.30***	.33***	–					
8.Generic social media use	.71***	.67***	.58***	.75***	.68***	.76***	.57***	–				
9. Stress	.22***	.27***	.09**	.33***	.21***	.31***	.15***	.34***	–			
10.Depression	.19***	.29***	.10***	.26***	.19***	.28***	.12***	.30***	.70***	–		
11.Negative affect	.22***	.35***	.10***	.31***	.20***	.30***	.10**	.33***	.63***	.68***	–	
12.Somatic symptoms	.13***	.23***	.16***	.20***	.16***	.23***	.13***	.26***	.46***	.57***	.40***	–

Note: *p <.05; **p <.01; ***p <.001.

Table 2 Regression Analysis: Social Media Activities and Psychological Well-being.

	Stress			Depression			Negative Affect		
		95% CI			95% CI			95% CI	
	β	LL	UL	β	LL	UL	β	LL	UL
Interaction	.03	-.03	.09	.02	-.03	.06	.05	-.02	.07
COVID info sharing	**.10***	**.02**	**.16**	**.15***	**.05**	**.16**	**.22***	**.09**	**.18**
Non-COVID self-disclosure	-.07[+]	-.13	.003	-.06	-.09	.01	**-.07***	**-.09**	**-.001**
COVID info consumption	**.21***	**.11**	**.26**	**.13****	**.03**	**.14**	**.18***	**.06**	**.16**
Non-COVID info consumption	-.06	-.12	.02	-.05	-.08	.02	-.07[+]	-.09	.003
Information seeking	**.08**[+]	-.01	.13	**.08***	**.01**	**.10**	.08[+]	-.004	.09
Entertainment	.01	-.05	.06	-.03	-.06	.03	-.04	-.06	.02
Age	**-.18***	**-.02**	**-.01**	**-.12***	**-.01**	**-.004**	**-.10***	**-.01**	**-.001**
Gender	**.09****	**.06**	**.32**	.003	-.10	.10	**.06***	**.002**	**.19**
Quarantine	**-.15***	**-.45**	**-.17**	**-.20***	**-.43**	**-.22**	**-.10****	**-.24**	**-.04**
Adjusted R^2	**.21**			**.17**			**.09**		

Note: *** $p <.001$, ** $p <.01$, * $p <.05$, [+] $p <.10$; Quarantine: 0= quarantine 1= non-quarantine; Gender: 0= male; 1= female.

Table 3 Univariate Analysis: Quarantine Status and Social Media Activities.

	Quarantined People		Unquarantined People			
	M	SD	M	SD	F(1, 884)	η²
Interaction	3.56	1.18	2.98	1.25	29.61***	.03
COVID info sharing	2.37	1.12	1.85	.98	30.68***	.03
Non-COVID Self-disclosure	2.26	1.04	1.93	1.02	13.98***	.02
COVID info consumption	3.45	1.10	2.88	1.09	35.83***	.04
Non-COVID info consumption	3.08	1.10	2.56	1.13	22.38***	.02
Information seeking	2.93	1.20	2.08	1.09	58.45***	.06
Entertainment	3.03	1.21	2.52	1.25	10.39**	.01
Generic social media use	2.96	.73	2.40	.78	63.41***	.06

Note; *** $p<.001$, ** $p<.01$, * $p <.05$; Quarantine 1= non-quarantine; 0= quarantine.

participants, we further checked their work status, confirming their roles as essential workers.[1]

Psychological well-being included three components, including depressive symptoms, measured with a shortened version of CES-D scale (Center for Epidemiological Studies Depression Scale, Radloff, 1977; α = .87, M = 2.39, SD = .74), perceived stress (PSS, Cohen et al., 1983; α = .89, M = 2.49, SD = .99), and negative affect (PANAS including upset, anger, anxiety, irritability, fear, scare and nervousness; α = .90, M = 2.05, SD = .68).

Physical health was assessed with Patient Health Questionnaire (PHQ-15; Kroenke et al., 2002). Participants indicated how frequently they experienced somatic symptoms (e.g., chest pain, headaches) since lockdown (1 = *not bothered at all*, 5 = *bothered a lot*; α = .86, M = 1.53, SD = .47).[2] PHQ-15 is a brief, self-administered instrument that is widely used for screening somatization syndromes in clinical practice and research. It includes 15 somatic symptoms that account for more than 90% of the physical complaints reported in primary care setting (Kroenke et al., 2002). PHQ-15 generally revealed three factors including cardiopulmonary, gastrointestinal and general pain/fatigue, and is demonstrated as the best fit for assessing common somatic symptoms in large-scale studies (Zijlema et al., 2013).

Social media use. Based on a recent meta-analysis providing a theory-based typology of the different types of social media use (Liu et al., 2019), we asked seven questions on how people used social media (1= *not at all*; 5= *very often*), including direct interaction

with others ($M =$ ⍰ 3.39, $SD = 1.25$), COVID information sharing ($M = 2.18$, $SD = 1.09$), non-COVID self-disclosure ($M = 2.16$, $SD = 1.04$), COVID information consumption ($M = 3.25$, $SD = 1.14$), non-COVID information consumption ($M = 2.90$, $SD = 1.15$), information seeking ($M = 2.66$, $SD = 1.24$) and entertainment ($M = 2.88$, $SD = 1.27$). Generic social media use was measured with an averaged composite of different social media activities ($α = .80$, $M = 2.61$, $SD = .85$).

Covariates. Given the existing literature on gender difference (Su et al., 2020) and age difference (e.g., Hardy & Castonguay, 2018) in social media use, we included gender and age as covariates in our analysis.

Data analysis

We first conducted within-subject ANOVA to explore how and how much people engage in different social media activities (RQ1). A series of regression analyses were then performed to explore the relationship between social media use and psychological well-being (RQ2 and RQ3). To explore whether quarantine status moderates the relationship between social media use and psychological well-being (RQ4), and whether psychological well-being mediates the relationship between social media use and physical health (RQ5), we conducted a moderated mediation analysis using the PROCESS macro in SPSS (Hayes, 2013, Model 7). We included generic social media use as the predictor, psychological well-being indicators as the mediators, age and gender as covariates, and somatic symptoms as the outcome variable. The moderated mediation analysis was conducted with 5000 randomly generated subsamples.

Results

RQ1 explored how and how much people use social media during lockdown. Our within-subject ANOVA results showed that participants used social media more for direct interaction ($M = 3.39$, $SD = 1.25$) and browsing information about COVID ($M = 3.25$, $SD = 1.14$); They were relatively less likely to share information on social media regardless of whether it was COVID-related ($M = 2.18$, $SD = 1.09$) or unrelated ($M = 2.16$, $SD = 1.04$), Wilks' Lambda = .38, $F(6, 996) = 275.05$, $p < .001$.

RQ2 explored the association between specific social media activities and psychological well-being. In general, controlling for demographics and quarantine status, non-COVID related self-disclosure was associated with lower negative affect. However, neither direct interaction nor entertainment was associated with psychological well-being. COVID related information consumption, sharing and seeking were consistently associated with lower psychological well-being (See Table 2 for regression results).

RQ3 explored the relationship between generic use of social media use and psychological well-being. Regression analyses showed that generic use of social media use was significantly related to higher stress ($β = .23$, $p < .001$, 95% CI = [.21, .38], $R^2 = .11$), more depressive symptoms ($β = .20$, $p < .001$, 95%CI = [.12, .25], $R^2 = .09$) and more negative affect ($β = .27$, $p < .001$, 95% CI = [.17, .29], $R^2 = .11$), after controlling for demographics and quarantine status. Thus, more generic use of social media was associated with lower psychological well-being.

RQ4 examined if quarantine status moderated the relationship between generic social media use and psychological well-being. RQ5 proposed that psychological well-being further mediated the relationship between generic social media use and physical health. First, controlling for demographics, our univariate analysis showed that people who were under quarantine used social media more than those who were not ($M = 2.96$ vs. 2.40, $SD = .73$ vs. $.78$), F $(1, 884) = 63.41$, $p < .001$, $\eta2 = .06$ (Table 3). Interestingly, quarantined people reported significantly more depressive symptoms ($M = 2.52$ vs. 2.03, $SD = .73$ vs. $.78$), F $(1, 851) = 62.68$, ($p < .001$), higher stress ($M = 2.70$ vs. 2.11, $SD = 1.05$ vs. $.72$), F $(1, 851) = 42.82$, ($p < .001$), more negative affect ($M = 2.15$ vs. 1.84, $SD = .72$ vs. $.58$), F $(1, 851) = 26.16$, ($p < .001$) and even more somatic symptoms ($M = 1.57$ vs. 1.38, $SD = .73$ vs. $.78$), F $(1, 891) = 37.23$, ($p < .001$).

Exploring RQ4 and RQ5, our moderated mediation model was significant in predicting somatic symptoms (Figure 1), $F (6, 844) = 82.10$, $p < .001$, $R^2 = .37$. Depressive symptoms ($\beta = .24$, $p < .001$, 95% CI = [.19, .29]) and negative affect ($\beta = .12$, $p < .001$, 95% CI = [.07, .17]) were significantly associated with more somatic symptoms. Increased generic use of social media use was directly associated with more self-reported somatic symptoms ($\beta = .05$, $p < .01$, 95% CI = [.02, .08]). Females tended to report more symptoms than males ($\beta = .07$, $p < .05$, 95% CI = [.01, .12]). The moderated mediation effect of quarantine status was significant through depressive symptoms ($\beta = -.05$, 95% CI = [-.08, -.02]).

Regarding RQ4, the interaction between quarantine status and generic social media use was significant in predicting depressive symptoms ($\beta = -.20$, $p < .01$, 95% CI = [-.33, -.07]) and stress ($\beta = -.19$, $p < .05$, 95% CI = [-.36, -.01]) (Figure 2). That is, the negative relationship between generic social media use and psychological well-being were significantly stronger for quarantined people, compared unquarantined people. Taken together, quarantine status moderated the relationship between generic social media use and psychological well-being, which was in turn associated with physical health.

Discussion

The present study explored the associations between social media use and psychological and physical well-being during lockdown. We found that non-COVID related self-
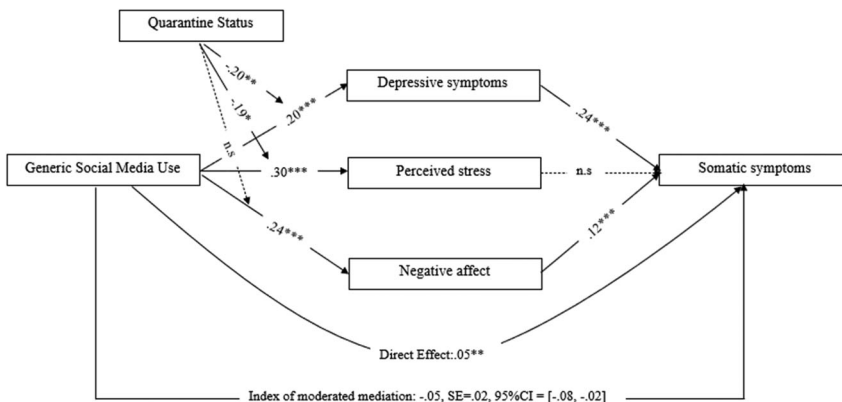

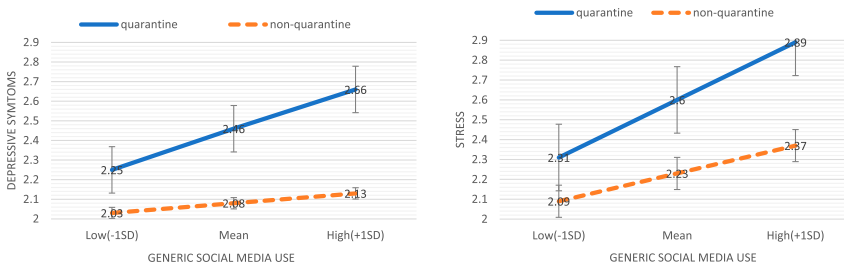**Figure 1.** Moderated Mediation Model Results.

Figure 2. Moderation Effect of Quarantine on Generic Social Media Use and Psychological Well-being.

disclosure on social media was positively associated with psychological well-being, whereas COVID related information consumption, sharing and seeking were overall negatively associated with psychological well-being. Greater generic social media use was negatively associated with psychological well-being, which in turn related to undermined physical health. Notably, the negative associations between social media use and well-being were significantly stronger for quarantined people, compared with non-quarantined people.

Social media use, psychological well-being, and physical health

In general, our results revealed that more generic social media use was associated with lower well-being during COVID-19 lockdown. A closer examination of specific social media activities showed that among the various social media activities, only non-COVID related self-disclosure was related to higher psychological well-being. This finding corroborates previous research suggesting that active social media use is positively associated with well-being (Verduyn et al., 2017). By sharing inner thoughts of their feelings with others through writing, images or videos, people may receive greater social support that is otherwise unavailable offline (Zhang, 2017). However, this correlational finding does not rule out the possibility that people who were less stressful and depressive were more likely to share personal information not relevant to COVID.

In contrast, COVID-related information consumption and information seeking were associated with lower psychological well-being. A number of possible mechanisms can help explain this finding. For example, consumption of other's negative posts on social media may induce emotional contagion, as people are likely to absorb and echo other's negative emotions, such as fear, anxiety and anger (Gao et al., 2020; Lin et al., 2020). Social comparison might be another factor (Verduyn et al., 2015), such that Wuhan residents may have felt frustrated when they saw positive posts (e.g., friends gathering) shared by people who were not under lockdown in other places. Future studies may manipulate the time spent engaging in different social media activities and examine whether time allocation would make a difference on well-being.

However, different from the active–passive dichotomy framework (Verduyn et al., 2017), other activities normally viewed as active usage, such as direct communication and entertainment, were not associated with better well-being. We suspect that other mechanisms might be at play. For example, interpersonal-connection-framework posits that only connection-promoting use of social media is beneficial (Clark et al., 2017).

Some active social media activities, such as arguments with strangers and video gaming without meaningful social interactions, may fail to enhance interpersonal connection or well-being (Baym, 2015; Clark et al., 2017). Overall, this study extends the dichotomous view of social media use, highlighting the importance of attending to the content of social media interactions and consumption.

Notably, as multiple psychological well-being indicators mediate the relationship between social media use and somatic symptoms, our findings enrich the scarce research on physical health implications of social media use (e.g., Lee et al., in press). In particular, our results suggest that psychological well-being as a potential mechanism by which social media use may undermine physical health. For example, negative emotions provoked by social media use, such as exposure to misinformation and fake news, might engender the risks of developing somatic symptoms (e.g., chest pain, headache; Tyrer & Baldwin, 2006). However, it is equally plausible that individuals whose physical health status is already compromised may develop mental health issues, which can lead to excessive or even addictive social media use (Chen et al., 2020b). More research is needed to untangle the intricate relationships between social media use, psychological well-being, and physical health.

The moderating role of quarantine status

Our findings also showed that the relationships among social media use, psychological well-being, and physical health were contingent on individuals' quarantine status. In general, although people under quarantine reported significantly more social media use than those who were not, the patterns of their usage were largely similar (Table 2) – they both primarily used social media for direct interaction and information consumption, but less for information sharing. Although previous findings argued that meaningful social interactions are less likely to happen via social media (vs. offline, Hall, 2016), our participants appeared to have adapted to the lockdown environment by using social media substantially for direct interaction. In particular, approximately over 60% of our quarantined participants reported they had been using social media for direct communication 'very often/all the time.'

Importantly, our findings showed that the negative relationships between social media use and psychological well-being were generally stronger for quarantined people than for unquarantined people (Figure 2). Given that quarantined people were not able to go to workplace or engage in outdoor activities, they might have spent more time on social media, consuming and seeking information related to COVID, which may lead to lower psychological well-being. For those who were working at essential businesses, the limited leisure time, less feelings of boredom, and probably better access to information might distract them from social media. This finding highlights the role of social context and life circumstances in influencing the health implications of social media, demonstrating the importance of attending to social embeddedness of technology use in understanding its relationship with well-being (Bijker, 1987).

Limitations

Our study has some limitations. First, although our typology-based measurements captured major activities on social media (Liu et al., 2019), our scale is not exhaustive. Future

study may consider examining a wider variety of activities and take account into the type and affordances of different social media platforms. Similarly, physical health can be assessed by a range of indicators other than somatic symptoms (Lee et al., in press; Lee & Way, 2021). Alternative indicators, such as body mass index and frequency of clinic visits, can be included in future studies.

Also, we relied on self-report responses to measure social media use, which might involve some measurement errors and recall biases (Parry et al., 2021). Alternative scales are available to capture social media use. For example, Bergan Social Media addiction Scale has been widely used to capture excessive social media use and is validated in different contexts (Leung et al., 2020). Future studies can also include objective social media use measures such as screen time for different activity or collect qualitative data through interviews to get a more comprehensive understanding of how people use social media during the crisis.

The cross-sectional nature of the study makes it hard to establish causality of the associations we found. For example, the positive relationship between self-disclosure and psychological well-being is likely bidirectional: people who are less stressed are more likely to disclose their life events not relevant to the pandemic; at the same time, sharing pandemic-irrelevant events may distract people from the anxiety and uncertainty induced by COVID-19. Future studies could utilize longitudinal or experimental designs to further understand the directionality between social media use and health outcomes. Large-scale computational analyses can be utilized to understand how online discussions of mental health are related to individuals' physical and psychological well-being (Shen et al., 2020).

Lastly, we used nonprobability sampling in our study. Nonprobability sampling techniques are often criticized due to the subjective nature in choosing a sample and thus may not be representative of the population; however, it is particularly useful when randomization is not available (Etikan, 2016). We believe the opportunity to recruit a unique sample (i.e., under strict quarantine vs. not) during the initial phase of the pandemic can provide important insights into to novel questions that are otherwise difficult to address.

Conclusion

Our research suggests that during lockdown, the increased use of social media, especially constant consumption of pandemic-related information, was negatively associated with psychological well-being, which in turn was correlated with undermined physical health. Quarantined people engaged in more social media use to compared with unquarantined individuals. Importantly, the negative association between social media use and psychological well-being was generally stronger for quarantined people than unquarantined people. This study deepens our understanding of the relationship between social media use and well-being in a unique context, where offline social interactions were strictly restricted.

Notes

1. We further validated participants' quarantine status by asking more questions. For example, on a four-point scale (1= never been out, 2 = I have been out fewer than 3 times, 3 = I went

out for 3–5 times, 4 = I have been out for more than 5 times), participants were asked 'since Wuhan was locked down, how many times have you been out?' ($M = 2.55$, $SD = 1.33$). Unquarantined people reported being outside home more often than quarantined people ($M = 3.11$ vs. 2.30), $F (1, 891) = 77.59$, ($p < .001$).

2. We excluded two items from the original scale that were not applicable to this study: 'how often have you experienced menstrual cramps or other problems with your periods/pain or problems during sexual intercourse.'

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No potential conflict of interest was reported by the author(s).

Notes on contributors

Zhiying Yue, Department of Communication, University at Buffalo, The State University of New York, Buffalo, N.Y., United States, 14260.

David S. Lee, Ph.D., Department of Communication, University at Buffalo, the State University of New York, Buffalo, N.Y., United States, 14260.

Jun Xiao, Ph.D., Center for Studies of Media Development in Wuhan University, Key Research Institute of Humanity and Social Sciences, Ministry of Education, China; School of Journalism and Communication, Wuhan University.

Renwen Zhang, Department of Communication and New Media, National University of Singapore, Singapore.

ORCID

Zhiying Yue http://orcid.org/0000-0003-1921-1409
David S. Lee http://orcid.org/0000-0003-4267-4604
Renwen Zhang http://orcid.org/0000-0002-7636-9598

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