JSPR

Journal of Social and Personal Relationships
2023, Vol. 0(0) 1–19

DOI: 10.1177/02654075231188185
journals.sagepub.com/home/spr
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Social media use, perceived social support, and well-being: Evidence from two waves of surveys peri- and post-COVID-19 lockdown

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Abstract

Numerous studies have suggested that active social media use can promote well-being by enhancing perceived social support. However, the relationship between social media use and perceived social support remains inconsistent across studies. This study explores possible mechanisms underlying the relationship between active social media use, perceived social support, and well-being during and after a COVID-19 lockdown. Using online surveys with Chinese participants during (N = 1,131) and after (N = 407) the lockdown period, our findings support a sequential mediation model. Specifically, active social media use was positively associated with perceived online network responsiveness, which in turn, predicted augmented perceived social support. Ultimately, increased social support was linked to reduced loneliness and increased life satisfaction. These findings were consistent both during and after the lockdown, indicating that social media has the potential to complement offline social interactions and effectively fulfill individuals' social needs.

Keywords

Social media, well-being, perceived social support, perceived online network responsiveness, COVID-19, lockdown

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Introduction

The nexus between social media and well-being has long been a topic of intense scholarly debate (e.g., Clark et al., 2018; Dienlin et al., 2017; Kross et al., 2020; Liu et al., 2019). While passive consumption of social media content (i.e., passive social media use) has been suggested to be associated with decreased well-being (Verduyn et al., 2020; Yue et al., 2022), there is evidence showing that active social media use, defined by direct information exchange with others, may be associated with positive outcomes (Clark et al., 2018; Dienlin & Johannes, 2022). A key mechanism underlying the positive relationship between active social media use and well-being is social support and social connectedness (Clark et al., 2018; Kross et al., 2020; Lin et al., 2020; Liu et al., 2019).

Perceived social support is generally defined as the "extent to which an individual believes that his or her needs for support, information, and feedback are fulfilled" (Procidano & Heller, 1983, p. 4). Numerous studies have shown that reciprocal information exchanges and positive social interactions on social media can bolster perceived social support (Lu & Hampton, 2016; Valkenburg & Peter, 2007; Wohn et al., 2016), which can mitigate the impact of stressful events and promote well-being (Chu et al., 2010; Zhang, 2017). Although social support is widely recognized as a crucial explanation of well-being (Siedlecki et al., 2014), the relationship between active social media use and perceived social support remains inconclusive, with empirical studies yielding mixed results. Some studies have reported positive associations (Rains et al., 2015; Steinfield et al., 2009; Zhang, 2017), while others have reported non-significant or negative relationships (Hall, 2018; Hamm et al., 2015; Li et al., 2015; Utz & Breuer, 2017). Several factors may account for these inconsistent results.

First, perceived social support primarily depends on receiving supportive words and actions from others (Cutrona & Suhr, 1992). However, it is important to note that active use of social media, such as sharing personal experiences, does not necessarily guarantee the provision of supportive responses. In fact, research has shown that disclosing stigmatized experiences on social media can lead to negative responses and social judgments from the audience (Suk et al., 2023), potentially diminishing perceived social support (e.g., Andalibi et al., 2018). Therefore, the relationship between active social media use and perceived social support may be context-specific and contingent on the nature and quality of the feedback received from others. To address this issue, our study surveyed participants in two distinct contexts—during and after lockdown to account for varying contexts in assessing the relationship between active social media use and perceived social support.

Second, we distinguish perceived social support from perceived online network responsiveness. Perceived social support hinges on the subjective belief of having reliable assistance in times of need or stress, often from close family and friends across both online and offline contexts; In contrast, perceived online network responsiveness specifically encapsulates an individual's perception of their entire social media network's active and supportive engagement with their posts, which is subject to the varying dynamics and characteristics unique to online interactions (Procidano & Heller, 1983; Walsh et al., 2020). Unlike a general sense of being supported, perceived online network

responsiveness is more strictly tied to the reactions and engagements received on social media. It is unclear to what extent perceived online network responsiveness translates into a general perception of being supported.

Prior research highlights that a significant amount of perceived social support is rooted in in-person interactions with close connections (Chen, 2012; Cutrona & Suhr, 1992; Haythornthwaite, 2005; Lu & Hampton, 2016). However, social media platforms facilitate connections with both strong and weak ties, and people tend to use them more often to interact with weaker ties while resorting to diverse communication channels to engage with their close relationships (Baym, 2015; Manago et al., 2012). Most studies on social media and social support have focused on contexts where face-to-face communication is dominant, with social media serving as a complementary channel (e.g., Beyens et al., 2020; Hall, 2018). However, the connection between active social media use and perceived social support is less straightforward when offline, in-person communication is constrained or limited.

Utilizing two waves of survey study, gathered during and after a lockdown period in Wuhan, China, when most people were quarantined at home and face-to-face communication outside the household was greatly limited, our study examines the mediating roles of perceived online network responsiveness and perceived social support in the relationship between active social media use and well-being. By exploring how these relationships fluctuate with varying availability of face-to-face communication, we shed light on the potential benefits of active social media use for well-being during crises, and further elucidate the underlying mechanisms.

Active social media use, perceived social support, and well-being

The prevalence of social media has spurred extensive research on its relationship with well-being. However, studies examining the gross time spent on social media and well-being have produced mixed results (Clark et al., 2018; Kross et al., 2020; Yue et al., 2021). It is suggested that this relationship depends on how and why people use it (Kross et al., 2020). Passive usage, which involves "monitoring the online life of other users without engaging in direct exchanges with them" (Verduyn et al., 2020, p. 3), can harm well-being through social comparison and displacement of more beneficial activities (Kross et al., 2020; Verduyn et al., 2017; 2020; Yue et al., 2022). In contrast, active use, which involves direct information exchange such as broadcasting or targeted one-on-one exchanges, can benefit well-being through an enhanced sense of social support (Clark et al., 2018; Dienlin & Johannes, 2022; Verduyn et al., 2020; Zhang, 2017).

Social support involves emotional care, instrumental help, and informational aid that people give and receive through human interactions (Procidano & Heller, 1983). It's crucial to differentiate perceived social support, gauging if social needs are met, from actual support received from one's network (Procidano & Heller, 1983). The appropriateness and quality of support determine satisfaction (Cutrona & Suhr, 1992). Studies suggest that social media can fulfill individuals' needs for social support under certain conditions, as they often enable individuals to broadcast messages to diverse audiences, facilitating the receipt of supportive resources (Blight et al., 2015; Kramer

et al., 2014; Lu & Hampton, 2016). For instance, during the Metoo movement, sharing personal traumatic experiences on social media garnered acknowledgment from a diverse group of people, who admitted, endorsed, and empathized with others (Suk et al., 2023). When individuals self-disclose to their relational partners, the feedback and responses they receive can predict increased intimacy and a sense of connectedness, potentially promoting well-being (Clark et al., 2018; Zhang, 2017).

However, the relationship between active social media use and perceived social support remains unclear (Hall, 2018; Hamm et al., 2015; Li et al., 2015; Utz & Breuer, 2017). Hall (2018) contended that social media use is not always regarded as a form of meaningful social interaction. For example, broadcasting content for visibility may not necessarily foster mutual understanding or establish social connections (Hall, 2018). In fact, some posts may go unnoticed or receive undesirable responses (Burke & Kraut, 2014), which can limit the effectiveness of active social media use in promoting perceived social support.

The context in which social support is sought might be critical (Williams, 2004). During times of stress, such as the initial period of social distancing and quarantine measures enforced during the COVID-19 pandemic, individuals' needs for online social connections may have surged. There might have been heightened expectations for online interactivity during this unique period. However, the extent to which social media can facilitate perceived social support during and after the COVID-19 lockdown remains uncertain. Given these uncertainties and inconsistencies in the literature, we proposed the following research question:

RQ1: What is the relationship between active social media use, perceived social support, and well-being during the COVID-19 pandemic?

Perceived online network responsiveness and perceived social support

It is important to distinguish between *perceived online network responsiveness* and *perceived social support*. *Perceived responsiveness* involves the belief that "relationship partners attend to and react supportively to central, core defining features of the self" (Reis et al., 2004, p. 203). In the context of social media, online network responsiveness stems from the phenomenon of context collapse, where individuals can broadcast messages to multiple recipients simultaneously (Marwick & Boyd, 2010). Walsh et al. (2020) defined *online network responsiveness* as the extent to which individuals perceive their online social network (i.e., people to whom they are connected on social media) as a single entity to react supportively to their posts. This perception can be influenced by aggregate counts of lightweight responses, such as likes or favorites, received from one's social media connections as a whole (Walsh et al., 2020). We adopt this definition in our paper and assert its distinction from perceived social support for several reasons.

First, perceived online network responsiveness and perceived social support operate separately due to their distinct conceptual characteristics (Rozzell et al., 2014). Perceived online network responsiveness captures the perceived supportive engagement level from an individual's broader social media network, predominantly composed of weak ties, as

gauged through responses to their online posts (Walsh et al., 2020; Wohn et al., 2016). In contrast, perceived social support is rooted in the perceived availability of help from others, both online and offline, during times of need (Cutrona & Suhr, 1992). Hence, the primary distinction lies in the scope of the network being considered (broader social media connections with more weak ties vs. narrower ones with more close ties) and the context of support (general online engagement vs. the availability of specific assistance during times of need).

It is plausible that perceived network responsiveness is more reflective of the responses received from one's online connections, while perceived social support is influenced by the interplay between one's online and offline social interactions and psychological needs.

Second, perceived online network responsiveness can serve as a predictor of individuals' perceived social support. Receipt of positive reactions on social media can foster a cumulative effect, providing comfort and meeting care needs. These beneficial interactions are particularly useful for individuals facing stressful situations or coping with illness (Rains et al., 2015; Wohn et al., 2016). Increased perceived online network responsiveness may suggest a relaxed environment that encourages the expression of assistance needs (Walsh et al., 2020). When individuals' primary social networks, such as friends and family members, may not fully understand their concerns or issues, having alternative social connections on social media can be invaluable (e.g., Rains et al., 2015). Therefore, it is reasonable to assume that active use of social media can enhance individuals' perceived online network responsiveness, which in turn, can positively correlate with perceived social support.

However, it is important to note that perceived online network responsiveness may not fully translate into a general sense of being supported. Although individuals might perceive their online connections as being responsive, discrepancies can arise between the anticipated and actual type of quality of support offered (Kaul & Lakey, 2003). The prevalence of quick, low-cost responses such as likes and upvotes on social media may acknowledge one's online presence and elevate the sense of online network responsiveness, but may not always signify high perceived social support (Hayes et al., 2016). Personalized messages delivered through private channels are often seen as more meaningful and supportive compared to light-weight responses from weak ties on social media (Baym, 2015; Carr et al., 2016; Lu & Hampton, 2016). Therefore, individuals' perceived online network responsiveness may not always align with their perceived social support.

Sharing information on social media can sometimes have unintended consequences such as cyberbullying, alienation, social rejection, and hostility, especially when disclosing negative emotions or stigmatized experiences (Andalibi et al., 2018; Suk et al., 2023; Whittaker & Kowalski, 2014), which casts further uncertainty on how individuals' active social media use relates to their perceived online network responsiveness. While active social media use has been defined in various ways, for the purpose of this study, we follow the lead of Verduyn et al., (2020) in defining it as direct information exchange, and operationalizing it as direct interaction with others and sharing information related and unrelated to COVID-19. We suspect that COVID-19-related information often encompasses more negative and support-seeking content, as individuals may share their

pandemic-specific concerns, challenges, and experiences, while general information sharing not related to COVID-19 might be less support-seeking and more neutral, as it covers everyday topics and issues. Given the inconsistency in the outcomes of active social media use, we ask the following research question:

RQ2: What is the role of perceived online network responsiveness in the relationship between active social media use, perceived social support, and well-being?

Social context of social media use

Many studies on social media and social support have been conducted in contexts where face-to-face communication is the primary mode of interaction, with social media playing a supplementing role (Beyens et al., 2020; Hall, 2018). While certain scholars argue that online relationships, given time, can attain comparable intimacy levels to their offline counterparts (Walther, 1992), face-to-face communication, abundant in empathy-inducing non-verbal cues, still remains a primary conduit for expressing empathy, care, and reassurance (Cohen et al., 2014). Our study seeks to explore whether computer-mediated communication (CMC) could sufficiently fulfill individuals' social needs during and after a lockdown when traditional face-to-face communication is largely restricted.

Amid the COVID-19 lockdowns, individuals increasingly turned to social media for informational, emotional, and tangible support, such as food delivery or resource exchange (Xiao et al., 2020). This leads to an expectation of higher perceived social support derived from social media during lockdown than in non-lockdown periods. Furthermore, natural disasters and crises can foster a sense of "we-ness," leading to increased cooperation and altruism (Yue & Yang, 2021). Disclosing distress during such times can enhance perceived social support due to the possibility of reduced stigma and judgment (Zhang et al., 2021a). Therefore, active social media use, particularly sharing personal feelings and experiences, might have been a more effective strategy to receive support during lockdown than non-lockdown periods.

Accordingly, a natural question emerges: can the use of social media effectively enhance perceived social support when offline communication is significantly limited? To address this question, we focused on the first epicenter of COVID-19—Wuhan, China. Beginning on January 23rd, 2020, Wuhan was under strict lockdown for 76 days, during which offline communication with people outside one's household was drastically curtailed (Pan et al., 2020). Consequently, social media emerged as the primary means of connection, information, and entertainment. While in the post-lockdown period, as people gradually resumed face-to-face interactions, social media usage might have shifted to serve a complementary role alongside offline communication. We pose a research question as follows:

RQ3: How do the relationships among active social media use, perceived online network responsiveness, perceived social support, and well-being differ during and after the lockdown?

Methods

Procedure

To address our research questions, we conducted two waves of survey data collection in Wuhan, China. The first wave was carried out in March 2020, approximately 40 days after the city was locked down and residents were mandated to stay at home (WHO, 2020). Using a combination of convenience and snowball sampling, we recruited 1,131 participants by posting recruitment announcements on the authors' personal Weibo and WeChat accounts, as well as on the official WeChat accounts of the Research Center at Wuhan University. Interested participants could access the survey through the link provided in the announcement, and they were encouraged to share the survey with others. At the end of the survey, participants were invited to leave their contact information if they were interested in participating in a follow-up study.

The second wave of survey data was collected in early June 2020, approximately 40 days after the lockdown was lifted. We contacted all participants who had left their contact information in the first wave. However, since only a limited number of participants provided their contact information, we also posted recruitment announcements on the authors' personal social media accounts as well as the University Research Center's official WeChat accounts and encouraged participants to share the survey with others. In both waves, survey participants received an incentive of RMB 5 (USD 0.77). Informed consent was obtained from all participants at the start of each study, and all research procedures were approved by the Institutional Review Board at the University at Buffalo, where the first author was affiliated while conducting the study. The survey questions were originally in English and were translated into Chinese by the first author. We pilot-tested the survey with 20 bilingual students to ensure the accuracy of the translation.

Eligible participants were those who were healthy adults[1] and who resided in Wuhan at the time of data collection. In Wave 1, the final sample included 1,131 participants, who ranged from 18 to 81 years old ($M = 38.99$, $SD = 10.84$). About 70% of the participants were female. On average, participants reported living with 2–3 people (M = 2.58; $SD = 1.52$). In the second wave, our sample included 407 participants aged 18 to 75 ($M = 38.19$ $SD = 10.05$), of whom about 66% were female. On average, participants reported 2.58 ($SD = 1.55$) people living in their households.

Measures

Active social media use was measured by asking the participants how often they had been using social media for (1) direct interactions with others; (2) sharing COVID-19-related information such as experiences, thoughts, feelings, and comments; and (3) sharing non-COVID-19 related information such as selfies or general life stories (Liu et al., 2019). Responses were rated on a five-point Likert scale ranging from "never" to "always" ($\alpha_{wave1} = .67$; $\alpha_{wave2} = .69$).

Online network responsiveness was assessed by asking participants to evaluate the overall supportiveness of their social media connections on a scale of 1 (*not supportive at all*) to 5 (*extremely supportive*) (Walsh et al., 2020).

Perceived social support was measured using six items adapted from the perceived social support scale (Zimet et al., 1988). Participants' responses were measured on a five-point scale (1 = *not at all* to 5 = *very much true*). Example items include "There are people around with whom I can share joys and sorrows"; "There are people around who try to help me" and "There are people around who are a real source of comfort to me" (α_{wave1} = .92; α_{wave2} = .95).

To assess *psychological well-being*, both hedonic and eudaimonic well-being were measured. Hedonic well-being focused on happiness and pleasure (Ryan & Deci, 2001), was operationalized as loneliness using three items adapted from a shortened version of the loneliness scale (Hughes et al., 2004). Participants rated their responses on a five-point scale ranging from 1 = *not at all* to 5 = *very much*. The items included "How often have you ever felt (1) a lack of companionship; (2) being left out and (3) being isolated from others" (α_{wave1} = .79; α_{wave2} = .86).

Eudaimonic well-being, which focuses on life-meaning and self-realization (Ryan & Deci, 2001), was operationalized as life satisfaction using three items adapted from the satisfaction with life scale (Diener et al., 1985). Participants rated their responses on a five-point scale (1 = *strongly disagree* to 5 = *strongly agree*). The items include "In general, in most ways my life is close to my ideal"; "The conditions of my life are excellent"; "I am satisfied with my life"; and "If I could have lived my life over, I would have changed almost nothing" (α_{wave1} = .85; α_{wave2} = .87).

Control variables. In the analysis, we included passive social media use (i.e., the frequency for people to use social media to passively browse information either relevant or non-relevant to COVID-19), demographic variables such as gender and age, and the number of people living in one household as covariates. Table 1 presents the descriptive statistics, reliability, and correlations among the key variables above. Specific measures are reported in the Supplementary Appendix.

Data analysis

Based on the contact information, we discovered that roughly 10% of the participants who completed the Wave 1 survey also participated in the Wave 2 survey. Given the challenges associated with accurately identifying all individuals who participated in both waves—stemming from privacy concerns and inaccurate contact information supplied by some participants-we elected to treat the data from the two waves as separate cross-sectional samples.[2] Descriptive and correlational analyses were conducted within SPSS 26.0 and Mplus 7.4 for confirmative factor analysis, path analysis, and multigroup comparison. We first specified a measurement model through confirmatory factor analysis, which exhibited good model fit (χ^2 = 455.51, *df* = 93, χ^2/df = 4.90, RMSEA = .05, SRMR = .05, CFI = .94, TLI = .93), and all factor loadings were above .50.

Subsequently, we conducted an overall path analysis using data from both Wave 1 and Wave 2 to explore our research questions. Then we conducted multigroup analysis

(MGA) using *context* (peri- vs. post-lockdown) as the grouping variable. To determine whether the parameters differed across groups, we used a nested model chi-square test to compare the model with path coefficients constrained across groups to the one without constraint.[3]

Results

We conducted a series of ANOVA analyses to examine the differences in key variables during and after the lockdown. Our participants reported significantly more active social media use during the lockdown, F (1, 1302) = 14.86, $p < .001$. They reported lower life satisfaction (F (1, 1536) = 105.02, $p < .001$) and higher loneliness (F (1, 1322) = 4.91, $p < .05$) during lockdown compared to after. Interestingly, people perceived higher online network responsiveness (F (1, 1319) = 11.79, $p < .001$) and social support (F (1, 1229) = 25.02, $p < .001$) during the lockdown than after (see means and *SD*s in Table 1).

We then specified an overall path analysis with both Wave 1 and Wave 2 data. To test mediations, we conducted bootstrapped mediation analyses with 10,000 randomly

Table 1. Zero-order correlations among key variables.

Variables	*M(SD)* Cronbach's α	1	2	3	4	5
During lockdown (Wave 1)						
1. Active social media use	2.57(.88) .67	--				
2. Perceived online Network responsiveness	2.81(1.20)	.30***	--			
3. Social support	4.01(.61) .92	.13***	.26***	--		
4. Loneliness	1.76(.84) .79	.15***	-.03	-.22***	--	
5. Life satisfaction	2.90(.89) .85	-.17***	.04	.14***	-.36***	--
After lockdown (Wave 2)						
1. Active social media use	2.36(.79) .69	--				
2. Perceived online network	2.56(1.17)	.27***	--			
3. Social support	3.81(.74) .95	.12*	.24***	--		
4. Loneliness	1.65(.79) .86	.10*	-.05	-.28***	--	
5. Life satisfaction	3.42(.87) .87	-.11*	.12*	.14**	-.29***	--

Note. Social support, loneliness, and life satisfaction variables are based on composites; *$p < .05$, **$p < .01$, ***$p < .001$.

generated subsamples. The results revealed that our sequential mediation model explained 7.9% of the variance in life satisfaction and 14.1% variance in loneliness. Our model is a saturated model that has a perfect model fit (Kline, 2006).

RQ1 and RQ2 explore the relationship between active social media use, perceived online network responsiveness, perceived social support, and well-being. Our path analysis with both waves of data showed that active social media use positively predicted perceived online network responsiveness ($\beta = .29$, $p < .001$, 95% CI = [.22, .35]), which was positively associated with perceived social support ($\beta = .24$, $p < .001$, 95% CI = [.19, .30]). Higher perceived social support, in turn, predicted higher life satisfaction ($\beta = .11$, $p < .001$, 95% CI = [.05, .18]) and lower loneliness ($\beta = -.24$, $p < .001$, 95% CI = [-.31, -.18]). Active social media was directly associated with life satisfaction ($\beta = -.10$, $p < .01$, 95% CI = [-.17, -.04]) and loneliness ($\beta = .11$, $p < .01$, 95% CI = [.04, .17]). Perceived online network responsiveness was also directly associated with life satisfaction ($\beta = .08$, $p < .05$, 95% CI = [.02, .14]). The more people living in one's household, the lower perceived online network responsiveness people reported ($\beta = -.09$, $p < .01$, 95% CI = [-.15, -.03]). Older people reported lower loneliness ($\beta = -.18$, $p < .001$, 95% CI = [-.23, -.12]). The relationship between active social media use and perceived social support was not significant ($p = .25$, 95% = [-.02, .08]). The indirect effect of active social media use on life satisfaction ($\beta = .02$, $p < .05$, 95% = [.01, .05]) was significant through perceived online network responsiveness. Neither the indirect effects of active social media use on loneliness ($p = .30$, 95% = [-.01, .02]) nor on life satisfaction ($p = .25$, 95% = [-.03, .01]) were significant through perceived social support. The sequential mediation was significant for both life satisfaction ($\beta = .01$, $p < .001$, 95% CI = [.003, .02]) and loneliness ($\beta = -.02$, $p < .001$, 95% CI = [-.02, -.01]) (see Supplementary Appendix for our syntax).

To explore whether these relationships differ during and after the lockdown (RQ3), we conducted multi-group comparisons, with *context* (Wave 1 vs. Wave 2) as the grouping variable (see Figure 1 for significant individual links). After running the unconstrained models, we constrained all parameters to have the same estimates for both waves. There were no significant differences between the fully constrained model and the unconstrained model ($\Delta\chi^2 = 9.94$, $\Delta df = 22$, $p = .98$). However, we observed differences revealed by the coefficient of each link.

Our multi-group modeling produced a good model fit with the data ($\chi^2 = 9.33$, $\chi^2_{\text{peri-}} = 7.88$, $\chi^2_{\text{peri-}} = 1.45$, $df = 6$, $\chi^2/df = 1.56$, RMSEA = .03, SRMR = .01, CFI = .99, TLI = .94). Specifically, during the lockdown period (Wave 1), our model explained 9% of the variance in life satisfaction and 13.3% in loneliness. Active social media use was positively associated with perceived online network responsiveness ($\beta = .29$, $p < .001$; 95% CI = [.21, .36]), which was positively associated with perceived social support ($\beta = .23$, $p < .001$; 95% CI = [.17, .30]). Perceived social support, in turn, predicted higher life satisfaction ($\beta = .13$, $p < .001$; 95% CI = [.05, .20]) and lower loneliness ($\beta = -.22$, $p < .001$; 95% CI = [-.29, -.15]). Active social media use was directly associated with lower life satisfaction ($\beta = -.11$, $p < .01$; 95% CI = [-.19, -.03]) and higher loneliness ($\beta = .13$, $p < .01$; 95% CI = [.05, .20]). The number of people living in one household was negatively associated with online network responsiveness ($\beta = -.07$, $p < .05$; 95% CI = [-.14, -.01]). Older people ($\beta = .08$, $p < .05$; 95% CI = [.01, .15]) and women ($\beta = .13$, $p <$

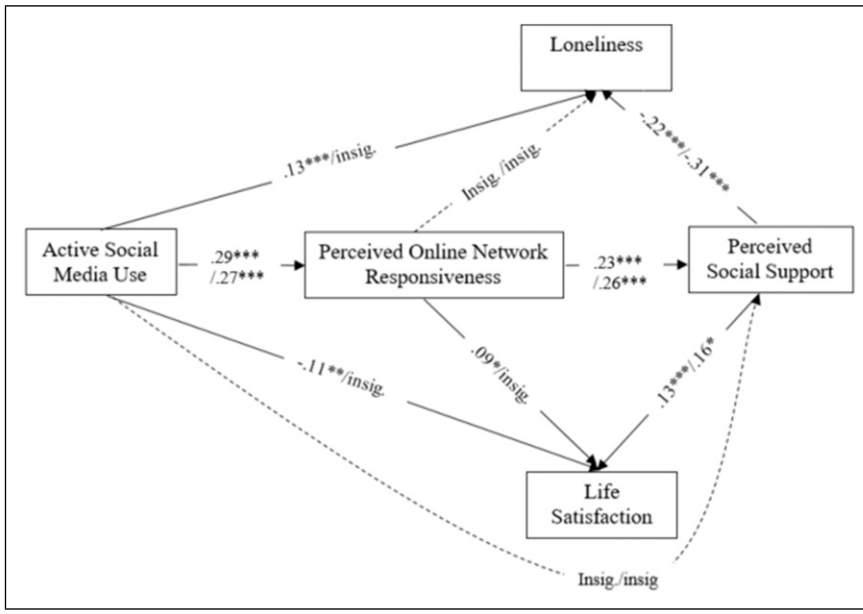

Figure 1. Multi-group path modeling results. Note: Standardized path coefficients for Wave 1 (i.e., during lockdown) are shown first, followed by standardized path coefficients for Wave 2 (after lockdown); *p <. 05; **p < .01; ***p < .001.

.001; 95% CI = [.06, .20]) reported higher perceived social support. The indirect effect of active social media use on life satisfaction was significant through perceived online network responsiveness (β = .03, p < .05; 95% CI = [.003, .05]). The indirect effects of active social media use on loneliness (p = .29; 95% CI = [-.01, .02]) and on life satisfaction (p = .33; 95% CI = [-.03, .01]) were not significant through perceived social support. However, the sequential mediations were significant for both life satisfaction (β = .01, p < .001; 95% CI = [.002, .01]) and loneliness (β = -.01, p < .001; 95% CI = [-.02, -.01]).

During the post-lockdown period, our model explained 5.7% variance in life satisfaction and 16.5% in loneliness. Active social media use was positively associated with online network responsiveness (β = .27, p < .001, 95% CI = [.16, .39]), which positively related to perceived social support (β = .26, p < .001, 95% CI = [.16, .36]). Perceived social support, in turn, predicted higher life satisfaction (β = .16, p < .001; 95% CI = [.03, .29]) and lower loneliness (β = -.31, p < .001; 95% CI = [-.41, -.20]). Older people perceived lower loneliness (β = -.22, p < .001; 95% CI = [-.32, -.11]). The number of people living in one household was also negatively associated with online network responsiveness (β = -.14, p < .05; 95% CI = [-.27, -.02]). The only significant indirect link was the sequential mediation between active social media use and loneliness through perceived online network responsiveness and perceived social support (β = -.02, p < .001; 95% CI = [-.04, -.01]).

Discussion

In light of the ongoing debate surrounding the impact of social media use on mental health, this study investigates the mechanisms that may elucidate the link between active social media use and psychological well-being during and after COVID-19 lockdown. Our results revealed a sequential mediation model whereby active social media use predicts higher perceived online network responsiveness, which is positively associated with perceived social support, culminating in reduced levels of loneliness and enhanced life satisfaction. These findings remained generally consistent across the peri- and post-lockdown periods, highlighting the promising potential of social media to complement face-to-face social interactions and fulfill people's social needs effectively.

Numerous studies have found that active social media use can improve well-being by enhancing the feeling of social connectedness (Clark et al., 2018; Verduyn et al., 2017). However, the specific role that perceived social support plays remains contentious. Our findings shed light on this issue by showing that perceived social support alone is not sufficient to explain the link between social media use and well-being. Instead, active social media use was indirectly related to perceived social support through the perception of online network responsiveness across the two waves of data. This suggests that active social media use may contribute to a general sense of social support only when individuals view their online connections as a supportive group. Specifically, among various social media activities, only direct interaction with others (e.g., private messaging) showed a positive association with perceived online network responsiveness across the two waves of data (see Supplementary Appendix for the post hoc regression analysis). These findings resonate with previous research that suggests meaningful social interactions mainly occur through one-on-one conversation rather than one-to-many broadcasts to a large audience on social media (Carpenter et al., 2018). Thus, it is important for social media companies to launch products and features that facilitate direct interactions between users, such as user-friendly private chat functions and chatrooms based on shared interests.

It is worth noting that the correlation between perceived online network responsiveness and perceived social support was moderately weak with correlation coefficients of .24 (Wave 1) and .26 (Wave 2). One possible reason is that social media collapses multiple audiences into one single context (Marwick & Boyd, 2010). Perceived social support is strongly linked to connections with strong ties but not weak ties (Kaul & Lakey, 2003), while one's online network contains many more weak ties than strong ties (Baym, 2015), therefore perceived online network responsiveness may operate separately from perceived social support. It is recommended that individuals maintain frequent conversations with their significant others during stressful situations. Another possible reason is that the format of supportive communication delivered by social media centers on lightweight one-click responses (Hayes et al., 2016), which cannot facilitate deep conversations that are generally perceived as more meaningful for developing social relationships (Hall, 2018). To promote perceived social support and well-being, clinical interventions or social machine agents (e.g., social robots) may employ personalized messages or deep conversations to interact with those who require assistance.

This study provides a focused analysis of how context impacts the relationship between active social media use and well-being. The results suggest that online network responsiveness and perceived social support consistently mediate this relationship in both contexts. However, active social media use was found to be directly associated with lower well-being only during the lockdown period, as evidenced by higher levels of loneliness and decreased life satisfaction. Notably, this negative relationship was not observed after the lockdown measures were lifted. It is possible that the sequential mediation model used in the current study may have overlooked other mechanisms, such as negative interaction, maladaptive social comparison, and negative emotion contagion, facilitated by active media use during the lockdown. Future studies should compare the relative weight of different mechanisms across contexts and delve into the nuances of active social media use.

Moreover, the study highlights the potential impact of the lack of physical touch and offline communication during the lockdown. As face-to-face communication was largely restricted, social media became a central means of maintaining social relationships. However, it is crucial to acknowledge that such mediated communication cannot replace non-verbal cues such as handshakes and hugs, which have been shown to reduce stress, pain, and blood pressure (Zhang et al., 2021b). These findings underscore the intricacies of the relationship between active social media use and well-being and urge for additional investigation into other potential mechanisms.

Our study revealed an intriguing finding that people who lived with more household members reported lower perceived online network responsiveness, and this trend was consistent across both contexts. We suspect that the competing demands from family members may account for this finding. For instance, working individuals living with children during the lockdown may have found it challenging to balance work and childcare responsibilities (Cheng et al., 2021), leaving them with less time to interact with friends online and receive supportive messages via social media. Conversely, those living with strong ties such as partners and parents during lockdown may receive enough social companionship, rendering additional support from online friends unnecessary. As a result, people living with others may undervalue the support they receive through social media, leading to a lower perceived network responsiveness. To gain a better understanding of this mechanism, future studies should explore how household composition and relational closeness during lockdown are related to individuals' needs and expectations for social support.

Limitations

First, self-report data used to capture social media use may be subject to various biases, suggesting the need to explore alternative data sources such as login data or passive sensing data. Moreover, although we intended to have more demographic covariates in our analysis to eliminate alternative explanations, these questions (e.g., income, marital status, and education) were finally removed due to the privacy concerns expressed by our participants who completed the survey in the first 2 days. Future studies should

incorporate more demographic information to better understand whether the relationships between social media use and well-being vary across different populations.

Second, our measurements may not be comprehensive enough to capture all types of active social media use and social support. For instance, participants may have varying interpretations of what constitutes direct social interactions. And our study did not include other forms of direct interaction that occur through means such as cell-phones. Future studies could explore more nuanced media use, such as the format of delivering supportive messages (e.g., lightweight one-click affordances, reciprocal information exchange, and one-on-one deep conversations), the content in mediated communication (e.g., topics, issues, and emotionality), and the relationship with response-providers (e.g., strong ties vs. weak ties) to gain further understanding of the relationship between technology use and well-being.

Third, our measure of perceived online network responsiveness may be limited. The use of a one-item measure may have introduced validity concerns, and our operationalization did not consider the overlap between one's online and offline social network. When rating their online network as a whole, participants may have included or excluded individuals who also interacted with them offline through different channels, which could potentially affect the divergent validity between perceived online network responsiveness and perceived social support. In addition, our measurement of social support did not distinguish between different types of support (e.g., informational, emotional, or instrumental support). Future studies may employ more comprehensive scales to assess this multidimensional concept. Furthermore, as we elected to treat Wave 1 and Wave 2 data as separate cross-sectional samples due to the difficulties in accurately identifying all participants who took part in both waves, readers should exercise caution in interpreting the results. This methodological decision may limit the scope of examining potential longitudinal effects.

Finally, the relationship between social media and well-being may be nonlinear or cyclical, rather than linear. For example, loneliness and life satisfaction may be factors that contribute to social media use, rather than the other way around. This is supported by research indicating that individuals who experienced loneliness during the pandemic were more likely to turn to social media as a coping mechanism (Lisitsa et al., 2020). Our additional analyses suggest that social media use may shape and be influenced by people's social and emotional experiences (see Supplementary Appendix for the results). Thus, future studies should explore these complexities and potential bidirectional relationships to gain a better understanding of the role of social media in well-being.

Conclusions

Our study showed that active social media use can have an indirect effect on well-being, which is mediated by perceived online network responsiveness and perceived social support. These dynamics were observed across two distinct contexts, suggesting that social media can be an important tool for people to maintain social connections during times of crisis. Specifically, the study highlighted the crucial role of perceived online network responsiveness in promoting a general sense of being supported, which is directly

linked to improved mental health and well-being. These findings have important implications for public health practitioners and policymakers in providing guidance on appropriate social media use to promote well-being during challenging times.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Open research statement

As part of IARR's encouragement of open research practices, the author(s) have provided the following information: This research was not pre-registered. The data used in the research can be publicly posted. The anonymized data and analysis scripts can be obtained at: https://osf.io/vufbk/?view_only=f6afff4e0f6c44e58d8b5585dcfccbef. The materials used in the research can be publicly posted. The materials can be obtained at the supplemental materials or be obtained by emailing zhiying.yue@childrens.harvard.edu.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. We used one item to assess participants' overall health (In general, since Wuhan was locked down/since the lockdown was lifted (April 8th), you would say that your health has been: poor, fair, good, very good, and excellent). We excluded 48 responses from Wave 1 and 2 responses from Wave 2 data, respectively, in our analysis to control for the potential confounding effect of health condition on social media use and psychological well-being.
2. Our analyses of the identified subsample (i.e., participants of both Wave 1 and Wave 2) revealed no significant differences in key variables compared to their respective wave cohorts. Furthermore, our lagged dependent variable analysis demonstrated minimal longitudinal effects. This suggests that participants' responses were primarily context-dependent, rather than influenced by recall or other longitudinal factors. Additional details regarding these analyses can be found in Supplementary Appendix.
3. Our data, syntax and results are available at https://osf.io/vufbk/?view_only=f6afff4e0f6c44e58d8b5585dcfccbef

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