Social Indicators Research (2023) 165:453–471
https://doi.org/10.1007/s11205-022-03023-3

ORIGINAL RESEARCH

"Nice You Share in Return": Informational Sharing, Reciprocal Sharing, and Life Satisfaction Amid COVID-19 Pandemic

Piper Liping Liu[1] · Vincent Huang[2] · Melannie Zhan[3] · Xinshu Zhao[1]

Accepted: 7 October 2022 / Published online: 29 October 2022

Abstract

Social media become an important space where people receive and share up-to-date health-related information during the rapid global spread of the novel coronavirus (COVID-19). While information sharing in social media has been shown to improve relations, reduce stress, and enhance life satisfaction, little is known about reciprocal sharing. Situated in COVID-19 pandemic, this study conceptualizes information sharing as a communication process during which sharers expect the receivers to reciprocate, while receivers feel obligated to return the favor. Building upon social exchange theory and studies on social media sharing, the study tested a model of moderated mediation in which sharing of COVID-19 information was predicted to enhance life satisfaction by encouraging reciprocal sharing, i.e., information reciprocity. Subjective norms, attitudes, and perceived usefulness of the information was predicted to moderate the mediation. The hypothesized mediation was supported by data from a survey of 511 online participants in China. Furthermore, the indirect effect appeared stronger among the respondents who found the information more useful, reported more positive attitude, or perceived more subjective norms. The findings suggest that expected reciprocation may be an important incentive for social sharing, and received reciprocation may be a central part of the mechanism through which sharing benefits the sharer. Policymakers and communicators may need to take information reciprocity into consideration when designing health information campaign to confront communal threats.

Keywords COVID-19 information sharing · Social media · Reciprocity · Life satisfaction · Moderated mediation

✉ Vincent Huang
vincenthuang@hkbu.edu.hk

[1] Department of Communication, University of Macau, Macau, China

[2] Department of Interactive Media, Hong Kong Baptist University, Hong Kong, China

[3] Division of Communication, School of Continuing Education, Hong Kong Baptist University, Hong Kong, China

1 Introduction

The rapid global spread of the novel coronavirus (COVID-19) has turned the disease into a catastrophic pandemic with 250 million confirmed cases and over 5 million deaths worldwide by November 2021 (Liu et al., 2021a, b). Countries around the world realize that the risks faced by our societies are complex, evolving, and associated with uncertainty and ambiguity. Extensive collaboration efforts to combat the disease have been encouraged (Fu et al., 2022), and people are becoming increasingly interdependent in response to communal risks (Liao et al., 2018; Lin & Abrahamsson, 2015). Communal risks include infectious diseases such as influenza, Ebola, and COVID-19, which share the same characteristics that 'pose danger to all members in a collective or a community, and that require some level of social response to manage or reduce' (Liao et al., 2018, p.910). Confronting communal risks, people are easily overwhelmed by negative emotions given the unprecedented uncertainty (Aqeel et al., 2021; Liu, 2020; Su et al., 2021), and the psychological needs to be cared for and informed were prioritized during the pandemic that essentially determined one's well-being (Fattahi et al., 2020; Šakan et al., 2020). As such, interdependence and risk information sharing is important to create shared understandings and make informed decisions that support public health security (Islam et al., 2020; Lu et al., 2021; Rahimi & Abadi, 2020; Yang et al., 2021). More importantly, information sharing has been found to be a critical part of one's life satisfaction since the shared information not only helps reduce uncertainty and elicit preventive actions but also implies care and concerns from others (Jiang & Hu, 2016; Wang, 2013).

Surrounding the COVID-19 pandemic, research on why people seek and share information has proliferated in the past two years (Huang & Yang, 2020; Kožuh & Čakš, 2021; Lu et al., 2021; Malik et al., 2021; Yang et al., 2021). For example, Yang et al. (2021) identified a series of socio-psychological factors that motivated people to share COVID-19 information, including current knowledge, information sufficiency threshold, informational subjective norms, and perceived information-gathering capacity. Based on the theory of planned behavior and uses and gratification theory, Malik et al., (2021) found that Facebook users shared COVID-19 information for entertainment, socializing, and status-seeking. Besides, earlier research has unexceptionally investigated information sharing at the organizational level (e.g., firm performance; Wang & Wang, 2012), and risk information sharing at individual and societal levels are only just beginning to be explored (Yang et al., 2021). Our knowledge about the reciprocal functions of risk information sharing, and how it exerts an impact on life satisfaction is still scattered and incomplete.

As the deep interdependence among people is fostered to a greater extent in the digital age, we are interested in how COVID-19 information sharing on social media helps foster reciprocal relationships and influence the actor's life satisfaction. We conceptualize information sharing as an activity of mutual exchange that contains anticipated reciprocity based on social exchange theory (SET). In other words, information sharing entails unspecified obligations in which people who receive shared information would be expected to return the favor. It is believed that social exchanges based on mutuality could yield long-term benefits such as well-being and life satisfaction (Jiang & Hu, 2016; Widén-Wulff & Ginman, 2004; Widén-Wulff et al., 2008). Although scholars are investigating social media as a critical information source during times of public health crisis, they have not yet directed sufficient interest toward the potentially promising link between information sharing on social media, reciprocity, and life satisfaction To fill the research gap, the current study proposed a model linking COVID-19 information sharing on social media and life

satisfaction through informational reciprocity. It also explored how individual differences in informational subjective norms, attitudes, and perceived information usefulness moderate the mediation relationship.

2 Conceptual Framework

Sharing, one of the social instincts that human beings are endowed with, is rooted in a spectrum of values, such as mutuality, reciprocity, equality, and care, which are constitutive of social relations (John, 2013b). Two typical semantic components of sharing have been emphasized by social science scholars: sharing is a form of communication that was accompanied by emotional variance, and sharing refers to the distribution of resources (John, 2013b; Zhao & John, 2020). As such, in the form of communication and resource distribution, the reciprocal and multidirectional nature of sharing has been recognized as fundamental to the formation and maintenance of social relations (John, 2013b). In human social interaction scenarios, people have a propensity to coordinate their actions in terms of turn-taking (Stevanovic & Peräkylä, 2015). This often happens in the context of information sharing: when one individual shares some information, and others reciprocate with information to sustain social relations and maintain collaboration (Andalibi et al., 2018; Surma, 2016). However, not all information sharing receives responses. This might be because the information is replicable (Chshir, 2007), and sharing information in some contexts (e.g., sharing news on social media) is with low costs, which makes reciprocity less desirable to some receivers. Thus, it is likely that there is a variance in informational reciprocity. Those who receive positive reciprocity will perceive higher life satisfaction. Relatively little research has linked information giving and its reciprocal responses and explored their impact on individual well-being. In this study, we draw on SET (Homans, 1958) to conceptualize information sharing on social media as a social exchange behavior. We argue that information sharing with positive reciprocal responses helps to improve individual life satisfaction.

SET has been widely applied in different contexts, including risk information sharing (Liao et al., 2018), knowledge sharing in organizational settings (Bartol et al., 2009; Widén-Wulff & Ginman, 2004), and online healthcare communities (Yan et al., 2016). Regardless, little research on communal risk information sharing using SET has investigated the role of social media in facilitating the sharing of public health information. The conceptualization of this study is based on SET proposed by Homans (1958), a theory created to explain the relationships between two parties through the cost-reward analysis. The theory's fundamental principle is that individuals tend to involve in certain activities that maximize profit and minimize cost in their endeavor (Bartol et al., 2009; Homans, 1958; Yan et al., 2016). At the heart of SET are the concepts of equity and reciprocity. Specifically, providers for any action or service are expecting a return of favor from the receivers, and the exchange expectancy concerns a certain agreed-upon standard of equivalence (Wahrendorf et al., 2010). In taking the view from human social interactions, SET posits that the exchange process requires joint efforts, and those engaged in interactions are both rational actors and reactors in social exchanges (Homans, 1958). In this study's context, if information sharing is a kind of social behavior, people should expect some sort of return from the receivers, or reciprocity. How their information sharing behaviors are responded to should affect how they evaluate the relationships with the receivers and life satisfaction. Based on this argument, we describe our model in the following sections.

2.1 Information Sharing on Social Media and Life Satisfaction

Technology innovations have brought tremendous benefits to development in various sectors of society, such as education, sustainable tourism, organizational management, medical, care coordination, and crisis management at the time of pandemic (Abbas et al., 2019, 2020; Li et al., 2022; NeJhaddadgar et al., 2020; Zhou et al., 2022). For example, Zhou et al. (2022) found that implementing non-pharmaceutical interventions through social media that worked in conjunction with various COVID-19 suppression measures was effective for crisis management. Social media refer to "internet-based technologies that allow users to easily create, edit, evaluate, and/or link to content or other creators of content" (Majchrzak et al., 2013, p. 38). Social media have become a catchphrase that people are using to communicate and share with others (Hasell & Weeks 2016; John 2013a; Osatuyi 2013). Sharing on social media incorporates both communication and distribution due to the unique features that social media allow the digital content sharing in a variety of forms (e.g., photos, video clips, and links) regardless of time and space constraints (John, 2013a). As such, sharing on social media has become essential to the establishment and maintenance of social relations in contemporary society (John, 2013a; Zhao & John, 2020). During the outbreak of the COVID-19 pandemic when lockdowns and curfews have been implemented (Zhou et al., 2022), people were at increased risks of mental health problems due to social isolation and COVID-19-related uncertainty (Kumar & Nayar, 2021; Shuja et al., 2020). Social media have become a ubiquitous part for social connection that helps mitigate COVID-19 related stress and increase the quality of life (Wong et al., 2021; Yang et al., 2020). This is because social media could provide immediate access to up-to-date information, and people increasingly rely on social media to share relevant information with family and friends for disease prevention and the expression of care (Liu, 2020).

Among the benefits identified in the literature, the most salient one is that information sharing could help improve and maintain interpersonal relationships that determine life satisfaction (Yang et al., 2020). Social science researchers have identified a positive association between communication, quality of social relationships, and life satisfaction (Aman et al., 2019; Lim & Putnam, 2010; Soroush et al., 2021). Empirical evidence has been documented in prior research suggesting that sharing COVID-19 related information on social media were positively related to people's life satisfaction and reduced mental illness (Yang et al., 2020). John (2013a, 2013b) has explicated the logic of sharing by emphasizing the human nature to express caring in a form of sharing what's important with people they care about. By this token, information sharing on social media play an essential role in establishing reciprocal social relationships, because people are driven by the expression of caring and relationship development motives when they share information (Chung et al., 2016; Hur et al., 2017; Lee & Ma, 2012; Maksl & Young, 2013). Individuals who leverage the informational utility of social media in organizational and interpersonal contexts are found to have higher levels of online social capital (Ellison et al., 2011; Huang & Liu, 2017; Sheer & Rice, 2017) and life satisfaction (Jiang & Hu, 2016; Wang, 2013). These studies suggest a direct relationship between information sharing and individual benefits. Following the existing literature, we first propose a direct relationship between information sharing and life satisfaction:

H1 Information sharing on social media will be positively associated with life satisfaction.

2.2 Mediating Role of Informational Reciprocity

Reciprocity is a social norm of responding to a positive action with another positive action. In response to friendly actions, people likely cooperate and return the favor with nicer actions (Belair-Gagnon et al., 2018; Perkins & Haley, 2013; Surma, 2016). Such positive and cooperative reciprocity is related to enhanced life satisfaction (Braun et al., 2018; Lowenstein et al., 2007; Perkins & Haley, 2013). Lowenstein et al. (2007) analyzed the intergenerational exchange patterns and found that receiving reciprocal support would exert a positive effect on life satisfaction in one's later life. In addition, Perkins and Haley (2013) found that giving and receiving compliments in social relationships, and reciprocal care would reduce depressive symptomatology and enhance mental health. The mechanism is that people feel cared for when they receive information and feel that their efforts are worthwhile. Thus, receiving reciprocal responses can be understood as receiving social approval from others on the persons' information sharing behaviors. In online contexts, studies have shown that people feel rewarded and would continue to participate in online community activities if they receive social approval from others (Belanche et al., 2019; Pai & Tsai, 2016).

Individuals who share information with others may seek a return of intrinsic and extrinsic benefits (Jiang & Hu, 2016; Yan et al., 2016). Intrinsic benefits, such as the feelings of pleasure and satisfaction, refer to psychological rewards that people achieve from making a meaningful contribution to others (Lang, 2000). Jiang and Hu (2016) found that knowledge sharing and information exchange would lead to greater life satisfaction because the sharing behaviors could help build reciprocal interpersonal relationships. Similarly, Belair-Gagnon et al. (2018) examined reciprocity in the context of give-and-take between journalist and their communities. They found that journalists often used social media (e.g., Twitter) to release news reports and build strong connections with the communities, and in turn, the audiences also contributed to the reporting process by providing feedback. In interpersonal contexts, Choi and Toma (2014) found that sharing positive and negative social events on social media (e.g., Twitter) were both related to individuals' psychological well-being, and reciprocal interaction has been stressed as an essential factor underlying the relationship between the sharing and psychological outcomes.

Applying this logic to COVID19 information sharing, as people increasingly use social media to share information about the pandemic, we argue that those who actively share information would perceive more life satisfaction if they receive reciprocal responses, i.e., receiving information shared by others (Chshir, 2007; Burke, Marlow, & Lento, 2009).

H2 The relationship between information sharing on social media and one's life satisfaction will be mediated through informational reciprocity.

2.3 Moderating Roles of Information Usefulness, Attitude, and Subjective Norms

Although we have argued that the distal relationship between one's information sharing on social media and life satisfaction is mediated by informational reciprocity, we expect the strength of this relationship to differ across different situational factors. This section thus examines three moderators of the mediation relationship (H2) proposed: perceived usefulness of information, attitude toward information sharing, and subjective norms. These moderators deal with the evaluation of the content of information, the evaluation

of information sharing behavior, and the perception of how others think about the information sharing behavior.

First, we propose that how people perceive the usefulness of COVID19 information will affect the mediating mechanism in which information sharing has a positive impact on life satisfaction through informational reciprocity. It can be reasoned that sharing behaviors could facilitate social integration. The ritual view of communication suggests that information sharing is not merely a transmission of information but a communicative behavior linked to participation, association, and mutual exchange (Carey, 2008). Thus, useful information is more likely to be shared, and sharing useful information is related to a positive evaluation of online communities and interpersonal relationships (Carey, 2008; Park et al., 2014; Savolainen, 2017). The sharing of useful and valuable information could motivate recipients to engage in reciprocal interactions. Especially, social media facilitate rapid response, and individuals' capability to reciprocate increases (Chan & Li, 2010). Following this line of reasoning, the usefulness of information could influence how people make sense of reciprocity. People who perceive that COVID-19 information is very useful would feel more rewarded when they receive informational reciprocity; consequently, the indirect impact of information sharing on life satisfaction should be stronger.

Second, the strength of the mediating relationship would vary as a function of the level of a positive attitude toward information sharing. Past research has shown that attitude plays an important role in facilitating intention and behaviors in many contexts (Umeh & Patel, 2004). This is because attitude concerns how people evaluate their behaviors. If information usefulness is an evaluation of what is shared, then attitude is an evaluation of the sharing behavior (Iyilade et al., 2015; Salehan et al., 2018). We argue that people who have higher levels of a positive attitude toward information sharing would have higher life satisfaction when they share information and receive reciprocal responses. Similar to the first moderator, the attitude toward information sharing helps people make sense of how other people respond to their behaviors (Chen & Cheng, 2012; Salehan et al., 2018). Higher levels of informational reciprocity would be regarded as highly rewarding if a person holds a very positive attitude toward information sharing. Thus, the mediating strength of informational reciprocity should be contingent on levels of a positive attitude toward information sharing.

Third, a person's belief in subjective norms of information sharing reciprocity moderates the impact of information sharing on life satisfaction through informational reciprocity. The subjective norm here is defined as how people perceive their significant others would think about the behavior (Ahn & Kahlor, 2020). For an information sharer, behaving in line with the norms enforced in the prevailing environment is a way of receiving social approval, promoting social integration, establishing reciprocity, and, consequently, creating high levels of life satisfaction (Batson, 1998; Oarga et al., 2015). Receiving reciprocal responses from others can be thought of as confirmation of the perceived subjective norm that significant others would think information sharing is important. Existing research suggests that informational reciprocity could contribute to a sense of belonging and social approval (Oarga et al., 2015; Ogutu et al., 2014). People feel that they are supported and appreciated when they receive feedback from others. For instance, Oarga and colleagues (2015) investigated the underlying mechanisms in the relationship between helping behaviors and life satisfaction, and confirmed the moderating role of subjective norms. The conformity with social norms perspective suggested that external rewards, in the form of reciprocity and social approval, are important for deriving psychological benefits from helping behaviors such as information sharing. Thus, we could argue that informational reciprocity

should have a stronger impact when a person perceives a subjective norm of information sharing (Fig. 1).

Based on the above, the following hypothesis was proposed:

H3 (a) The usefulness of information, (b) a positive attitude toward information sharing, (c) and perceived subjective norms will strengthen the positive effect of information sharing on social media on life satisfaction through informational reciprocity.

3 Methods

3.1 Procedure

This study was approved by the Institutional Review Board of the authors' institution. Respondents were recruited online on February 2020 according to APA ethical standards by *Wenjuanxing* (https://www.wjx.cn/), a Chinese commercial survey website like Amazon Mechanical Turk (MTurk). *Wenjuanxing* comprises 2.6 million members from different geographic areas of China. Adult members (aged 18 and above) who resided in the Chinese mainland received an e-mail containing a clear introduction of our survey, and they can access the online questionnaire through a link. The detailed sampling procedure can be found in previous research (Zheng & Zheng, 2014, 2015). Given that the data was collected when China was heavily hit by the pandemic and nationwide lockdowns were implemented, an online survey was a feasible option to reach more participants. Similar online procedures have been widely used in previous research (e.g., Huang & Liu, 2017; Liu & Yeo, 2019; Osatuyi, 2013). Respondents were informed that the participation was anonymous, voluntary, and confidential. Individuals who were uncomfortable with or uninterested in the survey were free to reject or suspend it. The survey includes questions

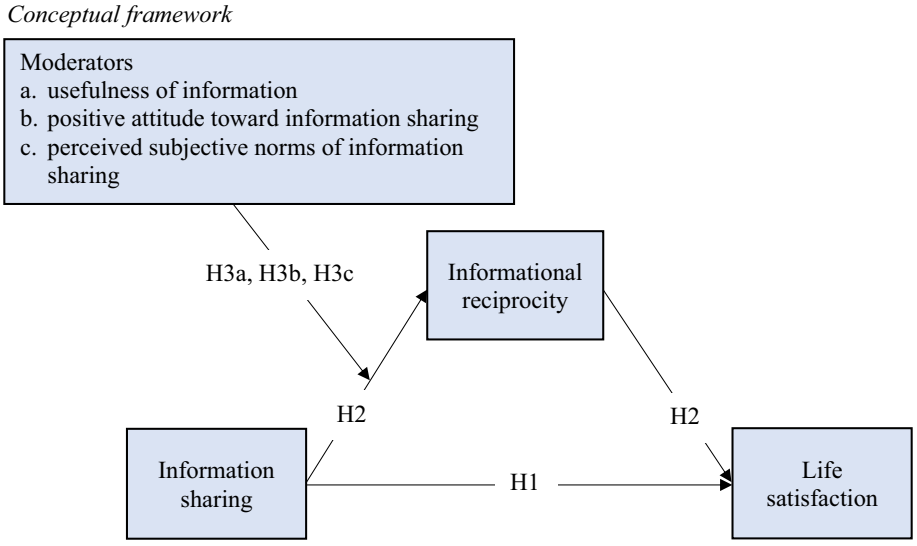

Fig. 1 Conceptual framework

for demographic information, items for COVID-19 related information sharing on social media, the attitude toward information sharing on social media, perceived usefulness of the information, perceived subjective norms, informational reciprocity, and life satisfaction.

3.2 Participants

The final sample ($N = 511$) included 305 females and 206 males. Participants were, on average, 32.57 years old (SD = 9.79). The majority of the participants had a college or above degree (74.8%, n = 382), and 9.0% (n = 46) held a high school or vocational school qualification. As for the level of monthly income, 22.3% (n = 114) had a monthly income above 12,000 Chinese Yuan (CNY), 39.4% (n = 201) between 6,000 and 12,000 CNY, and 38.4% (n = 196) below 6,000 CNY. Most of the respondents reported living in urban cities (72.0%, n = 368).

3.3 Measures

Information sharing on social media was measured by two items, adapted from previous research (Hilverda & Kuttschreuter, 2018). Respondents were asked about their past experience in sharing COVID-19 related information on social media (e.g., WeChat and Weibo): (1) share COVID-19 related information with family, friends, and others on social media; and (2) send messages containing COVID-19 related information to a specific target group on social media (e.g., WeChat group). A five-point Likert scale was used (1 = not at all; 5 = always). The two items were averaged to create one scale (M = 3.37, SD = 1.10, Cronbach's $\alpha = 0.87$).

Informational reciprocity was measured using two items drawn from Hilverda and Kuttschreuter (2018), on a five-point Likert scale from 1 (*not at all*) to 5 (*always*). Participants were asked to indicate to what extent they received COVID-19 related information from others after their sharing: (1) I received information in return; and (2) other people also told me what they knew about the risks too. The two items were averaged as an index (M = 3.94, SD = 0.79, Cronbach's $\alpha = 0.94$), and a higher value represents a greater level of informational reciprocity.

Perceived usefulness of information was measured using three items adapted from Larcker and Lessig (1980). Example items include 'it would be extremely difficult to complete a specification decision without needed COVID-19 related information', and 'sufficient COVID-19 related information would be useful and helpful for decision making'. Respondents answered the three items on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The three items were also averaged to present perceived usefulness of information (M = 3.85, SD = 0.73, Cronbach's $\alpha = 0.78$).

Attitude toward information sharing was measured by four items using a five-point Likert scale (Hilverda & Kuttschreuter, 2018). Participants were asked to evaluate the value of information sharing if they encountered an interesting message about COVID-19 risks. Example items include: 'I think it is useful to share the information' and 'I think it is helpful to share the information'. Response options ranged from strongly disagree (1) to strongly agree (5). A composite variable was computed by averaging the four items (M = 3.70, SD = 0.80, Cronbach's $\alpha = 0.92$).

Perceived subjective norms were measured with four items on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) (Yang et al., 2014). Respondents were asked to indicate to what extent they perceived their social environment to expect

them to share COVID-19 related information. Sample items include: 'I am expected to share information about COVID-19 risks', 'most of the people in my social environment expect me to share information about the risks COVID-19', and 'my friends expect me to share information about possible COVID-19 risks'. The score for perceived subjective norms was created by calculating the mean of the scores for the four items (M = 3.18, SD = 0.84, Cronbach's α = 0.94). A higher score reflected a higher level of others' expectations for COVID-19 information sharing.

Life satisfaction was measured with five items adapted from Xiong and Xu (2009). Participants responded to 'in most ways, my life is close to my ideal', 'I am satisfied with my life', 'the condition of my life are excellent', 'so far I have gotten the important things I want', and 'if I could live my time over, I would change almost nothing'. All items were rated from 1 (*strongly disagree*) to 5 (*strongly agree*). The five items were also averaged to create an index (M = 3.10, SD = 0.80, Cronbach's α = 0.89), and high values represent higher levels of life satisfaction.

Demographic variables were used as control variables, including age, gender (0 = female, 1 = male), monthly income [ranging from 1 = 3,000 Chinese Yuan (CNY) to 6 = 18,001 CNY or above], education (1 = middle school or below, 5 = postgraduate or above), and residence (0 = rural, 1 = urban).

3.4 Data Analysis

SPSS version 22 was used to analyze the data. First, a bivariate correlation analysis was conducted to show the bivariate relationships among pairs of key variables. Second, the mediation effect was tested using PROCESS model 4 in SPSS (Hayes, 2013). Third, there moderated mediation models were tested using PROCESS model 7. In the analysis, we used a 95% confidence level for the confidence interval (CI), bootstrapping with 5,000 iterations using a bias-corrected method.

4 Results

Pearson correlations for the focal variables of this study were presented in Table 1. The results showed that all bivariate relationships between information sharing on social media, informational reciprocity, perceived usefulness of information, attitude toward information

Table 1 Zero order correlation of key variables

	2	3	4	5	6
1 Information sharing on social media	.51***	.22***	.23***	.56***	.36***
2 Informational reciprocity		.22***	.24***	.61***	.23***
3 Life satisfaction			.22***	.22***	.17***
4 Perceived usefulness of Information				.28***	.26***
5 Attitude towards information sharing					.37***
6 Perceived subjective norms					-

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

sharing, perceived subjective norms, and life satisfaction was significant and positive (r ranged from 0.22 to 0.61, $p < 0.001$).

H1 posited a positive relationship between information sharing on social media and life satisfaction. As Table 2 illustrates, information sharing on social media will increase life satisfaction ($\beta = 0.12$, $p = 0.002$), supporting H1.

H2 predicted that the relationship between information sharing on social media and one's life satisfaction will be mediated through informational reciprocity. As depicted in Table 2, information sharing on social media was positively related to informational reciprocity ($\beta = 0.34$, $p < 0.001$), and a positive and significant relationship between informational reciprocity and life satisfaction was revealed ($\beta = 0.12$, $p = 0.024$). The results from bootstrapping showed that the indirect effect of information sharing on social media on life satisfaction via informational reciprocity was statistically significant, as the 95% bias-corrected confidence intervals (CI) did not contain zero (CI of 0.003 and 0.081). The statistically significant direct path and acknowledged indirect path form complementary mediation (Jiang et al., 2021; Zhao et al., 2010). This finding provided support for H2.

H3 proposed that (a) the usefulness of information, (b) positive attitude toward information sharing, (c) and perceived subjective norms will strengthen the effect of information sharing on social media on life satisfaction through informational reciprocity. The conditional indirect effects of information sharing on social media were evaluated at three levels of the usefulness of information, attitude toward information sharing, and perceived subjective norms (Low = M – 1SD, Medium = M, and High = M + 1SD). As it is shown in Table 3, the conditional indirect effect of information sharing on social media on life satisfaction through informational reciprocity was strong and significant at different levels of perceived usefulness of information (Low: $\beta = 0.02$, 95%CI = [0.002, 0.056]; Medium: $\beta = 0.04$, 95%CI = [0.003, 0.073]; High: $\beta = 0.05$, 95%CI = [0.005, 0.099]). Similar findings were revealed at different levels of perceived subjective norms (Low: $\beta = 0.02$, 95%CI = [0.002, 0.052]; Medium: $\beta = 0.04$, 95%CI = [0.003, 0.083]; High: $\beta = 0.06$, 95%CI = [0.004, 0.120]), and the conditional indirect effects were stronger at higher levels of the three moderators. Besides, such indirect effect was only found among participants showing moderate (Medium: $\beta = 0.02$, 95%CI = [0.002, 0.037]) or strong belief (High: $\beta = 0.02$, 95%CI = [0.002, 0.054]) regarding information sharing behavior. H3 was supported.

Table 2 Regression testing informational reciprocity as the mediator in the relationship between information sharing on social media and life satisfaction

	β	SE	95%CI	*p*
Total effect				
ISSM → Life satisfaction	.16	.03	[.093, .223]	< .001
Direct effect				
ISSM → Life satisfaction	.12	.04	[.046, .192]	.002
Indirect effect				
ISSM → Informational reciprocity	.34	.03	[.282, .395]	< .001
Informational reciprocity → Life satisfaction	.12	.04	[.015, .216]	.024
ISSM → Informational reciprocity → Life satisfaction	.04	.02	[.003, .081]	/

p-values are not computed for bootstrapped mediating effects; *ISSM* Information sharing on social media; *CI* confidence interval; Covariates: age, gender, education, income, and residence

Table 3 Regressions testing the moderated mediation model

		β	SE	95%CI	*p*
Interaction effect					
ISSM × Usefulness → Informational reciprocity		.16	.03	[.101, .226]	< .001
ISSM × Attitude → Informational reciprocity		.08	.03	[.024, .130]	.004
ISSM × Norms → Informational reciprocity		.18	.03	[.125, .244]	< .001
Mediator	Moderator	Level	Conditional indirect effect	Boot SE	95%CI
Informational reciprocity	Perceived usefulness of Information	Low	.02	.01	[.002, .056]
		Medium	.04	.02	[.003, .073]
		High	.05	.03	[.005, .099]
	Attitude toward information sharing	Low	.01	.01	[-.001, .024]
		Medium	.02	.01	[.002, .037]
		High	.02	.01	[.002, .054]
	Perceived subjective norms	Low	.02	.01	[.002, .052]
		Medium	.04	.02	[.003, .083]
		High	.06	.03	[.004, .120]

p-values are not computed for bootstrapped moderated mediation effects; *ISSM* Information sharing on social media; *CI* confidence interval; Covariates: age, gender, education, income, and residence

5 Discussion

This study proposed a moderated mediation model to understand the mechanisms through which information sharing on social media influences life satisfaction. In line with the existing research, information sharing on social media was positively related to informational reciprocity and life satisfaction. Informational reciprocity was positively associated with life satisfaction. Furthermore, informational reciprocity mediated the influence of information sharing on social media on life satisfaction. Moreover, the indirect effects differed at different levels of perceived usefulness of information, the attitude toward information sharing, and the perceived subjective norms. The research findings of the current study are helpful for policymakers and health improvement practitioners and provide valuable insights in relation to mental health and quality of life.

The findings herein indicated that COVID-19 information sharing on social media could exert a positive influence on life satisfaction (Jiang & Hu, 2016; Wang, 2013; Yang et al., 2020). This is because individuals who help others incur health benefits themselves (Fuligni, 2019; Schreier et al., 2013). For many people, the uncertainty surrounding the infectious disease is difficult to handle (Kumar & Nayar, 2021; Liu, 2020; Ornell et al., 2020; Zhou et al., 2020). Fear and anxiety about COVID-19 can be overwhelming and have a lasting impact on mental health (Abbas, 2021). A substantial number of studies have supported this with empirical evidence suggesting the prevalence of mental health problems related to the COVID-19 pandemic (Abbas, 2020; Kumar & Nayar, 2021; Rajkumar, 2020; Vindegaard & Benros, 2020; Wu et al., 2021). For example, a questionnaire survey conducted from February to March 2020 in China found that about 25% of respondents self-reported with mental health problems related to the pandemic, such as depression, anxiety, and insomnia (Zhou et al., 2020). In this case, the COVID-19 information sharing behavior would help reduce one's response to the life-threatening disease, and reduce their

anxiety that might cause physical illness (e.g., cardiovascular diseases) (Liu, 2020), leading to enhanced life satisfaction (Yang et al., 2020). Sharing behaviors are crucial to meet one's fundamental needs of social connection, and the sense of impact and effectiveness (Martela & Ryan, 2016). Our findings were consistent with prior research suggesting that people have the nature and propensity to contribute to other individuals by providing support and resources to achieve a collective goal, which in return will benefit their psychological health (Fuligni, 2019).

We identified the mediating role of informational reciprocity in the relationship between information sharing on social media and life satisfaction. As suggested by SET (Homans, 1958), information sharing on social media could increase informational reciprocity. This finding was in line with previous findings suggesting that confronting communal risks, sharing risk-related information would trigger a consideration of mutual dependence and reciprocity when the disease is expected to reoccur (Liao et al., 2018). Particularly, social media play an essential role that enables people to stay connected and engaged regardless of the coronavirus lockdowns and social-distancing measures (Liu, 2021a, b). It is more convenient for social media users to share information and express caring to ensure that their loved ones are informed and safe during a natural disaster (Hasell & Weeks, 2016; Liu, 2021a, b; Osatuyi, 2013). As a return, informational reciprocity could cultivate collective efforts that sustain the cooperation for community health (Liao et al., 2018). Furthermore, informational reciprocity was found to be positively associated with life satisfaction. This finding was also consistent with previous research suggesting the importance of a balance between giving and receiving help (Chen et al., 2021; Lu, 1997). Equity theory maintains that feeling equitably treated and the perception of reciprocity would be accompanied by the sense of satisfaction and well-being (Aman et al., 2019; Meyer et al., 2019; Väänänen et al., 2005). Reciprocal exchange of informational support at the time of the COVID-19 pandemic implies love and caring. When COVID-19 information sharers receive reciprocity, they would feel loved and appreciated, which in turn contributes to improved life satisfaction.

The findings of this study add to the ever-growing information sharing literature. In particular, the findings provide some support to the positive association between information sharing on social media and life satisfaction (e.g., Choi et al., 2014; Lin, 2007; Wang & Noe, 2010). Extending this line of research, we show that the positive impact of information sharing on social media on life satisfaction can be achieved through informational reciprocity. SET suggests that how an initiator's behavior is returned is usually not specified in the social exchange process (Bock & Kim, 2002). This means that there could be many different ways that information sharing could be reciprocated. This study confirms that informational reciprocity could be a meaningful kind of reciprocity. This finding could also further explain how information sharing fosters positive interpersonal relationships and community outcomes (John, 2013a, 2013b; Zhao & John, 2020). It is through reciprocal responses an information sharer develops a sense of interdependence with the receiver; consequently, the relationship is developed and life satisfaction enhanced. Future research could develop a path model to validate this claim.

The significant mediation effect of reciprocity implies that it is important to consider information reception in information sharing research. This actor-receiver link could help to understand the way that information sharing brings positive impact more comprehensively. Scholars can further explore the role of information receivers in the processes and outcomes of information sharing. Reciprocity shows individual differences (Pai & Tsai, 2016; Perugini & Gallucci, 2001). Thus, it will be interesting to investigate how individuals are different in responding to the behavior of information sharing in the context of

social media. For instance, Aman et al. (2021) argued that religious affiliation inherently influences how social media users interact with their family and friends, and essentially determines the life satisfaction of individuals. Besides, since social media provide distinctive communication opportunities (O'Sullivan & Carr, 2017), future research should also consider how affordances of social media are associated with individual differences in reciprocity. For instance, in the mass personal area (e.g. Facebook timeline and WeChat Moments), the visibility affordance might hinder reciprocity because people may have self-presentational concerns (DeVito et al., 2017).

Another theoretical contribution of this study is that it uncovers mechanisms of how information sharing on social media contributes to life satisfaction. The moderated mediation mechanisms help us understand boundary conditions in which information sharing could have a positive impact on life satisfaction through informational reciprocity. Specifically, all three relational factors tested—perceived usefulness of information, attitude toward information sharing, and perceived subjective norms—functioned as significant moderators. Under the influence of the perceived usefulness of information, the attitude toward information sharing, and the perceived subjective norms, COVID-19 information sharing on social media leads to informational reciprocity, which, as a result, enhances life satisfaction. These findings indicate that effective information sharing behaviors are based on a couple of factors. First, given that people are likely overwhelmed by a large volume of COVID-19 information on social media (Bermes, 2021; Cao et al., 2021), it is important to identify the useful information and make the sharing more effective. In this case, the receivers would be more willing to reciprocate as they receive valuable help (Park et al., 2014). Second, a positive attitude toward the information sharing behavior is also essential to prompt the information exchange process. The coronavirus pandemic further reveals the fact that human communities are interdependent, and collaboration efforts to protect against contracting the disease are needed. Thus, a positive attitude toward the COVID-19 information sharing behavior would improve reciprocity and strengthen interdependent relationships. Third, the results also suggested that subjective norms functioned to facilitate information sharing and reciprocity, which is accordant with prior research (Chen et al., 2018; Lin et al., 2013; Umeh & Patel, 2004). In this study, subjective norms indicate the expectation of a person by others to share COVID-19 information. This is understandable that the effectiveness of information and communication procedures should be based on the premise of information needs. Individuals who are happy with receiving the information would be more likely to return the favor.

5.1 Limitations and Future Research

The present study has some limitations that suggest avenues for future research. First, information sharing on social media was measured as the frequency of sharing COVID-19 information with others (e.g., family and friends) on social media. We know little about how information types (e.g., texts, videos, and pictures), and different content (e.g., statistics reports and news stories) exert different influences on informational reciprocity and life satisfaction. Scholars should consider alternative operationalization of information seeking. Second, we used the specific COVID-19 pandemic as the context of information sharing. Although we believe information sharing and reciprocity are vital when confronting communal risks, it remains unclear whether these findings would be applied to other communal risks. To test the applicability, future research should replicate and test the model in other communal risks. Third, we adopted a cross-sectional study design, which may preclude an

assessment of causal relationships between information sharing, reciprocity, and life satisfaction. Future research should collect panel data or use experimental methods to better understand the relationships. Fourth, an online survey was used for the data collection and sampling bias might occur that undermines the external validity of the test. For example, the education levels of respondents of our study were relatively high. As such, the findings of our study may not be generalized to the entire Chinese population. To overcome this problem, we encourage scholars to use probability sampling techniques to generate a statistically representative sample and replicate the research in other socio-cultural contexts.

6 Conclusion

Our study highlights social media as a crucial platform for health information sharing during times of public health crisis. Based on SET, the results indicated that COVID-19 information sharing on social media would lead to informational reciprocity, and in turn, contribute to life satisfaction. Besides, this study contributes to a better understanding of the moderating roles of perceived usefulness of information, attitude toward information sharing, and subjective norms in the indirect relationship between information sharing on social media and life satisfaction via informational reciprocity. Understanding these relationships can help foster reciprocal and interdependent human relationships in confronting communal threats, which are key to improving people's psychological health.

Acknowledgements This research is supported in part by grants of University of Macau, ICI-RTO-0010-2021, CPG20XX-00035-FSS and SRG20XX-00143-FSS (ZXS PI), and a grant of Macau Higher Education Fund (HSS-UMAC-2020-02, ZXS PI).

Declarations

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

References

Abbas, J. (2020). The impact of coronavirus (SARS-CoV2) epidemic on individuals mental health: The protective measures of Pakistan in managing and sustaining transmissible disease. *Psychiatria Danubina*, *32*(3–4), 472–477. https://doi.org/10.24869/psyd.2020.472

Abbas, J. (2021). Crisis management, transnational healthcare challenges and opportunities: The intersection of COVID-19 pandemic and global mental health. *Research in Globalization, 3*, 100037. https://doi.org/10.1016/j.resglo.2021.100037

Abbas, J., Aman, J., Nurunnabi, M., & Bano, S. (2019). The impact of social media on learning behavior for sustainable education: Evidence of students from selected universities in Pakistan. *Sustainability, 11*(6), 1683. https://doi.org/10.3390/su11061683

Abbas, J., Zhang, Q., Hussain, I., Akram, S., Afaq, A., & Shad, M. A. (2020). Sustainable innovation in small medium enterprises: The impact of knowledge management on organizational innovation through a mediation analysis by using SEM approach. *Sustainability, 12*(6), 2407. https://doi.org/10.3390/su12062407

Ahn, J., & Kahlor, L. A. (2020). No regrets when it comes to your health: Anticipated regret, subjective norms, information insufficiency and intent to seek health information from multiple sources. *Health Communication, 35*(10), 1295–1302. https://doi.org/10.1080/10410236.2019.1626535

Aman, J., Abbas, J., Lela, U., & Shi, G. (2021). Religious affiliation, daily spirituals, and private religious factors promote marital commitment among married couples: Does religiosity help people amid the COVID-19 crisis? *Frontiers in Psychology, 12*, 2687. https://doi.org/10.3389/fpsyg.2021.657400

Aman, J., Abbas, J., Nurunnabi, M., & Bano, S. (2019). The relationship of religiosity and marital satisfaction: The role of religious commitment and practices on marital satisfaction among Pakistani respondents. *Behavioral Sciences, 9*(3), 30. https://doi.org/10.3390/bs9030030

Andalibi, N., Haimson, O. L., Choudhury, M. D., & Forte, A. (2018). Social support, reciprocity, and anonymity in responses to sexual abuse disclosures on social media. *ACM Transactions on Computer-Human Interaction, 25*(5), 1–35. https://doi.org/10.1145/3234942

Aqeel, M., Abbas, J., Shuja, K. H., Rehna, T., Ziapour, A., Yousaf, I., & Karamat, T. (2021). The influence of illness perception, anxiety and depression disorders on students mental health during COVID-19 outbreak in Pakistan: A Web-based cross-sectional survey. *International Journal of Human Rights in Healthcare* (*ahead-of-print*). https://doi.org/10.1108/IJHRH-10-2020-0095

Bartol, K. M., Liu, W., Zeng, X., & Wu, K. (2009). Social exchange and knowledge sharing among knowledge workers: The moderating role of perceived job security. *Management and Organization Review, 5*(2), 223–240. https://doi.org/10.1111/j.1740-8784.2009.00146.x

Batson, C. D. (1998). Altruism and prosocial behavior. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., Vol. 2, pp. 282–316). McGraw-Hill.

Belair-Gagnon, V., Nelson, J. L., & Lewis, S. C. (2018). Audience engagement, reciprocity, and the pursuit of community connectedness in public media journalism. *Journalism Practice*, *13*(5), 558–575. https://doi.org/10.1080/17512786.2018.1542975

Belanche, D., Casaló, L. V., Flavián, C., & Guinalíu, M. (2019). Reciprocity and commitment in online travel communities. *Industrial Management and Data Systems, 119*(2), 397–411. https://doi.org/10.1108/IMDS-03-2018-0098

Bermes, A. (2021). Information overload and fake news sharing: A transactional stress perspective exploring the mitigating role of consumers' resilience during COVID-19. *Journal of Retailing and Consumer Services, 61*, 102555. https://doi.org/10.1016/j.jretconser.2021.102555

Bock, G. W., & Kim, Y. G. (2002). Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. *Information Resources Management Journal, 15*(2), 14–21. https://doi.org/10.4018/irmj.2002040102

Braun, T., Rohr, M. K., Wagner, J., & Kunzmann, U. (2018). Perceived reciprocity and relationship satisfaction: Age and relationship category matter. *Psychology and Aging, 33*(5), 713–727. https://doi.org/10.1037/pag0000267

Cao, J., Liu, F., Shang, M., & Zhou, X. (2021). Toward street vending in post COVID-19 China: Social networking services information overload and switching intention. *Technology in Society, 66*, 101669. https://doi.org/10.1016/j.techsoc.2021.101669

Carey, J. W. (2008). *Communication as Culture* (Revised). Essays on Media and Society.

Chan, K. W., & Li, S. Y. (2010). Understanding consumer-to-consumer interactions in virtual communities: The salience of reciprocity. *Journal of Business Research, 63*(9), 1033–1040. https://doi.org/10.1016/j.jbusres.2008.08.009

Chen, E., Lam, P. H., Finegood, E. D., Turiano, N. A., Mroczek, D. K., & Miller, G. E. (2021). The balance of giving versus receiving social support and all-cause mortality in a US national sample. *Proceedings of the National Academy of Sciences*, *118*(24). https://doi.org/10.1073/pnas.2024770118

Chen, W.-J., & Cheng, H.-Y. (2012). Factors affecting the knowledge sharing attitude of hotel service personnel. *International Journal of Hospitality Management, 31*(2), 468–476. https://doi.org/10.1016/j.ijhm.2011.07.005

Chen, Y., Liang, C., & Cai, D. (2018). Understanding WeChat users' behavior of sharing social crisis information. *International Journal of Human-Computer Interaction, 34*(4), 356–366. https://doi.org/10.1080/10447318.2018.1427826

Choi, J., Kim, S., Moo, J. Y., Kang, J., Lee, I., & Kim, J. (2014). Seek or provide: Comparative effects of online information sharing on seniors' quality of life. *CAIS*, *34*, 27. https://doi.org/10.17705/1CAIS.03427

Choi, M., & Toma, C. L. (2014). Social sharing through interpersonal media: Patterns and effects on emotional well-being. *Computers in Human Behavior, 36*, 530–541. https://doi.org/10.1016/j.chb.2014.04.026

Chung, N., Nam, K., & Koo, C. (2016). Examining information sharing in social networking communities: Applying theories of social capital and attachment. *Telematics and Informatics, 33*(1), 77–91. https://doi.org/10.1016/j.tele.2015.05.005

DeVito, M. A., Birnholtz, J., & Hancock, J. T. (2017). Platforms, people, and perception: Using affordances to understand self-presentation on social media. *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, 740–754. https://doi.org/10.1145/2998181.2998192

Ellison, N. B., Steinfield, C., & Lampe, C. (2011). Connection strategies: Social capital implications of Facebook-enabled communication practices. *New Media & Society, 13*(6), 873–892. https://doi.org/10.1177/1461444810385389

Fattahi, E., Solhi, M., Abbas, J., Kasmaei, P., Rastaghi, S., Pouresmaeil, M., Ziapour, A., & Gilan, H. D. (2020). Prioritization of needs among students of University of Medical Sciences: A needs assessment. *Journal of Education and Health Promotion, 9*, 57. https://doi.org/10.4103/0445-7706.281641

Fu, Q., Abbas, J., & Sultan, S. (2022). Reset the industry redux through corporate social responsibility: The COVID-19 tourism impact on hospitality firms through business model innovation. *Frontiers in Psychology, 12*, 795345. https://doi.org/10.3389/fpsyg.2021.795345

Fuligni, A. J. (2019). The need to contribute during adolescence. *Perspectives on Psychological Science, 14*(3), 331–343. https://doi.org/10.1177/1745691618805437

Hasell, A., & Weeks, B. E. (2016). Partisan provocation: The role of partisan news use and emotional responses in political information sharing in social media. *Human Communication Research, 42*(4), 641–661. https://doi.org/10.1111/hcre.12092

Hayes, A. F. (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis, First Edition: A Regression-Based Approach* (First edition). The Guilford Press.

Hilverda, F., & Kuttschreuter, M. (2018). Online information sharing about risks: The case of organic food. *Risk Analysis, 38*(9), 1904–1920. https://doi.org/10.1111/risa.12980

Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology, 63*(6), 597–606.

Huang, L. V., & Liu, P. L. (2017). Ties that work: Investigating the relationships among coworker connections, work-related Facebook utility, online social capital, and employee outcomes. *Computers in Human Behavior*, *72*(Supplement C), 512–524. https://doi.org/10.1016/j.chb.2017.02.054

Huang, Y., & Yang, C. (2020). A metacognitive approach to reconsidering risk perceptions and uncertainty: Understand information seeking during COVID-19. *Science Communication, 42*(5), 616–642. https://doi.org/10.1177/1075547020959818

Hur, K., Kim, T. T., Karatepe, O. M., & Lee, G. (2017). An exploration of the factors influencing social media continuance usage and information sharing intentions among Korean travellers. *Tourism Management, 63*, 170–178. https://doi.org/10.1016/j.tourman.2017.06.013

Islam, T., Mahmood, K., Sadiq, M., Usman, B., & Yousaf, S. U. (2020). Understanding knowledgeable workers' behavior toward COVID-19 information sharing through WhatsApp in Pakistan. *Frontiers in Psychology, 11*, 572526. https://doi.org/10.3389/fpsyg.2020.572526

Iyilade, J., Orji, R., & Vassileva, J. (2015). Factors influencing user's attitude to secondary information sharing and usage. *CIT. Journal of Computing and Information Technology*, *23*(3), 231–244. https://doi.org/10.2498/cit.1002535

Jiang, Y., Zhao, X., Zhu, L., Liu, J. S., & Deng, K. (2021). Total-effect test is superfluous for establishing complementary mediation. *Statistica Sinica, 31*(3), 1961–1983. https://doi.org/10.5705/ss.202019.0150

Jiang, Z., & Hu, X. (2016). Knowledge sharing and life satisfaction: The roles of colleague relationships and gender. *Social Indicators Research, 126*(1), 379–394. https://doi.org/10.1007/s11205-015-0886-9

John, N. A. (2013a). Sharing and Web 2.0: The emergence of a keyword. *New Media & Society*, *15*(2), 167–182. https://doi.org/10.1177/1461444812450684

John, N. A. (2013b). The social logics of sharing. *The Communication Review, 16*(3), 113–131. https://doi.org/10.1080/10714421.2013.807119

Kumar, A., & Nayar, K. R. (2021). COVID 19 and its mental health consequences. *Journal of Mental Health, 30*(1), 1–2. https://doi.org/10.1080/09638237.2020.1757052

Kožuh, I., & Čakš, P. (2021). Explaining News Trust in Social Media News during the COVID-19 Pandemic-The Role of a Need for Cognition and News Engagement. *International Journal of Environmental Research and Public Health, 18*(24), 12986. https://doi.org/10.3390/ijerph182412986

Lang, F. R. (2000). Endings and continuity of social relationships: Maximizing intrinsic benefits within personal networks when feeling near to death. *Journal of Social and Personal Relationships, 17*(2), 155–182. https://doi.org/10.1177/0265407500172001

Larcker, D. F., & Lessig, V. P. (1980). Perceived usefulness of information: A psychometric examination. *Decision Sciences, 11*(1), 121–134. https://doi.org/10.1111/j.1540-5915.1980.tb01130.x

Lee, C. S., & Ma, L. (2012). News sharing in social media: The effect of gratifications and prior experience. *Computers in Human Behavior, 28*(2), 331–339. https://doi.org/10.1016/j.chb.2011.10.002

Li, Z., Wang, D., Hassan, S., & Mubeen, R. (2022). Tourists' health risk threats amid COVID-19 era: Role of technology innovation, Transformation, and recovery implications for sustainable tourism. *Frontiers in Psychology, 12*, 769175. https://doi.org/10.3389/fpsyg.2021.769175

Liao, W., Yuan, Y. C., & McComas, K. A. (2018). Communal risk information sharing: Motivations behind voluntary information sharing for reducing interdependent risks in a community. *Communication Research, 45*(6), 909–933. https://doi.org/10.1177/0093650215626981

Lim, C., & Putnam, R. D. (2010). Religion, social networks, and life satisfaction. *American Sociological Review, 75*(6), 914–933. https://doi.org/10.1177/0003122410386686

Lin, H.-F. (2007). Effects of Extrinsic and Intrinsic Motivation on Employee Knowledge Sharing Intentions. *Journal of Information Science, 33*(2), 135–149. https://doi.org/10.1177/0165551506068174

Lin, L., & Abrahamsson, M. (2015). Communicational challenges in disaster risk management: Risk information sharing and stakeholder collaboration through risk and vulnerability assessments in Sweden. *Risk Management, 17*(3), 165–178. https://doi.org/10.1057/rm.2015.11

Lin, X., Featherman, M., & Sarker, S. (2013). Information sharing in the context of social media: An application of the theory of reasoned action and social capital theory. *Proceedings of the 2013 AIS SIGHCI Workshop on HCI Research in MIS,* 1–15. https://aisel.aisnet.org/sighci2013/17

Liu, P. L. (2020). COVID-19 information seeking on digital media and preventive behaviors: The mediation role of worry. *Cyberpsychology, Behavior, and Social Networking, 23*(10), 1–6. https://doi.org/10.1089/cyber.2020.0250

Liu, P. L., & Yeo, T. E. D. (2019). Breast health, risk factors, and cancer screening among lesbian, bisexual, and queer/questioning women in China. *Health Care for Women International, 42*(7–9), 947–961. https://doi.org/10.1080/07399332.2019.1571062

Liu, P. L. (2021a). COVID-19 information on social media and preventive behaviors: Managing the pandemic through personal responsibility. *Social Science and Medicine (1982)*, *277*, 113928. https://doi.org/10.1016/j.socscimed.2021.113928

Liu, P. L., Zhao, X., & Wan, B. (2021b). COVID-19 information exposure and vaccine hesitancy: The influence of trust in government and vaccine confidence. *Psychology, Health & Medicine*(ahead-of-print). https://doi.org/10.1080/13548506.2021.2014910

Lowenstein, A., Katz, R., & Gur-Yaish, N. (2007). Reciprocity in parent–child exchange and life satisfaction among the elderly: A cross-national perspective. *Journal of Social Issues, 63*(4), 865–883. https://doi.org/10.1111/j.1540-4560.2007.00541.x

Lu, L. (1997). Social support, reciprocity, and well-being. *The Journal of Social Psychology, 137*(5), 618–628. https://doi.org/10.1080/00224549709595483

Lu, L., Liu, J., Yuan, Y. C., Burns, K. S., Lu, E., & Li, D. (2021). Source trust and COVID-19 information sharing: The mediating roles of emotions and beliefs about sharing. *Health Education & Behavior, 48*(2), 132–139. https://doi.org/10.1177/1090198120984760

Majchrzak, A., Faraj, S., Kane, G. C., & Azad, B. (2013). The contradictory influence of social media affordances on online communal knowledge sharing. *Journal of Computer-Mediated Communication, 19*(1), 38–55. https://doi.org/10.1111/jcc4.12030

Maksl, A., & Young, R. (2013). Affording to exchange: Social capital and online information sharing. *Cyberpsychology, Behavior and Social Networking, 16*(8), 588–592. https://doi.org/10.1089/cyber.2012.0430

Malik, A., Mahmood, K., & Islam, T. (2021). Understanding the Facebook users' behavior towards COVID-19 information sharing by integrating the Theory of Planned Behavior and Gratifications. *Information Development, 02666669211049383,*. https://doi.org/10.1177/02666669211049383

Martela, F., & Ryan, R. M. (2016). The benefits of benevolence: Basic psychological needs, beneficence, and the enhancement of well-being. *Journal of Personality, 84*(6), 750–764. https://doi.org/10.1111/jopy.12215

Meyer, K., Puga, F., & Pickering, C. E. (2019). The Effect of perceived appreciation on caregiver well-being: A test of Equity Theory. *Innovation in Aging, 3*(Suppl 1), S728. https://doi.org/10.1093/geroni/igz038.2667

NeJhaddadgar, N., Ziapour, A., Zakkipour, G., Abbas, J., Abolfathi, M., & Shabani, M. (2020). Effectiveness of telephone-based screening and triage during COVID-19 outbreak in the promoted primary healthcare system: A case study in Ardabil province, Iran. *Zeitschrift Fur Gesundheitswissenschaften, 1–6,*. https://doi.org/10.1007/s10389-020-01407-8

Oarga, C., Stavrova, O., & Fetchenhauer, D. (2015). When and why is helping others good for well-being? The role of belief in reciprocity and conformity to society's expectations. *European Journal of Social Psychology, 45*(2), 242–254. https://doi.org/10.1002/ejsp.2092

Ogutu, R. P., Ogutu, M., & Njanja, L. (2014). The moderating effect of subjective norms, perceived behavioural control and gender on the relationship between attitude towards internet advertising and purchase intention of University students in Kenya. *International Journal of Science and Entrepreneurship, 3*(1), 1–37.

Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P. (2020). "Pandemic fear" and COVID-19: Mental health burden and strategies. *Brazilian Journal of Psychiatry, 42*, 232–235. https://doi.org/10.1590/1516-4446-2020-0008

Osatuyi, B. (2013). Information sharing on social media sites. *Computers in Human Behavior, 29*(6), 2622–2631. https://doi.org/10.1016/j.chb.2013.07.001

O'Sullivan, P. B., & Carr, C. T. (2017). Masspersonal Communication: A Model Bridging the Mass-Interpersonal Divide. *New Media and Society., 20*(3), 1161–1180. https://doi.org/10.1177/1461444816686104

Pai, P., & Tsai, H.-T. (2016). Reciprocity norms and information-sharing behavior in online consumption communities: An empirical investigation of antecedents and moderators. *Information and Management, 53*(1), 38–52. https://doi.org/10.1016/j.im.2015.08.002

Park, J. H., Gu, B., Leung, A. C. M., & Konana, P. (2014). An investigation of information sharing and seeking behaviors in online investment communities. *Computers in Human Behavior, 31*, 1–12. https://doi.org/10.1016/j.chb.2013.10.002

Perkins, E. A., & Haley, W. E. (2013). Emotional and tangible reciprocity in middle- and older-aged carers of adults with intellectual disabilities. *Journal of Policy and Practice in Intellectual Disabilities, 10*(4), 334–344. https://doi.org/10.1111/jppi.12061

Perugini, M., & Gallucci, M. (2001). Individual differences and social norms: The distinction between reciprocators and prosocials. *European Journal of Personality, 15*(S1), S19–S35. https://doi.org/10.1002/per.419

Rahimi, F., & Abadi, A. T. B. (2020). Transparency and information sharing could help abate the COVID-19 pandemic. *Infection Control & Hospital Epidemiology, 41*(11), 1366–1367. https://doi.org/10.1017/ice.2020.174

Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry, 52*, 102066. https://doi.org/10.1016/j.ajp.2020.102066

Šakan, D., Žuljević, D., & Rokvić, N. (2020). The role of basic psychological needs in well-being during the COVID-19 outbreak: A self-determination theory perspective. *Frontiers in Public Health, 8*, 583181. https://doi.org/10.3389/fpubh.2020.583181

Salehan, M., Kim, D. J., & Koo, C. (2018). A study of the effect of social trust, trust in social networking services, and sharing attitude, on two dimensions of personal information sharing behavior. *The Journal of Supercomputing, 74*(8), 3596–3619. https://doi.org/10.1007/s11227-016-1790-z

Savolainen, R. (2017). Information sharing and knowledge sharing as communicative activities. *Information Research: An International Electronic Journal*, *22*(3). https://eric.ed.gov/?id=EJ1156371

Schreier, H. M. C., Schonert-Reichl, K. A., & Chen, E. (2013). Effect of volunteering on risk factors for cardiovascular disease in adolescents: A randomized controlled trial. *JAMA Pediatrics, 167*(4), 327–332. https://doi.org/10.1001/jamapediatrics.2013.1100

Sheer, V. C., & Rice, R. E. (2017). Mobile instant messaging use and social capital: Direct and indirect associations with employee outcomes. *Information and Management, 54*(1), 90–102. https://doi.org/10.1016/j.im.2016.04.001

Shuja, K. H., Shahidullah, A., & M., Khan, E. A., & Abbas, J. (2020). Letter to highlight the effects of isolation on elderly during COVID-19 outbreak. *International Journal of Geriatric Psychiatry, 35*(12), 1477–1478. https://doi.org/10.1002/gps.5423

Soroush, A., Ziapour, A., Abbas, J., Jahanbin, I., Andayeshgar, B., Moradi, F., Najafi, S., & Cheraghpouran, E. (2021). Effects of group logotherapy training on self-esteem, communication skills, and impact of event scale-revised (IES-R) in older adults. *Ageing International (ahead-of-print)*. https://doi.org/10.1007/s12126-021-09458-2

Stevanovic, M., & Peräkylä, A. (2015). Experience sharing, emotional reciprocity, and turn-taking. *Frontiers in Psychology, 6*, 450. https://doi.org/10.3389/fpsyg.2015.00450

Su, Z., McDonnell, D., Wen, J., Kozak, M., Abbas, J., Šegalo, S., Li, X., Ahmad, J., Cheshmehzangi, A., Cai, Y., Yang, L., & Xiang, Y.-T. (2021). Mental health consequences of COVID-19 media coverage: The need for effective crisis communication practices. *Globalization and Health, 17*(1), 4. https://doi.org/10.1186/s12992-020-00654-4

Surma, J. (2016). Social exchange in online social networks. The reciprocity phenomenon on Facebook. *Computer Communications, 73*, 342–346. https://doi.org/10.1016/j.comcom.2015.06.017

Umeh, K., & Patel, R. (2004). Theory of planned behaviour and ecstasy use: An analysis of moderator-interactions. *British Journal of Health Psychology, 9*(1), 25–38. https://doi.org/10.1348/135910704322778704

Väänänen, A., Buunk, B. P., Kivimäki, M., Pentti, J., & Vahtera, J. (2005). When it is better to give than to receive: Long-term health effects of perceived reciprocity in support exchange. *Journal of Personality and Social Psychology, 89*(2), 176–193. https://doi.org/10.1037/0022-3514.89.2.176

Vindegaard, N., & Benros, M. E. (2020). COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain, Behavior, and Immunity, 89*, 531–542. https://doi.org/10.1016/j.bbi.2020.05.048

Wahrendorf, M., Ribet, C., Zins, M., Goldberg, M., & Siegrist, J. (2010). Perceived reciprocity in social exchange and health functioning in early old age: Prospective findings from the GAZEL study. *Aging & Mental Health, 14*(4), 425–432. https://doi.org/10.1080/13607860903483102

Wang, S., & Noe, R. A. (2010). Knowledge sharing: A review and directions for future research. *Human Resource Management Review, 20*(2), 115–131. https://doi.org/10.1016/j.hrmr.2009.10.001

Wang, S. S. (2013). "I share, therefore I am": Personality traits, life satisfaction, and Facebook check-ins. *Cyberpsychology, Behavior, and Social Networking, 16*(12), 870–877. https://doi.org/10.1089/cyber.2012.0395

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert Systems with Applications, 39*(10), 8899–8908. https://doi.org/10.1016/j.eswa.2012.02.017

Widén-Wulff, G., Ek, S., Ginman, M., Perttilä, R., Södergård, P., & Tötterman, A.-K. (2008). Information behaviour meets social capital: A conceptual model. *Journal of Information Science, 34*(3), 346–355. https://doi.org/10.1177/0165551507084679

Widén-Wulff, G., & Ginman, M. (2004). Explaining knowledge sharing in organizations through the dimensions of social capital. *Journal of Information Science, 30*(5), 448–458. https://doi.org/10.1177/0165551504046997

Wong, A., Ho, S., Olusanya, O., Antonini, M. V., & Lyness, D. (2021). The use of social media and online communications in times of pandemic COVID-19. *Journal of the Intensive Care Society, 22*(3), 255–260. https://doi.org/10.1177/1751143720966280

Wu, T., Jia, X., Shi, H., Niu, J., Yin, X., Xie, J., & Wang, X. (2021). Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders, 281*, 91–98. https://doi.org/10.1016/j.jad.2020.11.117

Xiong, C., & Xu, Y. (2009). Reliability and validity of the satisfaction with life scale for Chinese demo. *China Journal of Health Psychology, 17*(8), 948–949.

Yan, Z., Wang, T., Chen, Y., & Zhang, H. (2016). Knowledge sharing in online health communities: A social exchange theory perspective. *Information & Management, 53*(5), 643–653. https://doi.org/10.1016/j.im.2016.02.001

Yang, J. Z., Liu, Z., & Wong, J. C. (2021). Information seeking and information sharing during the COVID-19 pandemic. *Communication Quarterly (ahead of print)*. https://doi.org/10.1080/01463373.2021.1995772

Yang, Y., Liu, K., Li, S., & Shu, M. (2020). Social media activities, emotion regulation strategies, and their interactions on people's mental health in COVID-19 pandemic. *International Journal of Environmental Research and Public Health, 17*(23), 8931. https://doi.org/10.3390/ijerph17238931

Yang, Z. J., Kahlor, L. A., & Griffin, D. J. (2014). I share, therefore I am: A U.S.–China comparison of college students' motivations to share information about climate change. *Human Communication Research, 40*(1), 112–135. https://doi.org/10.1111/hcre.12018

Zhao, L., & John, N. (2020). The concept of 'sharing' in Chinese social media: Origins, transformations and implications. *Information, Communication & Society (ahead of print)*. https://doi.org/10.1080/1369118X.2020.1791216

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research, 37*(2), 197–206. https://doi.org/10.1086/651257

Zheng, L., & Zheng, Y. (2014). Online sexual activity in Mainland China: Relationship to sexual sensation seeking and sociosexuality. *Computers in Human Behavior, 36*, 323–329. https://doi.org/10.1016/j.chb.2014.03.062

Zheng, L., & Zheng, Y. (2015). Sex and sexual orientation differences in empathizing-systemizing cognitive styles in China. *Personality and Individual Differences, 87*, 267–271. https://doi.org/10.1016/j.paid.2015.08.014

Zhou, Y., Draghici, A., Mubeen, R., Boatca, M. E., & Salam, M. A. (2022). Social media efficacy in crisis management: Effectiveness of non-pharmaceutical interventions to manage COVID-19 challenges. *Front Psychiatry, 12*(1099), 626134. https://doi.org/10.3389/fpsyt.2021.626134

Zhou, J., Liu, L., Xue, P., Yang, X., & Tang, X. (2020). Mental health response to the COVID-19 outbreak in China. *American Journal of Psychiatry, 177*(7), 574–575. https://doi.org/10.1176/appi.ajp.2020.20030304