



Socially Connected during COVID-19: Online Social Connections Mediate the Relationship between Loneliness and Positive Coping Strategies

Kathleen A. Moore

Evita March

Federation University Australia

School of Health and Life Sciences

Northways Rd, Churchill 3842 Australia

Abstract

The novel coronavirus, COVID-19, spread across the world in early 2020. Many countries imposed social isolation restrictions where people were confined to their homes unless their work was deemed an essential service or for short outings to obtain necessary food and household supplies. We hypothesised that a lack of face-to-face social interactions would predict feelings of loneliness and reductions in healthy coping behaviours such as eating well and keeping occupied, and predicted that use of media connections to liaise with others would mediate this negative relationship. Two hundred and thirteen participants responded to an online survey with useable data available from 181 persons (147 females) (age $M = 37.82$ years, $SD = 13.24$). Data from a series of scales designed for this study revealed moderate levels of loneliness that directly predicted reduced engagement in healthy coping behaviours. This direct relationship was mediated by the use of media connections to liaise with others during the period of social isolation. Principal Component Analyses indicated media connections included two factors: Communication (e.g., phoning, texting) and social media (e.g., Facebook, Instagram). While the data were not representative of the wider population in terms of education and gender spread, the diversity of ages is a compensating factor. Suggestions for maintaining health and the importance of support during times of trauma, such as the COVID-19 pandemic, are discussed.

Keywords: COVID-19; Loneliness; Social Support; Coping

Corresponding author:

Kate Moore, Federation University Australia, Northways Road, Churchill, 3842.

Email: k.moore@federation.edu.au

ORCID IDs

Moore: <https://orcid.org/0000-0001-9161-331X>

March: <https://orcid.org/0000-0003-3633-8815>

Life as we know it has changed significantly due to COVID-19, the pandemic that seems to have started in China in late 2019 and has since swept indiscriminately across the globe. Countries and states have introduced quarantine measures, restricting travel and imposing strict isolation conditions on returning travellers with potentially deleterious effects on their mental health (Brooks et al., 2020). Businesses not considered essential have closed their doors and, where possible, staff are required to work from home. When outside the home, social distancing of 1.5 to 2m from other people is strongly recommended as well as strict hygiene practices regarding washing and sanitising hands. People in most countries and certainly in Australia, have been asked, nay told, by government, to self-isolate by confining themselves to their homes 24 hours a day unless employed in essential services, seeking medical help, exercising or they need to shop for essentials. While these ‘lockdown’ requirements have varied across the course of the pandemic, many people still voluntarily sequester themselves as a precaution or out of fear.

As humans, we are inherently social beings and typically interact with others at work, school and at leisure on a daily basis. Home confinement combined with the absence of our usual social interactions suggests we may be prone to feelings of loneliness. This raises questions around how we cope with social isolation and the strategies we use to connect with others. As our daily face-to-face contact with others is highly restricted at this time, it seems that those with the resources may turn to the virtual world to seek support and a sense of social connectedness. But more than this, how do we look after our mental and physical wellbeing when our daily routines have been disrupted: no work time, no gym time, no socializing? The aims in this paper were to explore people’s sense of loneliness during periods of imposed social isolation, their level of social connectedness using non face-to-face communication (i.e., phone calls, texting, social media), and the coping strategies used to maintain physical and mental health.

Hobfoll (1988) defined social support as the “social interactions or relationships that provide individuals with actual assistance or that embed individuals within a social system believed to provide love, caring, or a sense of attachment to a valued social group or dyad” (p. 121). Our social networks or supports have a direct relationship with our psychological and physical well-being, and/or act as a buffer between stressful life events and well-being (e.g., Andrews et al., 1978; Sarason et al., 1985; Schaefer et al., 1981). Kaniasty (2012) has shown that social support and

social connectedness have significant immediate effects on wellbeing during natural disasters. Such a sense of attachment or connectedness to others is not only essential for us to feel supported during adversity but, according to Kaniasty (2012) the disaster itself “elicit[s] an outpouring of immense mutual helping” (p. 22). But how do we connect with others when we are confined to social isolation in our homes as a result of government policies introduced to reduce transmission rates of COVID-19?

One major means for interacting with others during physical social interaction is via non face-to-face communication mechanisms, including online communication via social media and networks. Online communication offers many social benefits, such as relationship maintenance (Ellison et al., 2014), and increased intimacy (Jiang et al., 2011). Online social networks can potentially alleviate feelings of social isolation and loneliness by creating and facilitating opportunities for social connectedness (Khosravi et al., 2016), thus increasing social capital and reducing loneliness (Ryan et al., 2017). Online social connectedness has also been associated with lower depression and anxiety and greater satisfaction with life (Grieve et al., 2013). Both adults (Ahn & Shin, 2013) and older adults (Sinclair & Grieve, 2017) have been found to derive feelings of social connectedness from online networks. For older adults, their experience of online social connectedness is similar to traditional, face-to-face interactions (Sinclair & Grieve, 2017), and some research has even shown that older adults who use social media report greater social connectedness and perceived support (Yu et al., 2016). Other research has indicated a positive link between internet use and mood and social connectedness in ageing adults (e.g., Lifshitz et al., 2018; Sum et al., 2008). Despite the significant research on online networks and social connectedness, the use of the Internet for social connectedness during any form of disaster has not yet been explored.

Socially isolated people experience a range of impairments including increased blood pressure (Hawkey et al., 2010), depression (Cacioppo et al., 2010) and loneliness (Hawkey et al., 2010). Further, past research has shown that people who were in quarantine during the SARS outbreak of 2002–2003 experienced a range of impairments including depression (Cacioppo et al., 2010; Hawryluck et al., 2004), loneliness, and increased blood pressure (Hawryluck et al., 2004). More recently, Australians quarantined during an outbreak of equine influenza in 2007 experienced higher levels of psychological distress (Taylor et al., 2008). Given the propensity for individuals

to use the internet for connectedness (Ahn & Shin, 2013; Sinclair & Grieve, 2017) such usage during this COVID-19 pandemic and time of social isolation may be a proactive coping strategy used in attempts to reduce feelings of social isolation or loneliness. Certainly, Lett et al. (2007) suggested that social relationships can encourage older adults to seek or adhere to treatment plans from which it can be argued that the social connections we make via the internet during this COVID-19 pandemic and times of social isolation will motivate engagement in health promoting behaviours.

Theoretical Framework:

Social Compensation Theory in the Context of COVID-19

Social Compensation Theory (SCT) (Valkenburg & Peter, 2009) offers one way to conceptualise increased internet use particularly during times of stress or disasters, such as COVID-19. By applying SCT, we understand that increased online social interaction compensates for decreased face-to-face social interactions (Valkenburg et al., 2005). Such online social interactions can help to relieve negative feelings, such as loneliness, and even restore and compensate for some of the daily face-to-face communications that people may be missing. These communications might involve offering and receiving support and encouragement from significant others to maintain their mood while reducing feelings of loneliness. Alternatively, feelings of loneliness might lead to the use of the internet and other media in efforts to reach out to others. In sum, increased social interactions via the internet during times of forced social isolation may compensate for decreased face-to-face social interaction. Thus, a further aim in this paper was to explore people's use of internet media to establish social connections during social isolation of COVID-19.

Finally, not all strategies adopted during periods of loneliness are positive. As mentioned above, social isolation is associated with a range of ailments, including increased blood pressure (Hawkley et al., 2010), depression (Cacioppo et al., 2010), and loneliness (Hawkley et al., 2010). Reviews by House et al. (2008) and Rozanski et al. (1999) also found that social isolation was a risk factor for cardiac and all-cause mortality while social connectedness was associated with better autonomic activity (Uchino et al., 1996). Is this because socially isolated people lack the motivation to look after themselves? Is it because they are lonely that they lack volition to engage in health promoting behaviours. While they did not assess behaviours as such, Cacioppo et al. (2002) found that people scoring high on loneliness

had poorer outcomes across several health markers compared to those with low scores. Deckx et al. (2018) found a significant relationship between loneliness and emotion-focused coping strategies such as avoidance and withdrawal, which at this time, might mean withdrawal from healthy behaviours. Thus, the final aim in this paper was to explore the strategies people used (or do not use) to maintain their well-being during this isolated period and the impact of loneliness on these behaviours.

The aims in this study were threefold: 1) to ascertain the level of loneliness reported by people confined to social isolation as a result of government policies introduced to reduce transmission rates of COVID-19; 2) explore people's non face-to-face communication (e.g., phone calls, texting, social media) to establish social connections during this time, and 3) determine the strategies used to maintain wellbeing during social isolation. It was hypothesized that people would report medium to high levels of loneliness and feelings of loneliness would predict lower levels of engagement in healthy behaviours although (based on suggestions by Cotton et al., 2014) this relationship would be mediated by social connections via non face-to-face communication, termed media connectedness in the current study.

Method

Design

An online survey was used to collect data from the 16 April to 11th May 2020, during the period of social isolation imposed by the Australian government to reduce the transmission of COVID-19. During this period, for example, monetary fines were imposed on gatherings of more than two people for nonessential purposes outside the home.

Participants

Two hundred and thirteen volunteers (147 females) responded to an invitation to participate in this study, of whom 181 provided useable data. Participant ages ranged from 18 to 74 years, with a mean age of 37.82 years ($SD = 13.24$). A third of the sample was aged 18 – 26 years, a third of the sample was aged 27 – 40 years, and the remaining third of the sample was aged 40 – 74 years. Fifty-six percent of the sample were married/cohabitating, 34% were single, and 10% reported they were separated or divorced. The majority of respondents were University educated (87%) or had completed high school or an apprenticeship qualification (13%).

Procedure

The University's Human Ethics Committee provided approval for the conduct of this study. Partici-

pants were recruited via widely distributed advertisements placed on social media sites (Facebook, LinkedIn) inviting interested people aged 18 years and over and currently residing in Australia to access an online survey hosted on Qualtrics.com during the period of COVID-19 restrictions imposed by the Australian government. The Plain Language Statement on Qualtrics advised readers that their data are anonymous, participation voluntary, and submission of the completed survey would constitute their informed consent. No incentives were offered for participation.

The data were downloaded from Qualtrics and analysed using SPSS and AMOS (Version 26). A series of Principal Components Analyses (PCA) and Reliability Analyses were conducted on the scale questions written for this study prior to testing the hypotheses. The Kaiser-Meyer-Olkin statistic and Bartlett's Test of Sphericity indicated the suitability of each scale's data for analyses. Determination of the factor structures was based on the number of eigenvalues greater than one, and Cattell's Scree Plot.

Materials

Participants provided demographic data on their age, gender, marital and educational status, indicated if they were currently following the Australian government's requirement to self-isolate, and answered a series of questions designed for this study. The items for the scales were developed by (1) consulting Australian Government webpages outlining COVID-19 restrictions and (2) considering results and trends of previous pandemic and quarantine research (see Blendon et al., 2004; Taha et al., 2014; Wilken et al., 2017). The items have not been piloted, and as such the factor structure extracted here requires validation in future studies.

Loneliness was assessed by 12 questions: "Being in imposed social isolation because of COVID-19 makes me feel ... (e.g., lonely, alone)" rated on a 5-pt Likert scale from 1 = Not at all to 5 = Pretty much always.

The Media Connectedness Scale contained 10 questions: "Please indicate how much you use these media to connect or interact with other people at this time not how much you use them to scroll through other people's posts, watch or read content, or just look up information ... (e.g., texting, WhatsApp or similar, YouTube, Facebook)." Items are rated on a 5-pt Likert scale from 1 = Not at all to 5 = Quite a Lot.

Healthy Coping Behaviours were assessed with 13 questions: "I am coping with COVID-19 by ... (e.g.,

gardening, listening to music, social distancing)" rated on a 5-pt Likert scale from 1 = Not at all to 5 = Mostly all the time.

Results

The data were downloaded from Qualtrics and analysed using SPSS and AMOS (Version 26). A series of Principal Components Analyses (PCA) and Reliability Analyses were conducted on the scale questions written for this study prior to testing the hypotheses. The Kaiser-Meyer-Olkin statistic and Bartlett's Test of Sphericity indicated the suitability of each scale's data for analyses. Determination of the factor structures was based on the number of eigenvalues greater than one, and Cattell's Scree Plot.

The twelve items to assess Loneliness revealed one factor labelled lonely (Table 1) which explained 61.60% of the variance. It demonstrated excellent internal reliability (Cronbach's $\alpha = 0.95$).

The Media Connectedness Scale revealed two factors labelled communications and social media after the removal of one item (use of dating websites) that failed to contribute to the solution (Table 2). Together these two factors explained 48.24% of variance. Internal reliabilities were lower than the minimum recommendation of 0.70 at $\alpha = 0.51$ and 0.50 respectively, although Nunnally (1978) and Nunnally and Bernstein (1988) have indicated that newly developed measures can be accepted with a lower alpha value.

The Healthy Coping Behaviours Scale yielded two independent factors following the removal of two items (i.e., working at home; drinking more) which failed to load on to either factor. The two factors were labelled keeping occupied and health behaviours (Table 3). Together they explained 47.61% of the variance. Internal reliability for each was satisfactory, $\alpha = 0.75$ and 0.63 , respectively.

Descriptive Statistics

Seventy-four percent of respondents replied that they were adhering to social-isolation restrictions, 22% indicated they adhered mostly, and 4% indicated they were not complying with these requirements. Participants socially isolated in their homes reported moderate levels of loneliness on average, although the standard deviation was large (Table 4). There was no significant association between marital status and scores for loneliness ($\chi^2 = 91.09, p = .147, \eta = .572$). On the Media Connectedness Scale, the communication score was equivalent to the medium while the mean score for social media use was slightly lower than the medium.

Table 1: *Results of a Factor Analysis of the Loneliness Scale*

Items	Factor 1
Lonely	.92
Alone	.89
Anxious	.88
Abandoned	.84
Miserable	.79
Secluded	.77
Nervous	.76
Sad	.71
Scared	.71
Unhappy	.66
Tense	.62
Helpless	.61

Table 2: *Results of a Factor Analysis of the Media Connectedness Scale*

Items	1	2
Texting	.77	-.15
Phoning	.76	-.20
Face Time	.62	.25
WhatsApp/Signal	.31	
Facebook		.72
YouTube		.57
Instagram	.24	.54
Online Games	-.14	.49
Snapchat	.12	.34

Table 3: *Results of a Factor Analysis of the Healthy Coping Behaviours Scale*

Items	1	2
Catching up on chores	.87	
Sorting out things at home	.87	
Doing crafts	.62	-.15
Making the most of time	.57	.38
Gardening	.48	.12
Cooking	.43	.30
Eating well	.13	.83
Exercising	.20	.74
Social distancing	-.18	.54

Table 4: Means, Standard Deviations, and Ranges for Study Variables

Measure	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>Cronbach's α</i>
Lonely	27.18	12.00	12–56	.95
Internet Connections				
Communications	12.67	3.23	5–20	.52
Social Media	10.43	3.42	5–20	.50
Healthy Coping Behaviors				
Keeping Occupied	25.75	11.45	11–45	.75
Health Behaviors	6.36	2.35	3–15	.63

The mean score for keeping occupied was relatively high although the mean for engaging in healthy behaviours as a form of coping with social isolation during COVID-19 was low compared to the midpoint.

Direct Effect

Feelings of loneliness assessed during the period of social isolation had a direct negative impact on healthy coping behaviours ($\beta = -.88$), that is feeling lonely reduced people's efforts to keep occupied and to engage in healthy behaviours such as exercise and eating well.

Model Testing

A Path Analysis revealed that loneliness scores positively predicted 12% of the variance in media connectedness to make social connections ($\beta = .35$), operationalized as communication and social media, during social isolation. Use of media connections to make social connections positively predicted healthy coping behaviours ($\beta = .80$) and, in combination, scores on loneliness and media connectedness predicted 59% of the variance in healthy coping behaviours.

The inclusion of media connectedness (both communications and social media) in the model mediated the relationship between loneliness and healthy coping behaviours (Figure 1). As an exploratory model, the data provided a reasonable fit to the model ($\chi^2 = 12.23$, $p = .016$, $\chi^2/df = 3.06$, Goodness of Fit Index = .85, Incremental Fit Index = .88). The direct negative loading of loneliness on healthy coping behaviours while still significant, was reduced from $\beta = -.88$, to $\beta = -.42$ with the inclusion of media connectedness as a mediator. The indirect effect of loneliness on healthy behaviours through media connectedness was ($\beta = .28$).

Discussion

The aims in this study were to ascertain the level of loneliness reported by people socially isolated during

the COVID-19 pandemic, explore the use of the internet and other media as a means of social connectedness during this time, and the strategies used to cope and maintain wellbeing. In order to test these aims, we developed a series of scales: the Loneliness Scale, the Media Connectedness Scale and the Healthy Coping Behaviours Scale, all of which demonstrated good factorial validity and acceptable internal reliability.

The hypothesis that people would report experiencing medium to high levels of loneliness during the period of social isolation enforced during the height of the COVID-19 pandemic was supported. Approximately 26% of the sample scored above the mid-point on the loneliness scale.

In line with past research, loneliness was a significant negative predictor of people's healthy coping behaviours (Quan et al., 2014). That is, participants scoring high on loneliness demonstrated fewer attempts to engage in healthy behaviours such as eating well and exercising, and keeping occupied by performing household tasks (e.g., gardening) and pleasurable activities (e.g., listening to/playing music). Past research has associated loneliness with feelings of depression (Swami, 2007) and in the current measure of loneliness, feelings of sadness and being miserable were also present as part of feeling lonely, although these were not the dominant features of the scale. Loneliness, as well as depression, has been associated with a lack of volition or inactivity (Krämer et al., 2014; Tomstad et al., 2017) as demonstrated in the direct impact of loneliness on reduced engagement in healthy coping behaviours.

We then explored whether the loneliness present during imposed social isolation leads people to spend time connecting with others via the internet and other media when face-to-face contact is not possible. Results confirmed a positive pathway between loneliness and media connectedness that was manifest by two factors: communication (e.g., phoning) and social media (e.g., Facebook).

As expected, connecting with others via non face-

to-face communication including communications (phone call, messaging) and social media positively predicted engagement in proactive coping behaviours. Proactive coping behaviours included keeping occupied (e.g., sorting out and catching up with things at home, crafts, cooking, gardening), and to a lesser extent engaging in healthy behaviours such as eating well and exercising.

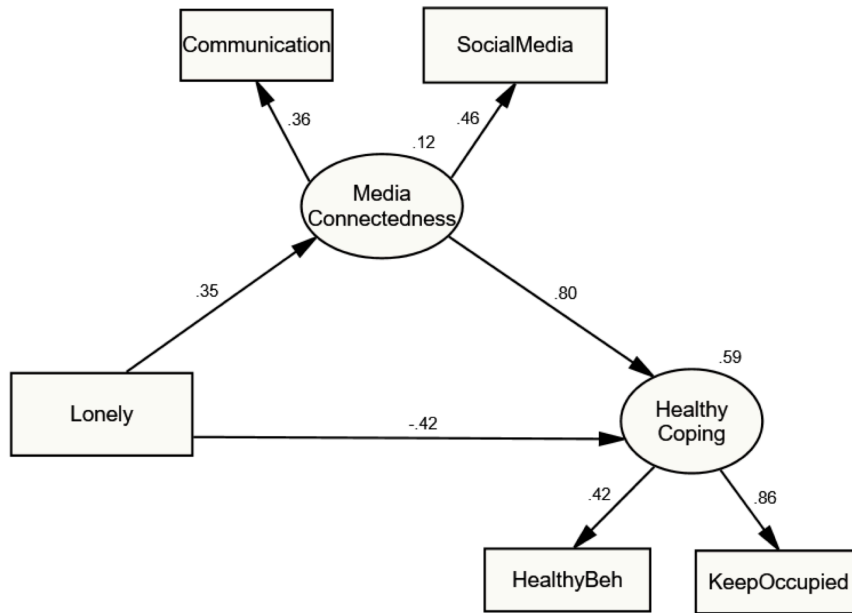
Furthermore, media connectedness mediated the effect of loneliness on healthy coping behaviours. That is, the more participants engaged with others via the internet and other media, the more likely they were to engage in strategies to occupy themselves and maintain their health. Past research (e.g., Kaniasty, 2012; Sarason et al., 1985; Schaefer et al., 1981) has also shown the importance of social connections or support, in times of stress and trauma, on people's wellbeing. While technology cannot replace human contact and touch, such as holding hands or hugging, it seems to have provided participants with a means of coping during the current COVID-19 pandemic when we are confined to our homes. Essentially, these media connections as a substitute for face-to-face interactions, indirectly mediated the impact of loneliness on engagement in healthy coping strategies that are vital for the maintenance of health and wellbeing.

The current data provide a cross-sectional view of the impact of COVID-19 during social isolation in an Australian sample. Limitations of the findings relate to a bias towards female participants, the fact that participants were predominantly from the eastern states, and a highly educated sample. The majority of respondents were University educated (87%) or had completed high school or an apprenticeship qualification (13%). These figures are higher than 2019 census reports where 'around two-thirds (68%) of Australians aged 20-64 years had a non-school qualification (a certificate, diploma or degree)' (Australian Bureau of Statistics, 2019), and may be in-

dicative of using LinkedIn as one method of participant recruitment. Therefore, it is important that future longitudinal studies extend the breadth and extent of sampling to ascertain the ongoing impact of social isolation on mood and potential 'social isolation fatigue' in the broader Australian population. Further, although the scales used in the current study were developed in line with research trends, the scales are still exploratory and further research is required to confirm their suitability for ongoing research. Nonetheless, Nunnally (1978) clearly indicated that less than optimal internal reliability is acceptable in this instance. While the majority of respondents were adhering to the social-isolation restriction, 4% of the sample indicated they were not. Despite this claim, they were not excluded from the data analyses as their media connectedness with others, their feelings, and healthy coping behaviours may be just as valid.

In conclusion, the current study provides insight into the level of loneliness experienced by people suddenly experiencing social-isolation during a traumatic event, in this case COVID-19. Loneliness exerted a direct negative effect on engagement in healthy coping behaviours such as keeping occupied but a positive impact of engagement with the internet and other media to connect with others when face-to-face interactions are not possible. These social connections positively predicted the use of healthy coping behaviours as well as mediating the relationship between loneliness and healthy coping behaviours. Clearly, keeping in social contact with others, albeit through technology of one kind or another, is important during times of social isolation. One especial benefit from such social connectedness is its contribution to us engaging in behaviours around healthy eating and exercise and activities to keep occupied while, mediating to some extent, feelings of loneliness.

Figure 1 *Model of Loneliness on Healthy Coping Behaviors mediated by Media Connectedness.*



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