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The effects of social isolation on well-being and life satisfaction during pandemic

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The SARS-CoV-2 pandemic placed many locations under ‘stay at home’ orders and adults simultaneously underwent a form of social isolation that is unprecedented in the modern world. Perceived social isolation can have a significant effect on health and well-being. Further, one can live with others and still experience perceived social isolation. However, there is limited research on psychological well-being during a pandemic. In addition, much of the research is limited to older adult samples. This study examined the effects of perceived social isolation in adults across the age span. Specifically, this study documented the prevalence of social isolation during the COVID-19 pandemic as well as the various factors that contribute to individuals of all ages feeling more or less isolated while they are required to maintain physical distancing for an extended period of time. Survey data was collected from 309 adults who ranged in age from 18 to 84. The measure consisted of a 42 item survey from the Revised UCLA Loneliness Scale, Measures of Social Isolation (Zavaleta et al., 2017), and items specifically about the pandemic and demographics. Items included both Likert scale items and open-ended questions. A “snowball” data collection process was used to build the sample. While the entire sample reported at least some perceived social isolation, young adults reported the highest levels of isolation, $\chi^2(2) = 27.36, p < 0.001$. Perceived social isolation was associated with poor life satisfaction across all domains, as well as work-related stress, and lower trust of institutions. Higher levels of substance use as a coping strategy was also related to higher perceived social isolation. Respondents reporting higher levels of subjective personal risk for COVID-19 also reported higher perceived social isolation. The experience of perceived social isolation has significant negative consequences related to psychological well-being.

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Introduction

In March 2020, the World Health Organization declared the COVID-19 outbreak a global pandemic, prompting most governors in the United States to issue stay-at-home orders in an effort to minimize the spread of COVID-19. This was after several months of similar quarantine orders in countries throughout Asia and Europe. As a result, a unique situation arose, in which most of the world's population was confined to their homes, with only medical staff and other essential workers being allowed to leave their homes on a regular basis. Several studies of previous quarantine episodes have shown that psychological stress reactions may emerge from the experience of physical and social isolation (Brooks et al., 2020). In addition to the stress that might arise with social isolation or being restricted to your home, there is also the stress of worrying about contracting COVID-19 and losing loved ones to the disease (Brooks et al., 2020; Smith and Lim, 2020). For many families, this stress is compounded by the challenge of working from home while also caring for children whose schools had been closed in an effort to slow the spread of the disease. While the effects of social isolation has been reported in the literature, little is known about the effects of social isolation during a global pandemic (Galea et al., 2020; Smith and Lim, 2020; Usher et al., 2020).

Social isolation is a multi-dimensional construct that can be defined as the inadequate quantity and/or quality of interactions with other people, including those interactions that occur at the individual, group, and/or community level (Nicholson, 2012; Smith and Lim, 2020; Umberson and Karas Montez, 2010; Zavaleta et al., 2017). Some measures of social isolation focus on external isolation which refers to the frequency of contact or interactions with other people. Other measures focus on internal or perceived social isolation which refers to the person's perceptions of loneliness, trust, and satisfaction with their relationships. This distinction is important because a person can have the subjective experience of being isolated even when they have frequent contact with other people and conversely they may not feel isolated even when their contact with others is limited (Hughes et al., 2004).

When considering the effects of social isolation, it is important to note that the majority of the existing research has focused on the elderly population (Nyqvist et al., 2016). This is likely because older adulthood is a time when external isolation is more likely due to various circumstances such as retirement, and limited physical mobility (Umberson and Karas Montez, 2010). During the COVID-19 pandemic the need for physical distancing due to virus mitigation efforts has exacerbated the isolation of many older adults (Berg-Weger and Morley, 2020; Smith et al., 2020) and has exposed younger adults to a similar experience (Brooks et al., 2020; Smith and Lim, 2020). Notably, a few studies have found that young adults report higher levels of loneliness (perceived social isolation) even though their social networks are larger (Child and Lawton, 2019; Nyqvist et al., 2016; Smith and Lim, 2020); thus indicating that age may be an important factor to consider in determining how long-term distancing due to COVID-19 will influence people's perceptions of being socially isolated.

The general pattern in this research is that increased social isolation is associated with decreased life satisfaction, higher levels of depression, and lower levels of psychological well-being (Cacioppo and Cacioppo, 2014; Coutin and Knapp, 2017; Dahlberg and McKee, 2018; Harasemiw et al., 2018; Lee and Cagle, 2018; Usher et al., 2020). Individuals who experience high levels of social isolation may engage in self-protective thinking that can lead to a negative outlook impacting the way individuals interact with others (Cacioppo and Cacioppo, 2014). Further, restricting social networks and experiencing elevated levels of social isolation act as mediators that result in elevated negative mood and lower satisfaction with life factors (Harasemiw et al., 2018; Zheng et al.,

2020). The relationship between well-being and feelings of control and satisfaction with one's environment are related to psychological health (Zheng et al., 2020). Dissatisfaction with one's home, resource scarcity such as food and self-care products, and job instability contribute to social isolation and poor well-being (Zavaleta et al., 2017).

Although there are fewer studies with young and middle aged adults, there is some evidence of a similar pattern of greater isolation being associated with negative psychological outcomes for this population (Bergin and Pakenham, 2015; Elphinstone, 2018; Liu et al., 2019; Nicholson, 2012; Smith and Lim, 2020; Usher et al., 2020). There is also considerable evidence that social isolation can have a detrimental impact on physical health (Holt-Lunstad et al., 2010; Steptoe et al., 2013). In a meta-analysis of 148 studies examining connections between social relationships and risk of mortality, Holt-Lunstad et al. (2010) concluded that the influence of social relationships on the risk for death is comparable to the risk caused by other factors like smoking and alcohol use, and greater than the risk associated with obesity and lack of exercise. Likewise, other researchers have highlighted the detrimental impact of social isolation and loneliness on various illnesses, including cardiovascular, inflammatory, neuroendocrine, and cognitive disorders (Bhatti and Haq, 2017; Xia and Li, 2018). Understanding behavioral factors related to positive and negative copings is essential in providing health guidance to adult populations.

Feelings of belonging and social connection are related to life satisfaction in older adults (Hawton et al., 2011; Mellor et al., 2008; Nicholson, 2012; Victor et al., 2000; Xia and Li, 2018). While physical distancing initiatives were implemented to save lives by reducing the spread of COVID-19, these results suggest that social isolation can have a negative impact on both mental and physical health that may linger beyond the mitigation orders (Berg-Weger and Morley, 2020; Brooks et al., 2020; Cava et al., 2005; Smith et al., 2020; Usher et al., 2020). It is therefore important that we document the prevalence of social isolation during the COVID-19 pandemic as well as the various factors that contribute to individuals of all ages feeling more or less isolated, while they are required to maintain physical distancing for an extended period of time. It was hypothesized that perceived social isolation would not be limited to an older adult population. Further, it was hypothesized that perceived social isolation would be related to individual's coping with the pandemic. Finally, it was hypothesized that the experience of social isolation would act as a mediator to life satisfaction and basic trust in institutions for individuals across the adult lifespan. The current study was designed to examine the following research questions:

1. Are there age differences in participants' perceived social isolation?
2. Do factors like time spent under required distancing and worry about personal risk for illness have an association with perceived social isolation?
3. Is perceived social isolation due to quarantine and pandemic mitigation efforts related to life satisfaction?
4. Is there an association between perceived social isolation and trust of institutions?
5. Is there a difference in basic stressors and coping during the pandemic for individuals experiencing varying levels of perceived social isolation?

Methods

Participants. Participants were adults age 18 years and above. Individuals younger than 18 years were not eligible to participate

in the study. There were no limitations on occupation, education, or time under mandatory “stay at home” orders. The researchers sought a sample of adults that was diverse by age, occupation, and ethnicity. The researchers sought a broad sample that would allow researchers to conduct a descriptive quantitative survey study examining factors related to perceived social isolation during the first months of the COVID-19 mitigation efforts.

Measures. Participants were asked to complete a 42-item electronic survey that consisted of both Likert-type items and open-ended questions. There were 20 Likert scale items, 3 items on a 3-point scale (1 = Hardly ever to 3 = Often) and 17 items on a 5-point scale (1 = Not at all satisfied to 4 = very satisfied, 0 = I don't know), 11 multiple choice items, one of which had an available short response answer, and 11 short answer items.

Items were selected from Measures of Social Isolation (Zavaleta et al., 2017) that included 27 items to measure feelings of social isolation through the proxy variables of stress, trust, and life satisfaction. Trust was measured for government, business, and media. Life satisfaction examined overall feelings of satisfaction as well as satisfaction with resources such as food, housing, work, and relationships. Three items related to social isolation were chosen from the Revised UCLA Loneliness Scale. Hughes et al. (2004) reported that these three items showed good psychometric validity and reliability for the construct of Loneliness.

There were a further 12 items from the authors specifically about circumstances regarding COVID-19 at the time of the survey. Participants answered questions about the length of time spent distancing from others, level of compliance with local regulations, primary news sources, whether physical distancing was voluntary or mandatory, how many people are in their household, work availability, methods of communication, feelings of personal risk of contracting COVID-19, possible changes in behavior, coping methods, stressors, and whether there are children over the age of 18 staying in the home.

Procedures. This study was submitted to the Cabrini University Institutional Review Board and approval was obtained in March 2020. Researchers recruited a sample of people that varied by age, gender, and ethnicity by identifying potential participants across academic and non-academic settings using professional contact lists. A “snowball” approach to data gathering was used. The researchers sent the survey to a broad group of adults and requested that the participants send the survey to others they felt would be interested in taking part in research. Recipients received an email that contained a description of the purpose of the study and how the data would be used. Included at the end of the email was a link to the online survey that first presented the study's consent form. Participants acknowledged informed consent and agreed to participate by opening and completing the survey.

At the end of the survey, participants were given the opportunity to supply an email to participate in a longitudinal study which consists of completing surveys at later dates. In addition, the sample was asked to forward the survey to their contacts who might be interested. Overall, the study took ~10 min to complete.

Results

Demographics. Participants were 309 adults who ranged in age from 18 to 84 ($M = 38.54, s = 18.27$). Data was collected beginning in 2020 from late March until early April. At the time of data collection distancing mandates were in place for 64.7% and voluntary for 34.6% of the sample, while 0.6% lived in places which had not yet outlined any pandemic mitigation policies. The average length of time distancing was slightly more than 2 weeks

($M = 14.91$ days, $s = 4.5$) with 30 days as the longest reported time.

The sample identified mostly as female (80.3%), with males (17.8%) and those who preferred not to answer (1.9%) representing smaller numbers. The majority of the sample identified as Caucasian (71.5%). Other ethnic identities reported by participants included Hispanic/Latinx, African-American/Black, Asian/East Asian, Jewish/Jewish White-Passing, Multi-racial/Multiethnic, and Country of Origin (Table 1). Individuals resided in the United States and Europe.

The majority of the sample lived in households with others (Fig. 1). More than one-third (36.7%) lived with one other person, 19.7% lived with two others, and 21% lived with three other people. People living alone comprised 12.1% of the sample. When asked about the presence of children under 18 years of age in the home, 20.5% answered yes.

The highest level of education attained ranged from completion of lower secondary school (0.3%) to doctoral level (6.8%). Two thirds of the sample consisted of individuals with a Bachelor's degree or above (Table 2).

Participants were asked to provide their occupation. The largest group identified themselves as professionals (26.5%), while 38.6% reported their field of work (Table 3). Students comprised

Table 1 Self-reported ethnic identities of participants.

Self-Identified Ethnicity	Percent
Caucasian/White	71.5
Hispanic/Latinx	6.1
African American/Black	3.9
Asian/East Indian	1.3
Jewish/Jewish White Passing	3.2
Multi-racial/Multi-ethnic	3.6
Country of Origin	6.5
Chose not to answer	3.9

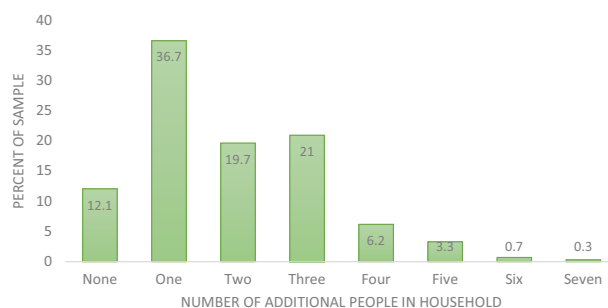


Fig. 1 Number of additional people in household as a percent. Figure shows how many additional individuals live in the participant's household in March 2020.

Table 2 Reported education levels.

Education attained	Percent
Doctorate	6.8
Master's	24.0
Bachelor's	35.1
Associate's	5.5
Some college	18.2
Post secondary-noncollege	4.2
HS-GED	5.8
Lower secondary	0.3

Table 3 Reported occupation.

Occupation	Percent
Student (grad and undergrad)	23.2
Retired	11.1
Professional	26.5
Business	7.5
Education	4.9
Psychology/mental health	3.9
Arts	2.9
Program management	2.3
Service industry	7.5
Law	2.6
Government	1.3
Homemaker	2.9
Healthcare	2.3
Veterinary	0.7
Unemployed prior to COVID19	0.3

23.1% of the sample, while 11.1% reported that they were retired. Some of the occupations reported by the sample included nurses and physicians, lawyers, psychologists, teachers, mental health professionals, retail sales, government work, homemakers, artists across types of media, financial analysts, hairdresser, and veterinary support personnel. One person indicated that they were unemployed prior to the pandemic.

Social isolation and demographics. Spearman's rank-order correlations were used to examine relationships between the three Likert scale items from the Revised UCLA Loneliness Scale that measure social isolation. Feeling isolated from others was significantly correlated with lacking companionship ($r_s = 0.45$, $p < 0.001$) and feeling left out ($r_s = 0.43$, $p < 0.001$). The items related to lacking companionship and feeling left out were also significantly correlated ($r_s = 0.39$, $p < 0.001$).

Kruskal–Wallis tests were conducted to determine if the variables of time in required distancing and age were each related to the three levels of social isolation (hardly, sometimes, often). There were no significant findings between perceived social isolation and length of time in required distancing, $\chi^2(2) = 0.024$, $p = 0.98$.

A significant relationship was found between perceived social isolation and age, $\chi^2(2) = 27.36$, $p < 0.001$. Subsequently, pairwise comparisons were performed using Dunn's procedure with a Bonferroni correction for multiple comparisons. Adjusted p values are presented. Post hoc analysis revealed statistically significant differences in age between those with high levels of social isolation (Mdn = 25) and some social isolation (Mdn = 31) ($p < 0.001$) and low isolation (Mdn = 46) ($p = 0.002$). Higher levels of social isolation were associated with younger age.

Age was then grouped (18–29, 30–49, 50–69, 70+) and a significant relationship was found between social isolation and age, $\chi^2(3) = 13.78$, $p = 0.003$. Post hoc analysis revealed statistically significant differences in perceived social isolation across age groups. The youngest adults (age 18–29) reported significantly higher social isolation (Mdn = 2.4) than the two oldest groups (50–69 year olds: Mdn = 1.6, $p = 0.04$); age 70 and above: Mdn = 1.57), $p = 0.01$. The difference between the youngest adults and the next youngest (30–49) was not significant ($p = 0.09$).

When asked if participants feel personally at risk for contracting SARS-CoV-2 61.2% reported that they feel at risk. A Mann–Whitney U test was conducted to compare social isolation experienced by those who reported feeling at risk and those who did not feel at risk. Individuals who feel at risk for

Table 4 Frequencies for 'I feel isolated from others'.

	Frequency	Percent
Hardly Ever	98	32.0
Sometimes	132	43.1
Often	76	24.8

infection reported more social isolation (Mdn = 2.0) than those that do not feel at risk (Mdn = 1.75), $U = 9377$, $z = -2.43$, $p = 0.015$.

Social isolation and life satisfaction. The relationship between level of social isolation and overall life satisfaction were examined using Kruskal–Wallis tests as the measure consisted of Likert-type items (Table 4).

Overall life satisfaction was significantly lower for those who reported greater social isolation ($\chi^2(2) = 50.56$, $p < 0.001$). Post hoc analysis revealed statistically significant differences in life satisfaction scores between those with high levels of social isolation (Mdn = 2.82) and some social isolation (Mdn = 3.04) ($p \leq 0.001$) and between high and low isolation (Mdn = 3.47) ($p \leq 0.001$), but not between high levels of social isolation and some social isolation ($p = 0.09$).

The pandemic added concern about access to resources such as food and 68% of the sample reported stress related to availability of resources. A significant relationship was found between social isolation and satisfaction with access to food, $\chi^2(2) = 21.92$, $p < 0.001$. Individuals reporting high levels of social isolation were the least satisfied with their food situation. Statistical difference were evident between high social isolation (Mdn = 3.28) and some social isolation (Mdn = 3.46) ($p = 0.003$) and between high and low isolation (Mdn = 3.69) ($p < 0.001$). Reporting higher levels of social isolation is associated with lower satisfaction with food.

As a result of stay at home orders, many participants were spending more time in their residences than prior to the pandemic. A significant relationship was found between social isolation and housing satisfaction, $\chi^2(2) = 10.33$, $p = 0.006$. Post hoc analysis revealed statistically a significant difference in housing satisfaction between those with high levels of social isolation (Mdn = 3.49) and low social isolation (Mdn = 3.75) ($p = 0.006$). Higher levels of social isolation is associated with lower levels of satisfaction with housing.

Work life changed for many participants and 22% of participants reported job loss as a result of the pandemic. A significant relationship was found between social isolation and work satisfaction, $\chi^2(2) = 21.40$, $p < 0.001$. Post hoc analysis revealed individuals reporting high social isolation reported much lower satisfaction with work (Mdn = 2.53) than did those reporting low social isolation (Mdn = 3.27) ($p < 0.001$) and moderate social isolation (Mdn = 3.03) ($p = 0.003$).

Social isolation and trust of institutions. The relationship between social isolation and connection to community was measured using a Kruskal–Wallis test. A significant relationship was found between feelings of social isolation and connection to community ($\chi^2(2) = 13.97$, $p = 0.001$). Post hoc analysis revealed a statistically significant difference in connection to community such that the group reporting higher social isolation (Mdn = 2.27, $p = 0.001$) reports less connection to their community than the group reporting low social isolation (Mdn = 2.93).

A significant relationship was found between social isolation and trust of central government institutions, $\chi^2(2) = 10.46$, $p = 0.005$. Post hoc analysis revealed a statistically significant

difference in trust of central government between individuals reporting low social isolation (Mdn = 2.91) and those reporting high social isolation (Mdn = 2.32) ($p = 0.008$) and moderate social isolation (Mdn = 2.48) ($p = 0.03$). There was less trust of central government for the group reporting high social isolation. However, distrust of central government did not extend to local government institutions. There was no significant difference in trust of local government for low, moderate, and high social isolation groups, $\chi^2(2) = 5.92$, $p = 0.052$.

Trust levels of business was significantly different between groups that differed in feelings of social isolation, $\chi^2(2) = 9.58$, $p = 0.008$. Post hoc analysis revealed more trust of business institutions for the low social isolation group (Mdn = 3.10) compared to the group reporting high social isolation (Mdn = 2.62) ($p = 0.007$).

Stressors. Sixty-seven participants reported loss of a job as a result of COVID-19. A Mann–Whitney U test was conducted to compare social isolation experienced by those who had lost their job to those who had not. Individuals who experienced job loss reported more social isolation (Mdn = 2.26) than those that did not lose their job (Mdn = 1.80), $U = 5819.5$, $z = -3.66$, $p < 0.001$.

Stress related to caring for an elderly family member was identified by 12% of the sample. A Mann–Whitney U test was conducted to compare social isolation experienced by those who reported that caring for an elderly family member is a stressor to those who had not. There was no significant finding, $U = 4483$, $z = -1.28$, $p = 0.20$. Similarly, there was no significant effect for caring for a child, $U = 3568.5$, $z = -0.48$, $p = 0.63$.

Coping strategies. Participants were asked to check off whether they were using virtual communication, exercise, going outdoors, and/or substances in order to cope with the challenges of distancing during pandemic. A Mann–Whitney U test was conducted to compare social isolation experienced by those who used substances as a coping strategy and those that did not. Individuals who reported substance use reported more social isolation (Mdn = 2.12) than those that did not (Mdn = 1.80), $U = 6724$, $z = -2.01$, $p = 0.04$.

There was no significant difference on Mann–Whitney U test for social isolation between those individuals who went outdoors to cope with pandemic versus those that did not, $U = 5416$, $z = -0.72$, $p = 0.47$. Similarly, there was no difference in social isolation between those individuals who used exercise as a coping tool and those that did not. Finally, there was no difference in social isolation between those that used virtual communication tools and those that did not, $U = 7839.5$, $z = -0.56$, $p = 0.58$. The only coping strategy which was significantly associated with social isolation was substance use.

Discussion

While research has explored the subjective experience of social isolation, the novel experience of mass physical distancing as a result of the SARS-CoV-2 pandemic suggests that social isolation is a significant factor in the public health crisis. The experience of social isolation has been examined in older populations but less often in middle-age and younger adults (Brooks et al., 2020; Smith and Lim, 2020). Perceived social isolation is related to numerous negative outcomes related to both physical and mental health (Bhatti and Haq, 2017; Holt-Lunstad et al., 2010; Victor et al., 2000; Xia and Li, 2018). Our findings indicate that younger adults in their 20s reported more social isolation than did those individuals aged 50 and older during physical distancing. This supports the findings of Nyqvist et al. (2016) that found teenagers

and young adults in Finland reported greater loneliness than did older adults.

The experience of social isolation is related to a reduction in life satisfaction. Previous research has shown that feelings of social connection are related to general life satisfaction in older adults (Hawton et al., 2011; Hughes et al., 2004; Mellor et al., 2008; Victor et al., 2000; Xia and Li, 2018). These findings indicate that perceived social isolation can be a significant mediator in life satisfaction and well-being across the adult lifespan during a global health crisis. Individuals reporting higher levels of social isolation experience less satisfaction with the conditions in their home.

During mandated “stay-at-home” conditions, the experience of work changed for many people. For many adults work is an essential aspect of identity and life satisfaction. The experience of individuals reporting elevated social isolation was also related to lower satisfaction with work. This study included a wide span of occupations involving both individuals required to work from home and essential workers continuing to work outside the home. Further, ~22% of the sample ($n = 67$) reported job loss as a stressor related to the SARS-CoV-2 pandemic and reported elevated social isolation. As institutions and businesses consider whether remote work is an economically viable alternative to face-to-face offices once physical distancing mandates are ended, the needs of workers for social interaction should be considered.

Further, individuals reporting higher social isolation also indicated less connection to their community and lower satisfaction with environmental factors such as housing and food. Findings indicate that higher perceived social isolation is associated with broad dissatisfaction across social and life domains and perceptions of personal risk from COVID-19. This supports research that identified a relationship between social isolation and health-related quality of life outcomes (Hawton et al., 2011; Victor et al., 2000). Perceptions of elevated social isolation are related to lower life satisfaction in functional and social domains.

Perceived social isolation is likewise related to trust of some institutions. While there was no effect for local government, individuals with higher perceived social isolation reported less trust of central government and of business. There is an association between higher levels of perceived social isolation and less connection to the community, lower life satisfaction, and less trust of large-scale institutions such as central government and businesses. As a result, the individuals who need the most support may be the most suspicious of the effectiveness of those institutions.

Coping strategies related to exercise, time spent outdoors, and virtual communication were not related to social isolation. However, individuals who reported using substances as a coping strategy reported significantly higher social isolation than did the group who did not indicate substance use as a coping strategy. Perceived social isolation was associated with negative coping rather than positive coping. This study shows that clinicians and health care providers should ask about coping strategies in order to provide effective supports for individuals.

There are several limitations that may limit the generalizability of the findings. The study is heavily female and this may have an effect on findings. In addition, the majority of the sample has a post-secondary degree and, as such, this study may not accurately reflect the broad experience of individuals during pandemic. Further, it cannot be ruled out that individuals reporting high levels of perceived social isolation may have experienced some social isolation prior to the pandemic.

Conclusions

In conclusion, this study suggests that perceived social isolation is a significant element of health-related quality of life during

pandemic. Perceived social isolation is not just an issue for older adults. Indeed, young adults appear to be suffering greatly from the distancing required to reduce the spread of SARS-CoV-2. The experience of social isolation is associated with poor life satisfaction across domains, work-related stress, lower trust of institutions such as central government and business, perceived personal risk for COVID-19, and higher levels of use of substances as a coping strategy. Measuring the degree of perceived social isolation is an important addition to wellness assessments. Stress and social isolation can impact health and immune function and so reducing perceived social isolation is essential during a time when individuals require strong immune function to fight off a novel virus. Further, it is anticipated that these widespread effects may linger as the uncertainty of the virus continues. As a result, we plan to follow participants for at least a year to examine the impact of SARS-CoV-2 on the well-being of adults.

Data availability

The dataset generated during and analyzed during the current study is not publicly available due to ethical restrictions and privacy agreements between the authors and participants.

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Author contributions

All authors jointly supervised and contributed to this work.

Competing interests

The authors declare no competing interests.

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