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Determinants of loneliness during the COVID-19 pandemic in the United States: A one-year follow-up study

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Abstract

An initial study on loneliness during the first month of the COVID-19 pandemic in the United States found that those who were living alone or who were single experienced greater loneliness than those who lived with others or were in a romantic relationship. This study presents follow-up analyses using data collected from the same sample (N = 428) at a total of five points in time throughout the first year of the COVID-19 pandemic in the United States. Unlike most studies using a longitudinal design to track loneliness throughout the COVID-19 pandemic, the results of this study showed that loneliness scores generally decreased over this time period. However, additional analyses showed that when participants experienced a de-escalation in their romantic relationship status (e.g., transitioning from being in a dating relationship to being single or from being married to separated), loneliness scores increased. Because prior research shows a connection between living alone and loneliness, the researchers also tested whether decreases in the number of people one lives with predicted increases in loneliness. The data was inconsistent with this prediction. Overall, these findings join a minority of other longitudinal studies investigating loneliness during the COVID-19 pandemic that found either a decrease or no change in loneliness, while also illustrating that increases in loneliness during the COVID-19 pandemic occurred after people experienced a de-escalation in their romantic relationship status. These findings underscore the importance of life events during the COVID-19 pandemic that may increase loneliness—specifically transitioning out of romantic relationships. Thus, future research on predictors of

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loneliness should continue to use longitudinal designs to determine how changes in one's life predict changes in loneliness.

Keywords
Communication, COVID-19, isolation, living alone, loneliness, longitudinal, pandemic, romantic relationship status

A recent study (Ray, 2021) investigated the experiences of loneliness in the United States during the first month of the COVID-19 pandemic. The study's results showed that living with others and being in a committed romantic relationship mitigated loneliness, even when controlling for trait-levels of loneliness, extraversion, and affection deprivation. Additionally, changes in loneliness during the first month of the COVID-19 pandemic differed based on age group. Young adults initially experienced more loneliness than middle-aged and older adults, but also experienced a more rapid decline in loneliness over the course of the month compared to middle-aged and older adults.

Although these findings are useful, shelter-in-place orders and social distancing guidelines continued for several months beyond that initial data collection. Considering some people may have returned to in-person work, become vaccinated, or made the personal decision to increase their social interactions, it is worth further investigating what factors predict the ongoing experience of loneliness approximately 1 year into the COVID-19 pandemic, and to explore how loneliness levels may have changed over the course of the first year of the pandemic. To do so, the present study seeks to determine if the same factors affecting loneliness during the first month of the pandemic influenced loneliness throughout the first year of the COVID-19 pandemic. We begin by reviewing the literature on loneliness and how one's romantic relationship status and living arrangements (i.e., living alone or with others) may affect experiences of loneliness.

Loneliness prevalence before and during the COVID-19 pandemic

Loneliness occurs when one experiences a deficiency in the quantity or quality of their close personal relationships (Cacioppo et al., 2006; Perlman & Peplau, 1981). Whereas most people will experience times of loneliness intermittently throughout their lives (Hawkley & Cacioppo, 2010; Rokach & Bauer, 2004), a growing number of people report experiencing chronic loneliness—a pervasive feeling of isolation and a lack of meaningful relationships (Diehl et al., 2018; Sherwood et al., 2014). The consequences of loneliness are not trivial. Loneliness has been linked with both mental and physical health outcomes, including experiences of clinical and subclinical depression (Aylaz et al., 2012; Cacioppo et al., 2006; Heinrich & Gullone, 2006), affection deprivation (Floyd, 2014, 2016), eating disorders (Levine, 2012), disordered sleep (Hawkley et al., 2010), suicide ideation (Stravynski & Boyer, 2001), immunosuppression (Pressman et al., 2005), and all-cause mortality (Holt-Lunstad et al., 2015; Shiovitz-Ezra & Ayalon, 2010).

Notably, the United States was experiencing a loneliness epidemic prior to the onset of the COVID-19 pandemic (Holt-Lunstad et al., 2017). Large-scale studies of loneliness and social connection found that 54% of Americans reported being chronically lonely in 2018, and this number increased to 61% in 2019, just prior to the start of the COVID-19 pandemic (Cigna, 2020). The United States is not alone regarding loneliness, as other countries both in the developed and developing world reported similar rates of loneliness prior to the COVID-19 pandemic. For example, one in 11 people aged 16 or older in the United Kingdom reported having zero close friends (Sherwood et al., 2014), and a study of students from 25 low- or middle-income countries found that one in six reported chronic loneliness or having no close friends (Sauter et al., 2020).

Recently, researchers have investigated loneliness trends during the COVID-19 pandemic (Ray, 2021). As mentioned earlier, results of the initial study from our sample showed that throughout the first month after shelter-in-place orders and social distancing guidelines were implemented in the United States, people reported notable levels of loneliness. Loneliness scores were highest for young adults, but these scores decreased over the course of the month. Older adults initially reported the lowest loneliness scores of any age group in the sample but were also the only age group to see a sustained increase in loneliness over the course of the month. One other recent study confirmed that young adults had the highest levels of emotional loneliest during the COVID-19 pandemic and that younger adults who frequently used social media reported particularly elevated levels of loneliness (Bonsaken et al., 2021).

In addition to these studies, other researchers have contributed to understanding how loneliness occurred during the COVID-19 pandemic. For example, loneliness continued to correlate with detrimental outcomes during the pandemic that were known correlates prior to the pandemic, such as affection deprivation (Hesse et al., 2021), feeling underbenefited in relationships (Holmstrom et al., 2021), and depression and anxiety (Hoffart et al., 2020). This is important because, in general, most studies found that loneliness increased during the first year of the pandemic (e.g., Bu et al., 2020; Hoffart et al., 2020; Killgore et al., 2020; Li & Wang, 2020). Some studies, however, did show loneliness levels staying stable during the COVID-19 pandemic (Luchetti et al., 2020; McGinty et al., 2020). To further add to the body of research on loneliness prevalence during the first year of the pandemic, the following research question is posed:

RQ: How did loneliness change during the first year of the COVID-19 pandemic in the United States?

Romantic relationship status as a predictor of loneliness

If loneliness results from a lack of meaningful relationships, then one predictor of loneliness during the COVID-19 pandemic could be whether one is in a committed romantic relationship. A robust body of literature touts the protective effects of romantic relationships against loneliness. This may be because such relationships are typically stable and expected to continue (Baumeister & Leary, 1995) or because romantic partners and spouses are usually one's primary provider of social support (Coyne &

DeLongis, 1986; Thoits, 1995), and support negatively correlates with loneliness (Floyd, 2014).

Research from before the COVID-19 pandemic had demonstrated this. For example, one study found elderly people who are single are more likely to experience loneliness than those who are partnered (e.g., Steed et al., 2007), and in a study of over 15,000 German adults, those who had a romantic partner reported less loneliness (Beutel et al., 2017). Early investigations into loneliness factors during the COVID-19 pandemic have also suggested that having a romantic partner protects against loneliness. Indeed, findings have confirmed this in samples from the United Kingdom (e.g., Groarke et al., 2020; Li & Wang, 2020) and Norway (e.g., Hansen et al., 2021; Hoffart et al., 2020), in which those with a romantic partner during the pandemic were less lonely than those who were single.

The present study, however, specifically investigates how changes in one's relationship status, either by escalating in connectedness to another (e.g., transitioning from being single to being in a committed dating relationship) or de-escalating in connectedness to another (e.g., going from being married to separated), may affect the trajectory of one's loneliness over time. Prior research suggests that experiencing a decrease in connectedness with a romantic partner precipitates an increase in loneliness, regardless if that separation occurs due to death or relationship dissolution (Rokach & Brock, 1996; Savikko et al., 2005). Considering the potential for relationships to end during the pandemic, either due to a decision to end the relationship or the death of a partner, the following is hypothesized:

H1: Experiencing a de-escalation in one's romantic relationship status predicts an increase in loneliness scores throughout the first year of the COVID-19 pandemic.

Living arrangements as a predictor of loneliness

A second factor potentially predicting loneliness is one's living arrangements. Research conducted before the COVID-19 pandemic consistently shows that living alone predicts loneliness. Within young adult populations, such as college students, those with roommates were less likely to report loneliness as they had more consistent opportunities for social interactions with their roommate (Henninger et al., 2016). Living alone has also been a consistent predictor of loneliness in elderly populations in several countries, including Australia (Steed et al., 2007), Finland (Savikko et al., 2005), Germany (Beutel et al., 2017), Taiwan (Yeh & Lo, 2004), the United States (Greenfield Russell, 2011; Russell, 1996; Victor et al., 2000), and throughout several countries in Europe (Sundström et al., 2009).

The few studies that have looked at living arrangements as a predictor of loneliness during the COVID-19 pandemic have yielded comparable results, including the initial analysis of the sample from the present study (Ray, 2021). One study used a cross-cohort design to compare loneliness reports from before and during the pandemic and found in both cohorts that those living alone reported greater loneliness (Bu et al., 2020). Li and Wang (2020) reported similar results, finding that living with another has protective effects against loneliness. Lastly, in a study that found no significant overall changes in

loneliness during the pandemic, one specific subgroup that did report higher baseline loneliness levels was those who lived alone (Luchetti et al., 2020).

The present study seeks to add to this body of research on living arrangements and loneliness during the COVID-19 pandemic by investigating whether changes in living arrangements (i.e., either increasing or decreasing the number of people one lives with) predicts the trajectory of one's loneliness. Considering that living with others during the pandemic would likely provide more opportunities for face-to-face interactions, and considering that the number of face-to-face interactions one has is a better predictor of wellbeing than the number of computer-mediated interactions one has (MacDonald et al., 2021), we hypothesize the following:

H2: Experiencing a decrease in the number of people one lives with predicts an increase in loneliness scores throughout the first year of the COVID-19 pandemic.

Method

Participants

Recruitment began in March of 2020 and occurred through multiple channels. Participants were recruited through announcements on the Facebook pages of the Health Communication Divisions for the National Communication Association and International Communication Association. A call for participants was also distributed through the communication discipline's listserv (Communication, Research, and Theory Network; CRTNET). The lead researcher also recruited participants through posts on his personal social media pages and by asking students in upper-division and graduate-level communication courses to both participate and recruit family members and friends to participate, too. At the end of data collection, 12 participants were randomly selected to receive a $50USD Amazon eGift card.

A total of 428 individuals participated in this study. Ages ranged from 18 to 75 years ($M = 34.34$, $Mdn = 30.00$, $SD = 13.84$). The sample was composed of 337 women (78.7%) and 88 men (20.1%) with three participants not reporting their biological sex. Approximately two-thirds of the participants were White (67.4%). Participants also reported identifying as Asian/Pacific Islander (11.2%), Hispanic/Latinx (10.2%), or Black (2.7%). Some participants reported multiple ethnicities (7.5%) or did not report their ethnicity (1.1%).

Participants also reported their highest education level. Some participants (4.4%) reported a high school diploma or equivalent as their highest education and 15.2% reported completing some college credit but not obtaining a college degree. Most of the sample reported completing at least one college degree. Specifically, 6.8% had completed an associate degree, 29.2% had completed a bachelor's degree, 28.5% had completed a master's degree, 14.5% reported completing a doctoral degree (e.g., a PhD or EdD), and 1.4% had completed a professional degree (e.g., an MD, JD, or DDS).

At the start of data collection, 50.0% of the sample reported working full-time, 19.4% worked part-time, 16.6% were not employed, 0.9% were furloughed, 2.8% were retired,

Table 1. Means, Standard Deviations, Internal Reliability Scores, and Intercorrelations Among the Study's Variables.

Variable	*M* (*SD*)	ω	1	2	3	4	5	6
1. Loneliness (Time 1)	3.78 (1.72)	—	—					
2. Loneliness (Time 2)	3.80 (1.65)	—	.59**	—				
3. Loneliness (Time 3)	3.65 (1.70)	—	.49**	.58**	—			
4. Loneliness (Time 4)	3.31 (1.83)	—	.45**	.44**	.52**	—		
5. Loneliness (Time 5)	3.30 (1.59)	—	.33**	.41**	.39**	.44**	—	
6. Extraversion (Time 1)	3.19 (0.81)	.93	.16*	.09	.06	−.01	−.13*	—
7. Affection deprivation (Time 1)	3.40 (1.28)	.93	.35**	.31	.37**	.36**	.32**	.02

Note. ω = McDonald's omega; *$p < .05$; **$p < .001$. Extraversion was measured on a 5-point scale. All other variables were measured on a 7-point scale.

3.0% listed their employment status as being a student, and 7.2% chose not to report their employment status. Household income was also reported (in $USD) at the start of the data collection, with 20.2% reporting less than $30,000 in income, 23.9% reporting between $30,000 and $59,999, 19.1% reporting between $60,000 and $99,999, 15.2% reporting income between $100,000 and $149,999, and 14.3% reporting household income greater than $150,000. Additionally, 7.0% of participants responded that they preferred not to report their household income.

Procedures

Participants completed online questionnaires at five points in time. The first three questionnaires were administered between March 24 and May 10, 2020 in 2-week intervals. Follow-up data was collected with a fourth questionnaire distributed between the end of July and the end of August of 2020. A fifth and final follow-up questionnaire was distributed between the end of April and May of 2021. Participants completed demographic measures (e.g., household income, employment status) and measures of extraversion and affection deprivation in the first questionnaire. During each of the five questionnaires, participants also reported their level of loneliness.

Measures

Composite scores were constructed by averaging responses to the individual items to create composite indices. Unless otherwise indicated, higher scores indicate greater degrees of the construct of interest. Zero-order correlations among the variables, as well as internal reliability and descriptive statistics are reported in Table 1.

Extraversion. We operationalized extraversion using the extraversion factor of the Eysenck Personality Questionnaire Brief Version (Sato, 2005), which consists of 12 items

Table 2. Descriptive Statistics for Relational Status by Time.

	Time 1, %	Time 2, %	Time 3, %	Time 4, %	Time 5, %
Single	25.8	26.7	26.6	23.2	22.5
Dating	27.3	24.7	25.3	26.7	26.2
Engaged	3.2	3.5	3.0	3.3	3.3
Married	40.5	41.6	41.6	43.1	43.7
Divorced/separated	2.7	2.8	2.6	3.3	3.5
Widowed	0.6	0.7	0.9	0.4	0.7

(e.g., "Do you enjoy meeting new people?"). Items were rated on a 5-point Likert-type scale (1 = *not at all,* 5 = *extremely*).

Affection deprivation. We used Floyd's (2016) measure of affection deprivation, which consists of eight items that measure, in general, how much individuals are displeased with the quantity of affection they receive (e.g., "I don't get enough affection from others"). Items were rated on a 7-point Likert-type scale (1 = *strongly disagree,* 7 = *strongly agree*).

Loneliness. In all five questionnaires, state-level loneliness was measured using a single item ("I feel lonely") using a 7-point Likert-type scale (1 = *strongly disagree,* 7 = *strongly agree*). Multiple prior studies have used a single item to measure state-level loneliness (e.g., Roddick & Chen, 2020; van Roekel et al., 2018).

Romantic relationship status. Participants provided an open-ended response regarding their romantic relationship status in each of the five questionnaires. Answers were categorized as single, dating, engaged, married, divorced, or widowed. Romantic relationship status for each questionnaire administered throughout the study is provided in Table 2. To capture changes in romantic relationship status across time, we coded if the relationship status stayed the same, escalated (e.g., transitioning from single to dating), or de-escalated (e.g., transitioning from married to widowed).

Living arrangements. Participants were asked how many people they lived with in each of the five questionnaires. To capture changes in living arrangements over the course of the study, we coded if the participant's living arrangements stayed the same, increased in the number of roommates, or decreased in the number of roommates. Table 3 presents the frequencies of changes in living arrangements and romantic relationship status.

Table 3. Frequencies of Changes in Romantic Relationship Status & Living Arrangements.

Variable & category	Percentage, %
Relationship status	
No change in relationship status	85.6
Increases in relationship status	6.9
Decreases in relationship status	7.5
Living arrangement	
No change in living arrangement	74.4
Increases in number of people in living arrangement	12.3
Decreases in number of people in living arrangement	13.3

Results

Data preparation and analytic plan

Our research question posed whether loneliness, in general, changed over the course of the year, and our hypotheses predicted that changes in one's loneliness throughout this time would be predicted by changes in romantic relationship status (H1) and living arrangements (H2). Both variables (changes in romantic relationship status and living arrangements) were dummy coded to run analyses. For each variable, the reference category was the "no change in relational status" or "no change in living arrangements" groupings, respectively. To answer our research question and test these predictions, we created growth curve models using multilevel modeling with SPSS to examine linear and nonlinear changes over time. This approach does not require equal spacing between points in time, does not require independence of observations, and is robust to violations of the homogeneity of variance assumption. Time was the key predictor variable in our growth curve models. The researchers initially included affection deprivation and extraversion as covariates; however, these variables were nonsignificant when included in the growth curve models and subsequently were removed for the sake of parsimony. Full information maximum likelihood (FIML) was used to address instances of missing data.

Research question

The researchers investigated how loneliness reports changed throughout the 12 months following initial shelter-in-place orders and social distancing guidelines. Results from the growth curve model revealed that there was a significant linear decrease in the loneliness indicator scores ($\beta = -2.92$, $SE = 0.10$, $p < .001$). The mean estimated initial loneliness and linear growth rate for the sample were 3.82 and 2.92, respectively. This suggests that the mean loneliness indicator was 3.82 and decreased over time. The random error terms associated with the intercept and linear effect were significant ($p < .001$), suggesting that the variability in these parameters could be explained by between-individual predictors. The correlation ($\beta = -3.42$, $SE = .21$, $p < .001$) between the intercept and the linear growth

Table 4. Growth Curve Model for Loneliness Scores Over Time.

	Model 1 (No predictors)			Model 2 (Final model)		
Fixed effects	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Intercept	3.82	0.12	<.001	3.96	0.21	<.001
Loneliness				2.92	0.10	<.001
Random effects[a]	Variance		*SD*	Variance		*SD*
Residual	1.84		1.36	1.93		1.37
ID	2.05		1.44	1.51		1.31

Note. [a]This section shows the amount of variance attributable to within-subject factors (labeled ID) and variance unexplained by the model (Residual).

parameter was negative. This suggests that loneliness indicator scores had a decrease in linear growth over time (see Table 4). That is, in this sample of adults in the United States, loneliness scores decreased throughout the first year of the COVID-19 pandemic.

Hypothesis 1

The first hypothesis predicted that experiencing a de-escalation in one's romantic relationship status (e.g., transitioning from being in a committed relationship to being single or going from being married to separated) would predict increases in loneliness throughout the first 12 months of the COVID-19 pandemic. Results from the growth curve model revealed that there was a significant linear increase in the loneliness indicator scores when there were de-escalations in one's romantic relationship status ($\beta = 3.62$, $SE = 0.08$, $p < .001$). The mean estimated initial loneliness and linear growth rate for the sample were 3.62 and 4.81, respectively. This suggests that the mean loneliness indicator was 3.62 and increased over time. The random error terms associated with the intercept and linear effect were significant ($p < .001$), suggesting that the variability in these parameters could be explained by between-individual predictors. The correlation ($\beta = 2.89$, $SE = .11$, $p < .001$) between the intercept and the linear growth parameter was positive. This suggests that loneliness indicator scores had an increase in linear growth over time. Thus, data was consistent with H1—experiencing a de-escalation in romantic relationship status predicted increases in loneliness (see Table 5).

Hypothesis 2

The second hypothesis stated that decreases in the number of people one lives with would predict increases in loneliness scores. Results from the growth curve model were not significant. Changes in the number of people one lived with did not predict an increase in loneliness scores. Thus, data was inconsistent with H2.

Table 5. Growth Curve Model for Relationships Status on Loneliness.

	Model 1 (no predictors)			Model 2 (final model)		
Fixed effects	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Intercept	3.62	0.08	<.001	3.53	0.14	<.001
Loneliness				4.81	0.11	<.001
Random effects[a]	Variance		*SD*	Variance		*SD*
Residual	2.10		1.06	2.31		1.13
ID	2.06		1.32	1.79		1.54

Notes. Reference group—no change in relationship status.
[a]This section shows the amount of variance attributable to within-subject factors (labeled ID) and variance unexplained by the model (Residual).

Discussion

The COVID-19 pandemic led to shelter-in-place orders, the implementation of social distancing guidelines, and other health measures intended to slow the spread of the virus. These orders and guidelines appeared to initially decrease population movement and in-person contact with people beyond one's household (Moreland et al., 2020). However, a potential unintended consequence of these measures, which were focused on physical health, was an increase in loneliness (Tull et al., 2020) and mental health issues associated with loneliness (Hoffart et al., 2020).

During the first year of the pandemic, several researchers tracked loneliness and investigated specific factors that could help identify certain subgroups of the population that might be particularly susceptible to loneliness during the pandemic (e.g., Bu et al., 2020; Li & Wang, 2020). An initial analysis conducted early into the data collection efforts for the present study showed that two such factors associated with greater loneliness were living alone and not being in a committed romantic relationship (Ray, 2021). However, in the months since that initial analysis occurred, relationships ended (Lebow, 2020), new relationships began (Wiederhold, 2021), and living arrangements changed, sometimes unexpectedly—all during a global pandemic (Ashby-King, 2021). Thus, this study investigated both the trajectory of loneliness over the course of the first year of the pandemic for adults in the United States, and also whether changes in one's romantic relationships status or living arrangements predicted changes in loneliness.

Our sole research question sought to add to the growing data on trajectories of loneliness throughout the pandemic. Whereas most studies reported increases in loneliness, in general, the present study found a significant decrease in loneliness over the course of the first year of the pandemic. Although this was not expected, these results do align with at least two other studies that demonstrated no significant increase in loneliness during the pandemic (Luchetti et al., 2020; McGinty et al., 2020). One interpretation of this outcome is that people learned to adapt how they interacted with family, friends, and colleagues by utilizing emerging technologies such as Zoom or FaceTime. A decrease in loneliness scores suggests that people found ways throughout

the pandemic to remain emotionally close, even when physically distant. A second interpretation of these results is that people may have become less compliant with health guidelines throughout the pandemic, and engaged in more in-person social interactions, potentially mitigating feelings of loneliness. For example, recent research showed that extroverted men were particularly likely to eschew social distancing and mask usage guidelines approximately 4–6 months after initial shelter-in-place orders in the United States (Ray, 2022).

We also predicted that a de-escalation in romantic relationship status would predict an increase in loneliness throughout the pandemic, and our data supported this prediction. Although having a romantic partner has been shown to protect against loneliness, both prior to the pandemic (e.g., Steed et al., 2007) and during the pandemic (e.g., Groarke et al., 2020), a central contribution of the present study is the consideration that *changes* in one's romantic relationship during the pandemic can precipitate loneliness. Losing an important relationship either due to death of a partner or relationship dissolution has been shown to increase loneliness (Rokach & Brock, 1996; Savikko et al., 2005), and this study confirms these findings in the context of the COVID-19 pandemic.

We similarly hypothesized that changes in living arrangements, and more specifically, the number of people one lived with, would also predict loneliness. The data, however, did not confirm this prediction. One explanation is that people may have been happy to see a roommate move out, particularly if that person did not share similar views toward public health guidelines. Additionally, simply because people live together does not mean they have a close relationship. A documented increase in the use of computer-mediated communication to stay in contact with friends during the pandemic (Juvonen et al., 2021) may suggest that people were selective with whom they communicated. It is possible that a roommate did not always serve as a source of connection for a person, and therefore may have had no impact on feelings of loneliness. In fact, recent research has found that loneliness was inversely correlated with the quality of the relationship one has with a roommate (Alheneidi et al., 2021).

Implications

An important implication of this study is the demonstrated need for tracking changes in loneliness over time as people experience a potentially negative life event such as the dissolution of a romantic relationship. The body of research on loneliness and its predictors often focuses on cross-sectional reports of participants' characteristics such as relationship status, living arrangements, employment status, and income level and does not always consider that these demographics will almost assuredly change over time. Furthermore, researchers have found intermittent loneliness is a universal experience (Hawkley & Cacioppo, 2010; Rokach & Bauer, 2004), and therefore greater attention should be given to changes in factors that are known to correlate with loneliness.

Pragmatically, people within someone's support network (i.e., family, friends, and colleagues) should recognize that certain life events such as relationship dissolution present an opportunity to increase support for the other as they may be experiencing acute

feelings of loneliness. Meanwhile, researchers should continue to investigate loneliness at the within-subjects level to detect what predicts increases or decreases in loneliness over time.

Limitations and future directions

As with any research endeavor, the present study endured limitations while generating opportunities for future studies. For example, although this study longitudinally investigates loneliness, it was not possible to have the participants' loneliness data from the time prior to the pandemic, thus eliminating the possibility of a true pretest-posttest analysis. Similarly, as with almost any longitudinal study, participant attrition was a concern. The attrition rate for the present study was seven percent, which was achieved in part by using FIML to address missing data. As noted by Wang et al. (2017), missing data techniques such as FIML combat attrition by estimating data when participants miss participating at points in time throughout a longitudinal data collection. This allows participants to continue participating in the data collection even after missing a prior wave of the data collection (Newman, 2014).

We must also note that although the sample included participants from a wide age range, the sample consisted predominantly of women. Considering that men typically report greater loneliness than women (Borys & Perlman, 1985) future research should continue to investigate the experiences of loneliness based on sex (and other factors) as the world population continues to live through the COVID-19 pandemic. Although we collected various demographic information from our participants, additional information could have been collected to better understand the characteristics of our sample. For one, we did not ask our participants about their sexual orientation or ability status. We also know that some participants recruited into this study were university students but we cannot definitively ascertain what percentage of the sample was composed of students. Finally, the researchers inquired about participants' biological sex as opposed to gender identity. Although participants were provided an opportunity to respond "Other" and provide details, no participants selected this option. In retrospect, asking about gender identity could have led to a more nuanced understanding of our sample.

Another limitation worth noting is that we did not have complete detailed information on who people were in a relationship with or with whom they were living. For example, it is feasible that in between two points in time a person went from living with two friends to living with two siblings, and such a change would not have been captured in our data. However, the hypothesis made herein was that living arrangements in general (i.e., the number of people you are living with) affect your loneliness—not the type or quality of those relationships. Future research endeavors could explore this possibility, though, and expand on one study conducted during the pandemic that found that loneliness inversely correlated with the quality of roommate relationship (Alheneidi et al., 2021).

Conclusion

The present study investigated how reports of loneliness by adults in the United States changed over the course of approximately the first year of the COVID-19 pandemic. Unlike many similar studies conducted, the results herein showed a general decrease in loneliness over time. Perhaps the most important contribution of this study, though, was the finding that a de-escalation in one's romantic relationship status predicted an increase in loneliness over the course of this study. The same could not be said for decreases in the number of people one lived with as a predictor for loneliness, suggesting the importance of romantic partners and romantic relationships as having protective effects against loneliness during the COVID-19 pandemic.

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Open research statement

As part of IARR's encouragement of open research practices, the author(s) have provided the following information: This research was not pre-registered. The data used in the research cannot be publicly shared but are available upon request.

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