

# Change in Loneliness Experienced by Older Men and Women Living Alone and With Others at the Onset of the COVID-19 Pandemic

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## Abstract

Building on theory suggesting that loneliness is distinct from living arrangements, social isolation, and perceived social support, we examined change in loneliness for older people at the onset of the COVID-19 pandemic. Analyzing 14-years of data with multilevel mixed-effects models, we found higher levels of loneliness among people living alone, people more socially isolated, and people with less perceived support. Gender affected changes in loneliness, controlling for social isolation, perceived support, living arrangements, age, education, income, health, and marital status. Women, whether living alone or with others, experienced increases in loneliness; women living alone reported the greatest increase in loneliness. Men living alone reported high levels of loneliness prior to the pandemic, but only a slight increase over time. These analyses, which demonstrate that loneliness changed at the onset of the pandemic as a function of gender and living arrangement identify older people most likely to benefit from intervention.

## Keywords

loneliness, gender, living arrangements, social isolation, perceived social support, COVID-19

The COVID-19 pandemic has changed the ways in which societies function and people interact. Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is a highly contagious virus that spreads quickly, has a prolonged incubation period, and can be transmitted by asymptomatic individuals. By December 2020, 16.5 million people in the U.S. had been diagnosed with the virus; more than 300,000 were dead (<https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html>). Health systems have struggled to keep up with demands, families have faced serious economic consequences as businesses closed and jobs were lost, and individuals have negotiated new ways to interact socially (Heid et al., 2020). With no cure and no vaccines deployed prior to December 2020, physical distancing (i.e., maintaining 6-feet of distance from others, avoiding crowded places, not gathering in groups) and mask-wearing (<https://www.cdc.gov/coronavirus/2019-ncov/index.html>) were the most effective strategies for slowing the spread of disease (Delen et al., 2020; Lewnard & Lo, 2020). Yet, scholars have questioned the effects that physical distancing might have on mental health, well-being, and loneliness, especially for older people living alone (Galea et al., 2020; McGinty et al., 2020). Grounded in theory about associations among loneliness, social isolation, perceived social support, and living arrangements, the analyses that follow examine predictors of change in loneliness experienced

by older people living alone and those living with others using data collected before and after the pandemic's onset.

## The COVID-19 Context

Beginning in March 2020, leaders in most countries, including the U.S., instituted stay-at-home policies and physical distancing mandates. In New Jersey, directives advised people to limit face-to-face contact with others, not gather in large groups, stay out of crowded places, keep at least 6-feet from others, and restrict travel. Non-essential businesses, schools, and places of worship were closed for in-person functioning. Hospitals cancelled elective surgeries; doctor appointments were limited to those that were critical (<https://www.nytimes.com/interactive/2020/us/coronavirus-stay-at-home-order.html>). By May 2020, people were advised to wear masks

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indoors and when unable to maintain 6-foot distance from others. Although some businesses re-opened between April and December 2020, restrictions on indoor gatherings remained the norm (<https://covid19.nj.gov/>).

### Older Adults' Vulnerability for Men and Women

According to the CDC, people 65+ and those with serious underlying medical conditions such as diabetes, lung or heart disease, and people who are immunocompromised are at greatest risk for contracting SARS-CoV-2 (<https://www.cdc.gov/aging/covid19-guidance.html>). As such, the CDC has advised older individuals to take extra precautions in social encounters (<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/older-adults.html#:~:text=As%20you%20get%20older%2C%20your%20risk%20of%20being%20hospitalized%20for,increases%20as%20you%20get%20older>). Because of this, some have suggested that older people, especially the 14.3 million people in the U.S. aged 65+ who live alone (<https://acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2018OlderAmericansProfile.pdf>) and those who are socially isolated, may experience the greatest mental and physical health risks from physical distancing (Cudjoe & Kotwal, 2020). In fact, many older people in the U.S. report feeling challenged by mandates to physically distance (Heid et al., 2020), and in the UK, a study of 35,712 adults specifically revealed that loneliness increased during the first 6 weeks of lockdown for the most vulnerable—people living alone, those with low household incomes, and people who were unemployed (Bu et al., 2020).

Older adults living alone tend to have higher loneliness scores than those living with others (Sundström et al., 2009; Victor et al., 2005). However, there is evidence suggesting that some older people will experience better emotional well-being than younger people in the face of threats from the COVID-19 pandemic (Carstensen et al., 2020); even those older adults who are living alone (Heidinger & Richter, 2020). Yet, there is much about the COVID-19 pandemic that is not understood, including whether loneliness increases for older adults and whether changes in loneliness vary as a function of living arrangements.

While the way in which gender influences how older adults cope with the pandemic is unclear, there is evidence that gender may be important. For example, prior to the pandemic, women reported more frequent contact with people in their social network and greater satisfaction from their relationships (Antonucci et al., 2014). Women are also more likely to have more intense positive and negative relationships (Birditt & Fingerman, 2003), and are more sensitive to lack of social support than men (Hackett et al., 2012; Kendler et al., 2005; Seeman et al., 2002). Although a meta-analysis found that across the lifespan mean levels of loneliness are similar for men and women (Maes et al., 2019), it is unclear how the unique demands of the pandemic might affect loneliness among older men and women. A study conducted at the beginning of the COVID-19 pandemic revealed that women aged 18–29 and 60+ had greater odds of experiencing loneliness

than men (Wickens et al., 2021). Therefore, examining gender differences in loneliness reports by older adults pre-and post-pandemic is critical.

### Relationships Among Living Alone, Social Isolation, Social Support, and Loneliness

Social connections are essential for health. Even before the pandemic, social isolation, social support, and loneliness had been identified as public health issues (National Academies of Sciences, Engineering, and Medicine, 2020). Although conceptually these social attributes are intertwined, they are distinct constructs (Menec et al., 2020; Newall & Menec, 2017). *Living alone* is an objective indicator of household composition. *Social isolation* is conceptualized as having minimal social contact with others or few social connections (De Jong Gierveld et al., 2006). *Social support* is the actual or perceived availability of informational, tangible, and emotional resources exchanged with others (Antonucci et al., 2014). Finally, *loneliness* is the painful subjective feeling of isolation that accompanies perceived deficiencies in social relationships (Peplau & Perlman, 1982).

Empirical efforts to distinguish these constructs have come from studies linking living alone, social isolation, perceived social support, and loneliness to morbidity and mortality outcomes (Gopinath et al., 2013; Kojima et al., 2020; Udell et al., 2012). There is evidence, for example, that feeling lonely has effects on morbidity and mortality that are independent of social isolation (Drageset et al., 2013; Hawkey & Cacioppo, 2010; Holt-Lunstad et al., 2015; Luo & Waite, 2014; Perissinotto et al., 2012; Rico-Uribe et al., 2018). Moreover, research finds that loneliness independently predicts depressive symptoms, after accounting for social isolation and a lack of social support (Golden et al., 2009; Long Lee et al., 2021). These findings suggest that people can feel lonely despite having a large social network. Similarly, people can be socially isolated, yet not feel lonely. Zebhauser et al. (2015), for example, found that 70% of older people living alone did not report feeling lonely.

A recent consensus statement documented the exponential growth in research treating loneliness as an outcome of interest (Prohaska et al., 2020). Studies focused on distinguishing loneliness, living alone, social isolation, and social support find that correlations among these constructs are weak (Beller & Wagner, 2018a, 2018b; Cornwell & Waite, 2009; Coyle & Dugan, 2012; McHugh Power et al., 2019; Steptoe et al., 2013). This work highlights the importance of examining the unique explanatory contributions of living arrangement, social isolation, and social support when seeking to understand the impact of the pandemic on loneliness experienced by older people.

Adding to the challenge of disentangling loneliness from social isolation, perceived support, and living arrangement is marital status. Married people as a whole consistently report less loneliness than unmarried people (Mullen et al., 2019; Nguyen et al., 2020). However, because the overwhelming

majority of married people do not live alone, marital status is inextricably confounded with living arrangement, especially when living arrangement is dichotomized as living alone versus living with others. As such, analyses examining the impact of the pandemic on loneliness must be clear about the roles of marital status and living arrangements.

### *Change in Loneliness of Older People at the Onset of COVID-19*

Understanding the effects of the pandemic on loneliness necessitates knowing the extent to which people experienced loneliness both prior to and following the pandemic's onset. In one of the few studies published to date based on longitudinal data, Luchetti et al. (2020) found no significant mean-level changes in loneliness between January and late April 2020 in a sample of American adults aged 18–98. Although older adults in this sample reported less loneliness than younger adults, they experienced an increase in loneliness during the acute phase of the pandemic. People living alone and those with at least one chronic condition reported feeling lonelier at baseline but did not increase in loneliness over time. This study also found that people perceived increased support from others during the initial months of the pandemic. Research conducted in countries with lockdown measures similar to the U.S. shows that loneliness increased during the COVID-19 pandemic (Heidinger & Richter, 2020; van Tilburg et al., 2020). A study in the Netherlands found that loneliness of people 65+ increased between October 2019 and May 2020, especially for those who did not live with their spouse or partner and for those who had experienced loss of social contact and activities (van Tilburg et al., 2020). Heidinger and Richter (2020), using propensity scores and data collected before and after onset of the pandemic, found that loneliness increased slightly among Austrians who were 60 and older, but only for those living with others. Together, these longitudinal studies suggest that much remains unknown about how the pandemic has affected loneliness experienced by older men and women in the U.S. and whether predictors of change in loneliness differ as a function of whether people live alone or with others.

### *Current Study*

The pandemic, with its mandate that people physically distance to contain the spread of the virus, provides an important context for examining differential associations among social isolation, social support, and loneliness for men and women living alone and those living with others. The analyses that follow examine these associations using data collected before and after the onset of COVID-19 from a large sample of older people in New Jersey.

Analyses address the following questions:

1. Does loneliness reported by community-dwelling older adults change differentially for people living alone and those living with others following the onset of the

pandemic? Based on the literature, we posit that while prior to the pandemic's onset, older adults who lived alone were likely to be at higher risk for feeling lonely than those living with others, after the pandemic's onset, even older adults living with others and those with previously active social relationships may be at risk. As such, while we expect an overall increase in loneliness for the sample, older adults living alone at the onset of the pandemic will be at greater risk for experiencing an increase in loneliness than those living with others.

2. Controlling for demographic variables known to be associated with loneliness (e.g., age, education, income, health; Dahlberg et al., 2018; Hawkey et al., 2008; Luo et al., 2012; Yang & Victor, 2011), does gender affect changes in loneliness for people living alone and those living with others following the onset of the pandemic? Given differences in social connections by gender, we posit that women will be at greater risk for loneliness than men during the pandemic.
3. Do social isolation and perceived social support during the pandemic predict changes in loneliness differentially for people living alone and those living with others, accounting for age, gender, education, income, and health? Based on the literature showing their independence, we expect that social isolation and perceived social support will have unique effects on loneliness.
4. Does marital status of people living with others uniquely account for variance in loneliness, beyond social isolation and perceived social support? Based on the literature, we expect those who are married to experience lower levels of loneliness than those who are unmarried but living with others.

## **Method**

### *Participants*

These analyses use data from a seven-wave, state-wide, panel study of older adults from New Jersey—ORANJ BOWL (Ongoing Research on Aging in New Jersey: Bettering Opportunities for Wellness in Life)—for whom data were collected between 2006 and October 2020. ORANJ BOWL was created to study factors associated with successful aging. In addition to adding to knowledge about successful aging (Pruchno et al., 2010, Wilson-Genderson et al., 2017), the panel has been used to study the effects of Hurricane Sandy on older people (Pruchno et al., 2020, Wilson-Genderson et al., 2017, 2018). Participants were recruited using cold calling and list-assisted random-digit-dialing (RDD) procedures. Eligible participants were required to live in New Jersey and be able to participate in an hour-long, English-language interview. Coverage loss due to cell phone-only households was small due to sample demographics (Blumberg & Luke, 2007). At baseline, ORANJ BOWL achieved a response rate of 58.73%, using standard American Association for Public Opinion Research

**Table 1.** Sample Demographic Characteristics at Each Wave.

	Wave 1 (N = 5,688)	Wave 5 (N = 3,076)	Wave 6 (N = 3,137)	Wave 7 (N = 2,458)
Age [M (SD)]	60.79 (7.10)	69.14 (6.73)	70.39 (6.66)	72.43 (6.62)
Gender (Women) [N (%)]	3,621 (64%)	1,956 (64%)	1,996 (64%)	1,568 (64%)
African American [N (%)]	646 (11%)	222 (7%)	250 (8%)	156 (6%)
Income [N (%)]				
Less than \$15K	365 (6%)	85 (3%)	102 (3%)	60 (2%)
\$15 K–\$30K	601 (11%)	221 (7%)	215 (7%)	141 (6%)
\$30 K–\$50K	862 (15%)	419 (14%)	431 (14%)	325 (13%)
\$50 K–\$80K	1,133 (20%)	639 (21%)	646 (21%)	487 (20%)
\$80 K–\$150K	1,291 (23%)	864 (28%)	881 (28%)	733 (30%)
More than \$150K	770 (14%)	516 (17%)	534 (17%)	460 (19%)
Missing	666 (12%)	332 (11%)	328 (11%)	252 (10%)
Educational Attainment [N (%)]				
Not HS Graduate	306 (5%)	59 (2%)	61 (2%)	37 (2%)
HS Graduate or GED	1,607 (28%)	686 (22%)	706 (23%)	508 (21%)
Some college	852 (15%)	452 (15%)	459 (15%)	342 (14%)
2 yr. college degree	530 (9%)	313 (10%)	312 (10%)	239 (10%)
4 yr. college degree.	1,108 (20%)	681 (22%)	714 (23%)	574 (23%)
Some post baccalaureate	220 (4%)	148 (5%)	153 (5%)	125 (5%)
Masters	743 (13%)	516 (17%)	517 (17%)	442 (18%)
Some post-Masters	73 (1%)	47 (2%)	45 (1%)	38 (2%)
Doctorate	236 (4%)	171 (6%)	167 (5%)	150 (6%)
Missing	13 (0.2%)	3 (0.1%)	3 (0.1%)	3 (0.1%)
Health Conditions <sup>a</sup> [M (SD)]	—	—	—	1.71 (1.39)
Living Arrangement ( <i>Live alone</i> ) [N (%)]	—	—	—	664 (27%)
Marital Status ( <i>Married</i> ) [N (%)]	—	—	—	1,436 (58%)
Perceived Social Support [M (SD)]	—	16.69 (3.64)	16.68 (3.60)	16.73 (3.58)
Social Isolation [M (SD)]	—	—	—	2.93 (1.35)
Loneliness [M (SD)]	—	2.75 (2.41)	2.91 (2.41)	2.92 (2.49)

<sup>a</sup>Count of eight possible Chronic Illnesses, Range 0 to 8.

calculations, and a Cooperation Rate of 72.88%. Sample development details may be found in Pruchno et al. (2010).

Baseline (Wave 1) data were collected via telephone interviews between 2006 and 2008 with 5,688 people aged 50–74. Participants were representative of older adults (aged 50–74) living in New Jersey in 2006, except for a slightly higher rate of women and people with more education. Because we were unable to translate the interview into Spanish, ORANJ BOWL under-represents Hispanics. Participants lived in 1,644 of New Jersey's 1,912 census tracts. Table 1 includes sample descriptive statistics.

One year after Wave 1, a subset of the sample completed a personality inventory (Wave 2). Wave 3 was completed in 2011 ( $N = 3,387$ ), Wave 4 from 2014 to 2015 ( $N = 3,608$ ), Wave 5 from 2015 to 2017 ( $N = 3,076$ ), Wave 6 from 2017 to 2019 ( $N = 3,137$ ), and Wave 7 from May 2020 to October 2020 ( $N = 2,458$ ). Wave 7 was launched using university funding with the goal of understanding the effects of the pandemic on this panel. Some of the questions included at Wave 7 were identical to those in previous waves (perceived social support, loneliness, health conditions, living arrangements), while others were developed based on emerging concerns about the pandemic (social isolation). For the purposes of the analyses that follow, we use data from Wave 1 (*Demographics*), Wave 5

(*Loneliness, Perceived Social Support*), Wave 6 (*Loneliness, Perceived Social Support*), and Wave 7 (*Loneliness, Perceived Social Support, Health Conditions, Living Arrangement, and Social Isolation*). Data from other waves were excluded because they did not include information about loneliness.

Panelists completing interviews at Waves 5, 6, and 7 had higher levels of education and income than those who died, withdrew, or did not complete these interviews. Completers were significantly older than non-completers and younger than people who withdrew or died. Completers were more likely to be female than those in the panel who died and less likely to be African American than those who died, withdrew, or did not complete (Heid et al., 2021).

## Measures

**Loneliness.** Loneliness was measured at Waves 5, 6, and 7 using the three-item loneliness scale developed by Hughes et al. (2004). Panelists reported how often (*never* [0], *rarely* [1], *sometimes* [2], or *most of the time* [3]) they: *lack companionship, feel left out, and feel isolated from others*. A mean-item total score was computed; higher scores indicated greater loneliness ( $\alpha = .84$  Wave 7). Scores on loneliness ranged from 0 to 9.

**Demographics.** At baseline (Wave 1), panelists reported their age, gender (0 = *male*, 1 = *female*), income (range from 1 = *less than \$15,000* to 6 = *more than \$150,000*), educational attainment (range from 1 = *less than high school* to 9 = *doctoral degree*) and race (0 = *not African American*, 1 = *African American*). At Wave 7, participants also reported their marital status. Responses were dichotomized as *unmarried* [0] or *married* [1].

**Health conditions.** At Wave 7, participants indicated whether a physician had ever told them they had any of eight chronic health conditions: arthritis, hypertension, heart conditions, cancer, diabetes, osteoporosis, stroke, and breathing problems. Responses were coded as *no* [0] or *yes* [1] and summed (Range 0–8) to create a total count of illnesses.

**Living arrangements.** At Wave 7, the onset of the pandemic, participants reported how many people lived in their household. Responses were dichotomized as *living with others* [0] or *living alone* [1].

**Perceived social support.** Because the literature finds that associations are stronger between perceived social support and loneliness than between actual social support and loneliness, we focused on perceived support (Holt-Lunstad et al., 2017). Perceived social support was measured at Waves 5, 6, and 7 with four items (“*There is someone you can count on to listen to you when you need to talk*,” “*Someone is available to give you good advice about a problem*,” “*Someone shows you love and affection*,” and “*There is someone you can count on to provide you with emotional support in talking over problems or helping you make a difficult decision*”). Respondents indicated whether they experienced each: *none of the time* [1], *a little of the time* [2], *some of the time* [3], *most of the time* [4], or *all of the time* [5] since mid-March 2020 (start of shutdowns due to the COVID-19 Pandemic in the U.S.). A mean-item total score was computed ( $\alpha = .92$  Wave 7).

**Social isolation.** At Wave 7, participants were asked “Since mid-March, how much time have you typically spent alone each day, not seeing or talking to another person, during waking hours?” Response options were: *Less than 1 hour* [1], *Between 1 and 2 hours* [2], *More than 2 hours but less than 4 hours* [3], *More than 4 hours but less than 8 hours* [4], and *8 hours or more* [5].

### Statistical Analysis

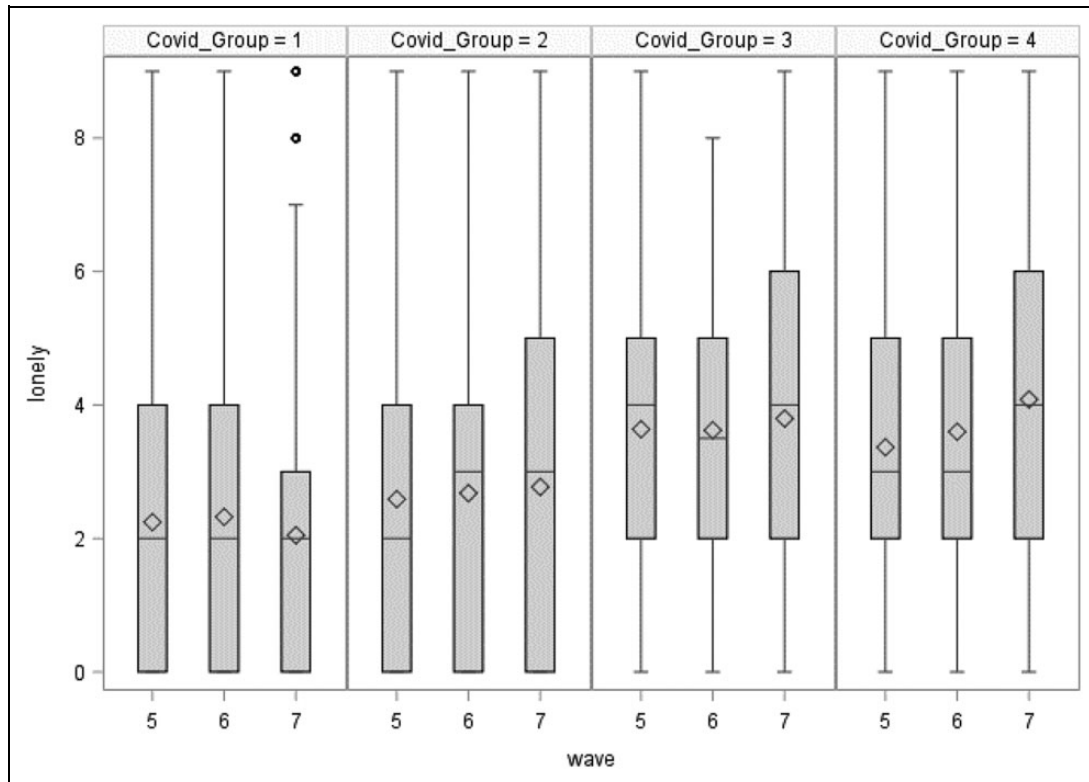
We examined descriptive information for each wave of data and inspected bivariate correlations among model variables for people living alone and those living with others. Because the sample was largely White, we excluded race from subsequent models. Next, we ran multilevel mixed effects models that accounted for the nesting of observations within participants. These analyses examined the associations among demographic characteristics, perceived social support, social isolation, and

loneliness over time using all available waves of data for each participant and generated unbiased estimates in the presence of missing data. Data included in the multilevel models came from people who participated in at least Waves 5 and 7 ( $N = 2,293$ ).

After confirming a substantial within-person ICC of .49, we created a within-person conditional model ( $Y_{it} = \pi_{0i} + \pi_{1i}(\text{wave}_{it}) + \pi_{2i}(\text{lag}_{it}) + e_{it}$ ) to estimate average linear and person-specific change over time in loneliness for people living with others (Model 1A) and people living alone (Model 1B). In this initial model,  $Y_{it}$  was the loneliness score at time  $t$  for participant  $i$ ;  $\pi_{0i}$  was the initial status of loneliness for participant  $i$ . The linear time parameter  $\pi_{1i}$  was coded as 5, 6, 7 (wave) and represents the point of measurement for the linear change in loneliness. A lag variable  $\pi_{2i}$  was included to capture the exact amount of time that had passed for each individual participant since data collection during COVID-19 began (lag);  $e_{it}$  is the error for participant  $i$  at time  $t$ . The lag variable was specifically included to ensure that the amount of time under COVID-19 restrictions did not influence models (i.e., people surveyed in August having been under physically distancing restrictions for a longer time than people surveyed in May).

Once the form of the change and average slopes were determined, we introduced additional variables including demographic characteristics (age, education, income, gender, and health conditions) to account for associations between person-level characteristics and loneliness (Models 2A and 2B). Descriptive statistics demonstrated different means for men and women over time as a function of living arrangement (see Figure 1). As such, we computed an interaction term (Gender  $\times$  Wave) and included it in these models. Next, we added indicators of social isolation and perceived social support to the models (Models 3A and 3B). As perceived social support was measured at waves 5, 6, and 7, it was mean-centered and entered as a time-varying covariate. Finally, for people living with others, we added information about marital status (married vs. unmarried) to the other predictors in the model (Model 4A). We did not examine this model for people living alone because only 12 people living alone reported being married.

Model results are presented as regression parameter estimates ( $\beta$ ) with the associated standard errors reflecting the strength of the association of each variable and change in loneliness (see  $Y_{it}$  above), and the significance test assessed as  $p$ -values less than .05. Fit indices are presented for the sake of model comparison including  $-2$  Log Likelihood, AIC, AICC, BIC, and  $\chi^2$ , all of which are interpreted as smaller is better. Effect sizes were computed comparing the loneliness means for men and women living alone with the means for men and women living with others. Similarly effect sizes comparing the change in loneliness scores for these groups were computed and reported. Effect sizes are reported as Cohen’s  $d$  and are interpreted as  $d = .2$  is a small,  $d = .5$  is a medium, and  $d = .8$  is a large effect size. SAS 9.4 was used for all analyses.



**Figure 1.** Means (diamond shapes), medians (line splitting rectangles), and distributions of reports of loneliness across waves by living arrangement and gender during COVID-19. Group 1 includes men who live with others, group 2 are women who live with others, group 3 are men who live alone, and group 4 are women who live alone.

**Table 2.** Comparison of Model Variables for People Living Alone and People Living With Others at Wave 7 (N = 2,458).

	Living Alone N = 664	Living With Others N = 1,794	Test of Difference <sup>b</sup>
Age [M (SD)]	74.10 (6.63)	71.80 (6.50)	7.88 (.0001)
Gender (Women) [N (%)]	510 (78%)	1,046 (59%)	75.20 (.0001)
African American [N (%)]	67 (10%)	85 (5%)	24.30 (.0001)
Income [M (SD)]	3.70 (1.30)	4.60 (1.10)	16.30 (.0001)
Educational Attainment [M (SD)]	4.40 (2.10)	4.70 (2.10)	4.10 (.001)
Health Conditions <sup>a</sup> [M (SD)]	1.94 (1.46)	1.63 (1.30)	4.90 (.0001)
Marital status (Married) [N (%)]	12 (2%)	1424 (79%)	1200.00 (.0001)
Perceived Social Support [M (SD)]	16.00 (4.00)	17.00 (3.40)	10.70 (.0001)
Social Isolation [M (SD)]	4.10 (0.98)	2.48 (1.20)	53.70 (.0001)
Loneliness [M (SD)]	4.00 (2.50)	2.50 (2.30)	18.60 (.0001)

<sup>a</sup>Count of eight possible Chronic Illnesses, Range 0–8. <sup>b</sup>Test of difference for continuous variables is t-test (p-value) and for categorical is  $\chi^2$  (p-value).

## Results

Descriptive statistics are presented for the sample by wave in Table 1. At the onset of the pandemic, the mean age of people in the sample was 72.4. (range 62–91). There was adequate variability on key variables, as 27% of the sample lived alone and 58% of the sample was married. Mean levels of perceived social support are stable between Waves 5 and 7. Table 2 details characteristics of people living alone and those living with others at Wave 7. Those living alone were more likely to be female, older, have lower education and income levels, more

chronic conditions, lower perceived social support, more time spent alone (social isolation), and higher levels of loneliness. Although people living alone were more likely to be African American, the number of African Americans in this sample is modest, thus this should be interpreted with caution.

Bivariate correlations (Table 3) revealed that at Wave 7, loneliness had different associations with demographic characteristics for people living alone and those living with others. For people living with others, loneliness was associated with younger age, lower income, female gender, and being married, associations that were not significant for people living alone.

**Table 3.** Bivariate Correlations Among Demographics, Social attributes, and Loneliness at Wave 7.

	1	2	3	4	5	6	7	8	9
1. Loneliness	—	−0.03	0.04	0.01	0.04	0.09*	×	−0.36***	0.14***
2. Age	−0.07***	—	−0.19***	−0.15***	0.11**	0.21***	×	0.03	−0.08*
3. Education	0.02	−0.07**	—	0.44***	−0.06	−0.10*	×	0.01	0.06
4. Income	−0.09***	−0.20***	0.35***	—	−0.11**	−0.19***	×	0.05	0.02
5. Gender	0.15***	−0.01	−0.13***	−0.17***	—	0.16***	×	0.15***	−0.05
6. Health Conditions	0.09***	0.22***	−0.15***	−0.16***	0.09***	—	×	0.004	0.03
7. Marital Status	−0.20***	−0.10***	0.12***	0.28***	−0.19***	−0.12***	—	×	×
8. Perceived Social Support	−0.46***	0.00	0.07**	0.08**	0.04	−0.05	0.08***	—	−0.13***
9. Social Isolation	0.25***	−0.05*	0.02	−0.04	−0.07**	−0.02	−0.25***	−0.19***	—

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . Values below the diagonal are correlations for people living with others ( $N = 1,794$ ); values above the diagonal are correlations for people living alone during COVID-19 Pandemic ( $n = 664$ ). Perceived Social Support was measured at waves 5–7; the correlation reported here is for wave 7 values. ×As only 12 participants who lived alone reported being married correlations are not presented.

Regardless of whether people were living with others or living alone, higher levels of loneliness were associated with more health conditions, less perceived support, and more social isolation.

Results of the initial multilevel models (Table 4) indicated that the time parameter (wave) for people living with others (Model 1A) was not significant nor was the lag. The model for individuals living alone (Model 1B) revealed a significant positive effect of time (wave) suggesting that for these individuals, loneliness increased over time; the lag parameter was not significant.

The second model, adding personal characteristics revealed that for those living with others (Model 2A), the time parameter (wave) was significant and negative suggesting a decline in loneliness over time. In this model age and income were negatively associated with loneliness; health conditions (worse health) were positively associated with loneliness. Although the main effect of gender was significant, the gender by time interaction was significant and positive suggesting that the decline in loneliness was not uniform for men and women. For people living alone (Model 2B) the time parameter (wave) was no longer significant. Age was negatively associated and health conditions were positively associated with loneliness. Although the main effect of gender was significant, the gender by time (wave) interaction was significant and positive suggesting that loneliness behaved differently over time for men and women living alone.

The third model, adding perceived social support and social isolation, revealed that for those living with others (Model 3A) the time parameter (wave) remained significant and negative suggesting a decline in loneliness over time. Age and income remained negatively associated with loneliness; health conditions remained positively associated with loneliness. In this model, education was negatively associated with loneliness. Once again, the gender by time interaction was significant and positive suggesting that the decline in loneliness was not uniform for men and women and that the main effect of gender needed careful consideration. Perceived social support was negatively associated with loneliness; social isolation was positively associated with loneliness. For people living alone

(Model 3B), neither the time parameter (wave) nor the lag was significant. Age and income remained negatively associated with loneliness; health conditions (worse health) remained positively associated with loneliness. Here again, the gender by time interaction was significant and positive suggesting that loneliness was not uniform by gender over time and that the main effect of gender needed careful consideration. Perceived social support was negatively associated with loneliness; social isolation was positively associated with loneliness.

Figure 2 depicts loneliness scores over time by living arrangement and gender. We found that the interaction between time and gender was due to the fact that the men living with others experienced a reduction in loneliness while the women living with others experienced an increase in loneliness. The figure shows that overall, people living alone had higher loneliness scores across all waves than people who lived with others. Men who lived with others had the lowest loneliness scores at both Waves 5 and 6. Their loneliness scores dropped lower still at the last wave (Wave 7). Women who lived with others had loneliness scores at Waves 5 and 6 slightly higher than men who lived with others; however, these women experienced an increase in loneliness at the onset of the pandemic (Wave 7). In contrast to people who lived with others, men who lived alone had the highest loneliness scores at Wave 5 and Wave 6. Loneliness increased slightly at Wave 7 for men living alone. Although the women who lived alone initially have loneliness scores (Wave 5) lower than men who lived alone, these women experienced increases in loneliness at both Waves 6 and 7. At Wave 7, women who lived alone had the highest loneliness scores. We computed effect sizes to inform the interpretation of Figure 2. The change in loneliness scores for men living with others (T5 v. T7) evidenced an effect size  $d = .07$ ; for women living with others the change evidenced an effect size  $d = .09$ . For men living alone the change in loneliness scores (T5 v. T7) evidenced an effect size  $d = .06$ ; for women living alone the change evidenced an effect size  $d = .30$ . The effect size for the difference between men living with others compared to the men living alone was  $d = .65$  (T5) and  $d = .78$  (T7). The effect size for the difference between women living

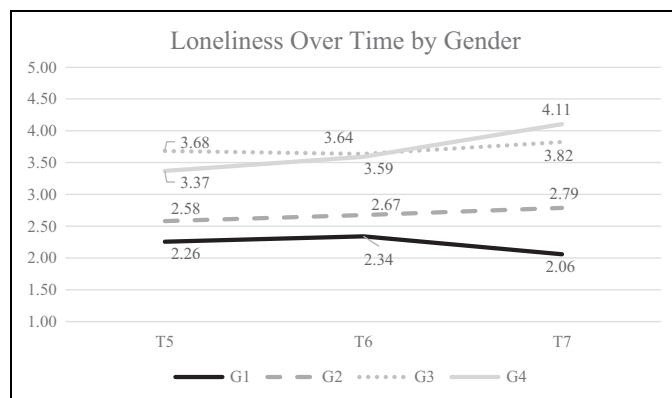
**Table 4.** Results of Multi-Level Model Analyses (N = 2,293).

Effect	Model 1A Live With Others β (SE)	Model 1B Live Alone β (SE)	Model 2A Live With Others β (SE)	Model 2B Live Alone β (SE)	Model 3A Live With Others β (SE)	Model 3B Live Alone β (SE)	Model 4A Live With Others
Intercept	2.34 (0.17)	1.89 (0.30)	6.1 (0.67)	6.16 (1.20)	9.30 (0.66)	8.18 (1.20)	10.30 (0.57)
Wave	0.03 (0.03)	0.30 (0.05)***	-0.13 (0.05)**	0.10 (0.11)	-0.12 (0.05)**	0.10 (0.11)	-0.09 (0.04)*
Lag <sup>a</sup>	-0.0001 (0.001)	-0.002 (0.002)	-0.0004 (0.001)	-0.002 (0.002)	-0.0001 (0.001)	-0.001 (0.002)	-0.0001 (0.001)
Age			-0.04 (0.01)***	-0.05 (0.01)**	-0.03 (0.01)***	-0.04 (0.01)**	-0.03 (0.006)***
Education			0.02 (0.02)	0.04 (0.04)	0.05 (0.02)*	0.04 (0.04)	0.05 (0.02)**
Income			-0.10 (0.04)**	-0.07 (0.06)	-0.07 (0.03)*	-0.05 (0.06)	-0.08 (0.04)*
Gender			-0.87 (0.37)*	-1.67 (0.78)*	-0.67 (0.31)*	-1.40 (0.58)*	-0.57 (0.24)*
Gender × Wave			0.21 (0.06)***	0.28 (0.13)*	0.21 (0.06)**	0.28 (0.13)*	0.18 (0.06)**
Health Conditions			0.18 (0.04)***	0.14 (0.06)*	0.15 (0.03)***	0.11 (0.05)*	0.13 (0.03)***
Perceived Social Support					-0.28 (0.01)***	-0.22 (0.02)***	-0.31 (0.009)***
Social Isolation					0.27 (0.03)***	0.18 (0.08)*	0.20 (0.03)**
Marital Status							-0.53 (0.10)***
Fit Indices							
-2 LL <sup>b</sup>	21242.4	8032.6	20614.2	7738.4	19438.1	7413.7	18739.6
AIC	21246.4	8038.6	20622.2	7746.4	19446.1	7421.7	18747.6
AICC	21246.4	8038.6	20622.2	7746.4	19446.1	7421.7	18747.6
BIC	21257.4	8052.1	20643.9	7764.0	19467.7	7439.2	18769.2
χ <sup>2</sup>			1429.34	478.07	852.95	338.64	593.08

Note. \*p < .05, \*\*p < .01, \*\*\*p < .001.

<sup>a</sup>Lag is the exact amount of time that has passed for the individual since start of COVID data collection. bLL = Log Likelihood.





**Figure 2.** Mean reports of loneliness across waves by living arrangement and gender. Group 1 (G1) includes men who live with others, group 2 (G2) are women who live with others, group 3 (G3) are men who live alone, and group 4 (G4) are women who live alone.

with others compared to the women living alone was  $d = .35$  (T5) and  $d = .54$  (T7).

The final model (Model 4A) indicates that for people living with others, being married is negatively associated with loneliness suggesting that being married has unique protective effects against loneliness. The significance of the other model parameters was unchanged.

In sum, findings indicate that there is a change in loneliness over time and this change is experienced differentially for women and men based on living arrangement. Men living with others experience a decrease in loneliness, while all other groups, especially women living alone, experience an increase in loneliness over time. Results also demonstrate that perceived social support was negatively associated with loneliness while social isolation was positively associated with loneliness. For people living with others, being married was negatively associated with loneliness.

## Discussion

These analyses examined associations among social isolation, perceived social support, and loneliness, accounting for age, gender, race, income, education, marital status, and health conditions among older people who were living alone and those living with others at the onset of the COVID-19 pandemic. Consistent with earlier research, we found that older people living alone before the pandemic reported higher levels of loneliness than people living with others (Sundström et al., 2009; Victor et al., 2005). New knowledge centering on the way in which social isolation, perceived social support, and loneliness are related to one another and how living arrangements and gender relate to loneliness have implications for research, practice, and policy.

Building on empirical findings reported by Bu et al. (2020), Luchetti et al. (2020), and van Tilburg et al. (2020), and concerns identified by Galea et al. (2020) and McGinty et al. (2020) at the onset of the pandemic, our analyses reveal that the pandemic, with its mandates to physically distance, is

associated with change in loneliness. However, this change is not uniform. Using data from a large panel collected before and after the onset of the COVID-19 pandemic, we found that loneliness changed differentially for women and men who were living alone and those who were living with others. While loneliness increased for both men and women living alone (Model 1B), for people living with others, only women experienced an increase in loneliness. Older people living alone reported the highest levels of loneliness, with women living alone reporting the greatest increases in loneliness. These findings highlight the vulnerability of older people living alone and suggest that interventions designed to combat loneliness should be targeted to people living alone, especially women. For example, interactive technology reduces loneliness in older people (Poscia et al., 2018). Virtual or telephone-based support programs (i.e., Big & Mini, bigandmini.org) during a pandemic, such as COVID-19, where physical contacts are limited with others, may prove particularly effective for those living alone and women more generally.

While a recent meta-analysis of the association between gender and loneliness across the life span found little evidence for gender differences (Maes et al., 2019), our analyses found that controlling for age, education, income, and health, gender affected the ways in which loneliness changed over time both for people living with others and people living alone. This finding may be due to the unique challenges associated with the pandemic (Wickens et al., 2021). More specifically, women who were living with others reported higher levels of loneliness than men living with others at each wave of assessment. The significant interaction between gender and time suggested that despite having social companions available in the form of other household members, women's loneliness increased at the onset of the pandemic. For people living alone, men reported more loneliness than women prior to the pandemic. After the onset of the pandemic, this changed, and women who were living alone experienced more loneliness than men living alone. The mean level of loneliness for women living alone evidenced the greatest increase of all the participants even after accounting for the positive effects of social isolation (time spent alone) and negative effects of perceived social support on loneliness (Models 3A and 3B). The effect sizes indicate that the most notable differences in the means for loneliness were men and women not living alone compared to those living alone and for the change in loneliness for women living alone. These findings identify women, especially women living alone, as a group at risk for experiencing high levels of loneliness when they are required to limit physical contact with other people. Physical distancing may be more detrimental to women because of inherent differences in the nature of social relationships of women compared to men (Hackett et al., 2012; Kendler et al., 2005; Seeman et al., 2002), although future studies are needed to more carefully address this issue.

While loneliness scores increased over time for people living alone and for women living with others, for men living with others loneliness decreased at the onset of the pandemic. Though it is unclear why loneliness decreased for these men, it

is possible that pandemic restrictions encouraged more family time for men who might have been working or otherwise engaged in activities outside the home. In turn, more family time might be responsible for decreasing feelings of loneliness. Future research should examine this possibility.

Examining individual characteristics other than gender, we found that both age and health were consistently associated with loneliness regardless of living arrangement and that marital status was protective for those living with others. Older people living alone and with others reported less loneliness; people with more chronic conditions reported more loneliness. These findings are consistent with the literature; older people are better at regulating emotions in the face of a threat, such as a pandemic (Carstensen et al., 2020), and those that are ill are less able to access their social networks (Uchino, 2009). These analyses also show that while living with others at the onset of the pandemic helped contain loneliness, being married provided an additional buffer against loneliness. This finding is consistent with research showing that being married is associated with better well-being, higher life satisfaction, and lower depression and anxiety (Akhtar-Danesh & Landeen, 2007; Kiecolt-Glaser & Wilson, 2017) as well as lower levels of loneliness (Mullen et al., 2019; Nguyen et al., 2020). Yet because research also finds that quality of the marital relationship affects mental health (Holt-Lunstad et al., 2008), future research should measure and account for this attribute.

Finally, as noted above, we found that people who spent more time alone and those perceiving less social support at the onset of the pandemic became lonelier over time, regardless of whether people were living alone or with others. These findings affirm prior work that documents modest associations among social isolation, social support, and loneliness (Beller & Wagner, 2018a, 2018b; Cornwell & Waite, 2009; Coyle & Dugan, 2012; McHugh Power et al., 2019; Steptoe et al., 2013). However, these findings also provide empirical evidence that while social isolation, living alone, and perceived social support are related constructs, each is distinct from the others, accounting for unique variance in models predicting loneliness. The significant, though modest bivariate correlations suggest that these constructs are related, yet separate. As such, even though the DeJong loneliness scale includes a question about feeling isolated (Hughes et al., 2004), the significant, yet modest correlations between loneliness and social isolation suggests that these are distinct constructs. Moreover, the relative stability of perceived social support over time, yet change in loneliness, provides further evidence that these constructs are unique. Future research examining these constructs over time will help disentangle them.

While this study provides important new information about loneliness for older people at the onset of the pandemic, it is not without limitations. First, all data were self-reported. Although our measure of perceived social support includes questions similar to those in other studies and is reliable, it is not a widely used scale and our measure of social isolation relied on a single question. Second, although we examined change over time in loneliness accounting for change over time in perceived social

support, our measures of health and social isolation came only from Wave 7. As such, our analyses do not inform how changes in these variables affect changes in loneliness. Moreover, while information about living arrangements came from Wave 7, we do not know about the longevity of these arrangements. Third, data came from a panel of people recruited in 2006. Although patterns of attrition from this panel were similar to those in other longitudinal panels (greater loss among non-white respondents, people with less education and income), findings can be generalized only to community-dwelling people like those who continued to participate. Because we did not continue to follow people who moved to nursing homes, findings cannot be generalized to this population. In addition, because others have found cultural differences in loneliness (Heu et al., 2019), with loneliness being greater in individualistic countries than collectivistic countries, generalization of findings is cautioned. Fourth, when recruited, the panel was limited to people living in New Jersey. Although we continue to follow people leaving the state, more than 85% of people participating in Wave 7 lived in New Jersey, a state whose governor instituted physical distancing restrictions early in the pandemic's history. As such, findings may not be generalizable to people living in states or countries with less restrictive physical distancing mandates. Fifth, our measure of social isolation included only one specific item, yet because others have found that different measures of social isolation relate differentially to loneliness and health (Beller & Wagner, 2018a, 2018b), findings may have varied had we used a different measure of social isolation. Finally, generalization of findings is limited to the initial months of the pandemic. While restrictions initiated in hopes of limiting the spread of the virus affected loneliness, these data did not address the extent to which increases in loneliness were sustained over the course of the now more than 1-year pandemic. However, the lack of significance for the time lag variable suggests that varying amount of time social distancing did not influence the changes in loneliness we observed from May until October 2020. Moreover, as these longitudinal data found that loneliness increased over time even before the pandemic, future work is needed to know the extent to which this trend is generalizable and how increases in loneliness might be mitigated.

## Conclusion

Despite limitations, these analyses document changes in loneliness experienced by community-dwelling older people following the onset of the COVID-19 pandemic. By finding that loneliness increased for older men and women living alone, but only for women living with others, and that women living alone were particularly vulnerable to increasing loneliness, our results help identify targets for intervention. Findings further extend the loneliness literature by documenting how pandemic-related social restrictions may influence loneliness trajectories. Moreover, our findings add to a growing literature regarding distinctions among loneliness, perceived social support, social isolation, and living arrangements. These

analyses also raise new questions for future research about how loneliness and change in loneliness relate to changes in other indicators of mental health (e.g., depressive symptoms) and indicators of physical health.


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### References

- Akhtar-Danesh, N., & Landeen, J. (2007). Relation between depression and sociodemographic factors. *International Journal of Mental Health Systems, 1*(1), 4. <https://doi-org.ezproxy.rowan.edu/10.1186/1752-4458-1-4>
- Antonucci, T. C., Ajrouch, K. J., & Birditt, K. S. (2014). The convoy model: Explaining social relations from a multidisciplinary perspective. *The Gerontologist, 54*(1), 82–92. <https://doi.org/10.1093/geront/gnt118>
- Beller, J., & Wagner, A. (2018a). Disentangling loneliness: Differential effects of subjective loneliness, network quality, network size, and living alone on physical, mental, and cognitive health. *Journal of Aging and Health, 30*(4), 521–539. <https://doi.org/10.1177/0898264316685843>
- Beller, J., & Wagner, A. (2018b). Loneliness, social isolation, their synergistic interaction, and mortality. *Health Psychology, 37*(9), 808–813. <https://doi.org/10.1037/hea0000605>
- Birditt, K. S., & Fingerman, K. L. (2003). Age and gender differences in adults' descriptions of emotional reactions to interpersonal problems. *The Journals of Gerontology: Series B, 58*(4), P237–P245. <https://doi.org/10.1093/geronb/58.4.P237>
- Blumberg, S. J., & Luke, J. V. (2007). Coverage bias in traditional telephone surveys of low-income and young adults. *Public Opinion Quarterly, 71*(5), 734–749. <https://doi.org/10.1093/poq/nfm047>
- Bu, F., Steptoe, A., & Fancourt, D. (2020). Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic. *Public Health, 186*, 31–34. <https://doi.org/10.1016/j.puhe.2020.06.036>
- Carstensen, L. L., Shavit, Y. Z., & Barnes, J. T. (2020). Age advantages in emotional experience persist even under threat from the COVID-19 pandemic. *Psychological Science, 31*(11), 1374–1385. <https://doi.org/10.1177/0956797620967261>
- Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior, 50*(1), 31–48. <https://doi.org/10.1177/002214650905000103>
- Coyle, C. E., & Dugan, E. (2012). Social isolation, loneliness and health among older adults. *Journal of Aging and Health, 24*(8), 1346–1363. <https://doi.org/10.1177/0898264312460275>
- Cudjoe, T. K. M., & Kotwal, A. A. (2020). “Social distancing” amid a crisis in social isolation and loneliness. *Journal of the American Geriatrics Society. https://doi.org/10.1111/jgs.16527*
- Dahlberg, L., Agahi, N., & Lennartsson, C. (2018). Lonelier than ever? Loneliness of older people over two decades. *Archives of Gerontology and Geriatrics, 75*, 96–103. <https://doi.org/https://doi.org/10.1016/j.archger.2017.11.004>
- De Jong Gierveld, J., van Tilburg, T. G., & Dykstra, P. A. (2006). Loneliness and social isolation. In D. Perlman & A. Vangelisti (Eds.), *The Cambridge handbook of personal relationships* (pp. 485–500). Cambridge University.
- Delen, D., Eryarsoy, E., & Davazdahemami, B. (2020). No place like home: Cross-national data analysis of the efficacy of social distancing during the COVID-19 pandemic. *JMIR Public Health and Surveillance, 6*(2), e19862. <https://doi.org/10.2196/19862>
- Drageset, J., Eide, G. E., Kirkevold, M., & Ranhoff, A. H. (2013). Emotional loneliness is associated with mortality among mentally intact nursing home residents with and without cancer: A five-year follow-up study. *Journal of Clinical Nursing, 22*(1–2), 106–114. <https://doi.org/10.1111/j.1365-2702.2012.04209.x>
- Galea, S., Merchant, R. M., & Lurie, N. (2020). The mental health consequences of COVID-19 and physical distancing: The need for prevention and early intervention. *JAMA Internal Medicine. https://doi.org/10.1001/jamainternmed.2020.1562*
- Golden, J., Conroy, R. M., Bruce, I., Denihan, A., Greene, E., Kirby, M., & Lawlor, B. A. (2009). Loneliness, social support networks, mood and wellbeing in community-dwelling elderly. *International Journal of Geriatric Psychiatry, 24*, 694–700. <https://doi-org.ezproxy.rowan.edu/10.1002/gps.2181>
- Gopinath, B., Rochtchina, E., Anstey, K. J., & Mitchell, P. (2013). Living alone and risk of mortality in older, community-dwelling adults. *JAMA Internal Medicine, 173*(4), 320–321. <https://doi.org/10.1001/jamainternmed.2013.1597>
- Hackett, R. A., Hamer, M., Endrighi, R., Brydon, L., & Steptoe, A. (2012). Loneliness and stress-related inflammatory and neuroendocrine responses in older men and women. *Psychoneuroendocrinology, 37*(11), 1801–1809. <https://doi.org/10.1016/j.psyneuen.2012.03.016>
- Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine, 40*(2), 218–227. <https://doi.org/10.1007/s12160-010-9210-8>
- Hawkley, L. C., Hughes, M. E., Waite, L. J., Masi, C. M., Thisted, R. A., & Cacioppo, J. T. (2008). From social structural factors to perceptions of relationship quality and loneliness: The Chicago health, aging, and social relations study. *The Journals of Gerontology: Series B, 63*(6), S375–384. <https://doi.org/10.1093/geronb/63.6.s375>

- Heid, A. R., Cartwright, F. P., Wilson-Genderson, M., & Pruchno, R. (2021). Understanding attrition and bolstering retention in a longitudinal panel of older adults: ORANJ BOWL. *Innovation in Aging*, *igab010*. <https://doi.org/10.1093/geroni/igab010>
- Heid, A. R., Cartwright, F., Wilson-Genderson, M., & Pruchno, R. (2020). Challenges experienced by older people during the initial months of the COVID-19 pandemic. *The Gerontologist*. <https://doi.org/10.1093/geront/gnaa138>
- Heidinger, T., & Richter, L. (2020). The effect of COVID-19 on loneliness in the elderly: An empirical comparison of pre- and peri-pandemic loneliness in community-dwelling elderly [Brief Research Report]. *Frontiers in Psychology*, *11*(2595). <https://doi.org/10.3389/fpsyg.2020.585308>
- Heu, L. C., van Zomeren, M., & Hansen, N. (2019). Lonely alone or lonely together? A cultural-psychological examination of individualism-collectivism and loneliness in five European countries. *Personality and Social Psychology Bulletin*, *45*(5), 780–793. <https://doi.org/10.1177/0146167218796793>
- Holt-Lunstad, J., Birmingham, W., & Jones, B. Q. (2008, April). Is there something unique about marriage? The relative impact of marital status, relationship quality, and network social support on ambulatory blood pressure and mental health. *Annals of Behavioral Medicine*, *35*(2), 239–244. <https://doi.org/10.1007/s12160-008-9018-y>
- Holt-Lunstad, J., Robles, T. F., & Sbarra, D. A. (2017). Advancing social connection as a public health priority in the United States. *American Psychologist*, *72*(6), 517–530. <https://doi.org/10.1037/amp0000103>
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *10*(2), 227–237. <https://doi.org/10.1177/1745691614568352>
- Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, *26*(6), 655–672. <https://doi.org/10.1177/0164027504268574>
- Kendler, K. S., Myers, J., & Prescott, C. A. (2005). Sex differences in the relationship between social support and risk for major depression: A longitudinal study of opposite-sex twin pairs. *The American Journal of Psychiatry*, *162*(2), 250–256. <https://doi.org/10.1176/appi.ajp.162.2.250>
- Kiecolt-Glaser, J. K., & Wilson, S. J. (2017). Lovesick: How couples' relationships influence health. *Annual Review of Clinical Psychology*, *13*(1), 421–443. <https://doi-org.ezproxy.rowan.edu/10.1146/annurev-clinpsy-032816-045111>
- Kojima, G., Taniguchi, Y., Kitamura, A., & Fujiwara, Y. (2020). Is living alone a risk factor of frailty? A systematic review and meta-analysis. *Ageing Research Review*, *59*, 101048. <https://doi.org/10.1016/j.arr.2020.101048>
- Lewnard, J. A., & Lo, N. C. (2020). Scientific and ethical basis for social-distancing interventions against COVID-19. *The Lancet. Infectious Diseases*, *20*(6), 631–633. [https://doi.org/10.1016/S1473-3099\(20\)30190-0](https://doi.org/10.1016/S1473-3099(20)30190-0)
- Long Lee, S., Pearce, E., Ajnakina, O., Johnson, S., Lewis, G., Mann, F., Pitman, A., Solmi, F., Sommerlad, A., Steptoe, A., Tymoszuk, U., & Lewis, G. (2021). The association between loneliness and depressive symptoms among adults aged 50 years and older: A 12-year population-based cohort study. *The Lancet Psychiatry*, *8*(1), 48–57. [https://doi.org/10.1016/S2215-0366\(20\)30383-7](https://doi.org/10.1016/S2215-0366(20)30383-7)
- Luchetti, M., Lee, J. H., Aschwanden, D., Sesker, A., Strickhouser, J. E., Terracciano, A., & Sutin, A. R. (2020). The trajectory of loneliness in response to COVID-19. *American Psychologist*, *75*(7), 897–908. <https://doi.org/10.1037/amp0000690>
- Luo, Y., Hawkey, L. C., Waite, L. J., & Cacioppo, J. T. (2012). Loneliness, health, and mortality in old age: A national longitudinal study. *Social Science and Medicine*, *74*(6), 907–914. <https://doi.org/10.1016/j.socscimed.2011.11.028>
- Luo, Y., & Waite, L. J. (2014). Loneliness and mortality among older adults in China. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *69*(4), 633–645. <https://doi.org/10.1093/geronb/gbu007>
- Maes, M., Qualter, P., Vanhalst, J., Van den Noortgate, W., Goossens, L., & Kandler, C. (2019). Gender differences in loneliness across the lifespan: A meta-analysis. *European Journal of Personality*, *33*(6), 642–654. <https://doi.org/10.1002/per.2220>
- McGinty, E. E., Presskreischer, R., Han, H., & Barry, C. L. (2020). Psychological distress and loneliness reported by US adults in 2018 and April 2020. *JAMA*, *324*(1), 93–94. <https://doi.org/10.1001/jama.2020.9740>
- McHugh Power, J. E., Steptoe, A., Kee, F., & Lawlor, B. A. (2019). Loneliness and social engagement in older adults: A bivariate dual change score analysis. *Psychology and Aging*, *34*(1), 152–162. <https://doi.org/10.1037/pag0000287>
- Menec, V. H., Newall, N. E., Mackenzie, C. S., Shooshtari, S., & Nowicki, S. (2020). Examining social isolation and loneliness in combination in relation to social support and psychological distress using Canadian Longitudinal Study of Aging (CLSA) data. *PLoS One*, *15*(3), e0230673. <https://doi.org/10.1371/journal.pone.0230673>
- Mullen, R. A., Tong, S., Sabo, R. T., Liaw, W. R., Marshall, J., Nease, D. E., Krist, A. H., & Frey, J. J. (2019). Loneliness in primary care patients: A prevalence study. *Annals of Family Medicine*, *17*, 108–115. <https://dx.doi.org/10.1370/afm.2358>
- National Academies of Sciences, Engineering, and Medicine. (2020). *Social isolation and loneliness in older adults: Opportunities for the health care system*. <https://doi.org/10.17226/25663>
- Newall, N. E. G., & Menec, V. H. (2017). Loneliness and social isolation of older adults: Why it is important to examine these social aspects together. *Journal of Social and Personal Relationships*, *36*(3), 925–939. <https://doi.org/10.1177/0265407517749045>
- Nguyen, T. T., Lee, E. E., Daly, R. E., Wu, T. C., Tang, Y., Tu, X., Van Patten, R., Jeste, D. V., & Palmer, B. W. (2020). Predictors of loneliness by age decade: study of psychological and environmental factors in 2,843 community-dwelling Americans aged 20–69 years. *Journal of Clinical Psychiatry*, *81*, <https://dx.doi.org/10.4088/JCP.20m13378>
- Peplau, L. A., & Perlman, D. (1982). *Loneliness: A sourcebook of current theory, research, and therapy*. Wiley.
- Perissinotto, C. M., Stijacic Cenzer, I., & Covinsky, K. E. (2012). Loneliness in older persons: A predictor of functional decline and

- death. *Archives of Internal Medicine*, 172(14), 1078–1083. <https://doi.org/10.1001/archinternmed.2012.1993>
- Poscia, A., Stojanovic, J., Ignazio La Milia, D., Duplaga, M., Grysztar, M., Moscato, U., Onder, G., Collamati, A., Ricciardi, W., & Magnavita, N. (2018). Interventions targeting loneliness and social isolation among the older people: An update systematic review. *Experimental Gerontology*, 102, 133–144. <https://doi.org/10.1016/j.exger.2017.11.017>
- Prohaska, T., Burholt, V., Burns, A., Golden, J., Hawkey, L., Lawlor, B., Leavey, G., Lubben, J., Sullivan, R., Perissinotto, C., van Tilburg, T., Tully, M., Victor, C., & Fried, L. (2020). Consensus statement: Loneliness in older adults, the 21st century social determinant of health? *BMJ Open*, 10(8), e034967. <https://doi.org/10.1136/bmjopen-2019-034967>
- Pruchno, R. A., Wilson-Genderson, M., & Cartwright, F. C. (2010). A two-factor model of successful aging. *The Journals of Gerontology: Series B*, 65(6), 671–679. <https://doi.org/10.1093/geronb/gbq051>
- Pruchno, R., Wilson-Genderson, M., Heid, A., & Cartwright, F. (2020). Trajectories of depressive symptoms experienced by older people: Effects of time, hurricane sandy, and the great recession. *The Journals of Gerontology: Series B*, gbaa198, <https://doi.org/10.1093/geronb/gbaa198>
- Rico-Urbe, L. A., Caballero, F. F., Martín-María, N., Cabello, M., Ayuso-Mateos, J. L., & Miret, M. (2018). Association of loneliness with all-cause mortality: A meta-analysis. *PLoS One*, 13(1), e0190033. <https://doi.org/10.1371/journal.pone.0190033>
- Seeman, T. E., Singer, B. H., Ryff, C. D., Dienberg Love, G., & Levy-Storms, L. (2002). Social relationships, gender, and allostatic load across two age cohorts. *Psychosomatic Medicine*, 64(3), 395–406. <https://doi.org/10.1097/00006842-200205000-00004>
- Stepoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences of the United States of America*, 110(15), 5797–5801. <https://doi.org/10.1073/pnas.1219686110>
- Sundström, G., Fransson, E., Malmberg, B., & Davey, A. (2009). Loneliness among older Europeans. *European Journal of Ageing*, 6(4), 267. <https://doi.org/10.1007/s10433-009-0134-8>
- Uchino, B. N. (2009). Understanding the links between social support and physical health: A life-span perspective with emphasis on the separability of perceived and received support. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, 4(3), 236–255. <https://doi.org/10.1111/j.1745-6924.2009.01122.x>
- Udell, J. A., Steg, P. G., Scirica, B. M., Smith, S. C. Jr., Ohman, E. M., Eagle, K. A., Goto, S., Cho, J. I., & Bhatt, D. L. (2012). Living alone and cardiovascular risk in outpatients at risk of or with atherothrombosis. *Archives of Internal Medicine*, 172(14), 1086–1095. <https://doi.org/10.1001/archinternmed.2012.2782>
- van Tilburg, T. G., Steinmetz, S., Stolte, E., van der Roest, H., & de Vries, D. H. (2020). Loneliness and mental health during the COVID-19 pandemic: A study among Dutch older adults. *The Journals of Gerontology: Series B*. <https://doi.org/10.1093/geronb/gbaa111>
- Victor, C., Scambler, S., Bowling, A., & Bond, J. (2005). The prevalence of, and risk factors for, loneliness in later life: A survey of older people in Great Britain. *Ageing and Society*, 25(6), 357–375. <https://doi.org/10.1017/S0144686X04003332>
- Wickens, C. M., McDonald, A. J., Elton-Marshall, T., Wells, S., Nigatu, Y. T., Janowicz, D., & Hamilton, H. A. (2021). Loneliness in the COVID-19 pandemic: Associations with age, gender and their interaction. *Journal of Psychiatric Research*, 136, 103–108. <https://doi.org/10.1016/j.jpsychires.2021.01.047>
- Wilson-Genderson, M., Heid, A. R., & Pruchno, R. (2018). Long-term effects of disaster on depressive symptoms: Type of exposure matters. *Social Science & Medicine*, 217, 84–91. <https://doi.org/10.1016/j.soc.scimed.2018.09.062>
- Wilson-Genderson, M., Pruchno, R., & Heid, A. R. (2017). Modeling successful aging over time in the context of a disaster. *The Journals of Gerontology: Series B*, 72(2), 328–339. <https://doi.org/10.1093/geronb/gbw127>
- Yang, K., & Victor, C. (2011). Age and loneliness in 25 European nations. *Ageing and Society*, 31(8), 1368–1388. <https://doi.org/10.1017/S0144686X1000139X>
- Zebhauser, A., Baumert, J., Emeny, R. T., Ronel, J., Peters, A., & Ladwig, K. H. (2015). What prevents old people living alone from feeling lonely? Findings from the KORA-Age-study. *Ageing and Mental Health*, 19(9), 773–780. <https://doi.org/10.1080/13607863.2014.977769>

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