

Special Issue: Gerontology in a Time of Pandemic, Part II: Research Article

The COVID-19 Pandemic and Psychosocial Outcomes Across Age Through the Stress and Coping Framework

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Received: August 7, 2020; Editorial Decision Date: December 8, 2020

Decision Editor: Suzanne Meeks, PhD, FGSA

Abstract

Background and Objectives: The emergence of the Coronavirus Disease 2019 (COVID-19) and the measures implemented to curb its spread may have deleterious effects on mental health. Older adults may be at increased risk for adverse psychosocial outcomes because opportunities to remain socially connected have diminished. Research is needed to better understand the impact of pandemic-related stress on mental health. The purpose of this study is 3-fold: (a) to examine the influences of COVID-19 pandemic-related stress on depression, anxiety, and loneliness; (b) to assess the mediating role of coping style and social support; and (c) to investigate whether these relationships vary across age.

Research Design and Methods: Participants ($N = 1,318$) aged 18–92 years completed an online survey assessing pandemic-related stress, mental health, social support, coping, and their experiences with social distancing, during the initial implementation of social distancing measures in the United States.

Results: Social support and coping style were found to relate to psychosocial outcomes. Avoidant coping was the strongest mediator of the relationship between pandemic-related stress and psychosocial outcomes, particularly depression. Avoidant coping more strongly mediated the relationship between stress and depression in younger adults compared to older adults.

Discussion and Implications: Results were consistent with the stress and coping framework and recent work highlighting older adults' resilience during the COVID-19 pandemic. Findings highlight the associations between positive coping behaviors and psychosocial well-being and indicate that older adults may use unique adaptive mechanisms to preserve well-being during the COVID-19 pandemic.

Keywords: Coping, Mental health, Social distancing, Social support, Stress

The emergence of the Coronavirus Disease 2019 (COVID-19) as a public health crisis has fundamentally shifted the lives of millions of individuals across the globe. The measures taken to “flatten the curve” were implemented to contain the spread of the virus and prevent overwhelming strain on the health care system. The consequences of the pandemic, including loss of financial stability and social connectivity, extend beyond the immediate physical

threat of the virus. Stay-at-home orders transformed how individuals live, work, socialize, and cope with stressors in daily life. Such measures, coupled with pandemic-related stress and uncertainty, may have significant impacts on mental health and well-being (Losada-Baltar et al., 2020).

Early research on COVID-19 primarily focused on the virus as a pathogen rather than examining its broader influence on the social and cultural contexts in which we live

(Galea et al., 2020). As the COVID-19 pandemic persists, emerging work has begun to highlight the threat the pandemic poses to mental health and well-being, including increased prevalence of anxiety and depressive disorders (Banerjee & Rai, 2020). Pandemic-related stressors, such as separation from loved ones, disruptions in daily routines, concerns about health, and financial instability, can have dramatic effects on psychosocial well-being (Torales et al., 2020; Tull et al., 2020). Moreover, the current state of the “infodemic” (e.g., frequent exposure to media coverage, information overload, and/or inadequate or false information) can further exacerbate stress and risk for adverse psychological outcomes (Fiorillo & Gorwood, 2020; Ornell et al., 2020; Rajkumar, 2020).

The speculation surrounding the psychosocial implications of the COVID-19 pandemic is drawn from prior work on epidemics and other natural disasters (Fiorillo & Gorwood, 2020). For example, large-scale national disasters in the United States (e.g., the September 11 attacks, Hurricane Katrina) and global epidemics (e.g., Severe Acute Respiratory Syndrome) have been widely accompanied by increases in anxiety, depression, avoidant behavior, anger, and substance use (Galea et al., 2020; Hawryluck et al., 2004; Marjanovic et al., 2007; Reynolds et al., 2008). Other work has shown that the immediate financial (e.g., loss of income due to unemployment) and psychosocial stressors related to epidemics may have significant effects on mental health and daily life (Ornell et al., 2020). Further, there is well-established literature highlighting stress, including traumatic stress, as a predictor of adverse physical and mental health outcomes (e.g., Hammen et al., 2009; Morrill et al., 2008). Given that the COVID-19 pandemic has been deemed a large-scale “collective stressor” characterized by uncertainty, lack of control, and vast changes in daily life, there is reason to hypothesize that stress would play a significant role on symptoms of anxiety and depression (Holman et al., 2020; Xiong et al., 2020).

The invisible threat of the pandemic can be associated with mass feelings of panic, fear, and heightened stress (Fiorillo & Gorwood, 2020; Horesh & Brown, 2020), requiring individuals to be vigilant in adhering to measures to contain its spread (e.g., social distancing) even at the cost of one’s mental health. Emerging work is beginning to determine the implications of COVID-19 pandemic-related stress. For example, Barzilay et al. (2020) and Gallagher et al. (2020) found that greater pandemic-related stress was associated with greater functional impairment and clinically significant symptoms of depression and anxiety. However, further research is needed to examine the impact of the COVID-19 pandemic, specifically traumatic stress, on mental health.

The impact of the current pandemic on psychosocial well-being can be understood in the context of the stress and coping model (Lazarus & Folkman, 1984), which posits that stress arises due to complex and dynamic

transactions between an individual and their environment. This framework suggests that individuals appraise the significance of stressors (primary appraisal) and evaluate their own perceived resources (e.g., coping) to manage emotions or address the stressor at hand. Because there are variations in how individuals perceive stress and utilize coping resources, these individual characteristics can lead to differential effects on psychosocial outcomes. The role of coping as a mediating influence in the relationship between stressors and outcomes depends on how well one’s method of coping corresponds to stress appraisals and situational conditions (Biggs et al., 2017; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). Dysfunctional coping mechanisms, such as avoidant coping (i.e., behaviors individuals engage in to avoid thinking about, or to escape feelings associated with, stressors), may exacerbate perceived stress and subsequently increase risk for adverse psychosocial outcomes (Ben-Zur, 2009; Biggs et al., 2017). Recent work examining coping has shown that individuals with higher levels of pandemic-related uncertainty were more likely to use maladaptive coping strategies, which was related to greater levels of anxiety, depression, and worse subjective well-being (Rettie & Daniels, 2020; Wang et al., 2020; Zacher & Rudolph, 2020). Maladaptive coping (e.g., avoidance) is common following traumatic events (e.g., Park et al., 2020), providing preliminary evidence that the impact of COVID-19 pandemic-related stress on mental health may operate through coping style.

Social support may also differentially influence mental health (Cornwell & Waite, 2009; Hsu & Tung, 2010; Nemeroff et al., 2010). While most research has examined social support as a predictor of posttraumatic stress, researchers have more recently considered the impact of posttraumatic stress on social support. This alternative “erosion model” purports that symptoms associated with posttraumatic distress, such as social withdrawal, may erode the amount or quality of social support received from one’s network (Clapp & Beck, 2009, p. 237; King et al., 2006). Accordingly, the stress caused by the pandemic may function as a barrier to effectively accessing social support, which may have negative psychosocial implications. For instance, stay-at-home orders have resulted in disruptions in daily life and reduced social contact, which can exacerbate loneliness and social isolation (Tull et al., 2020).

Relatedly, Sanders (2020) noted that individuals who live alone are at particular risk for poor mental health outcomes because the COVID-19 pandemic has resulted in limited opportunities for social engagement. Research has consistently shown social isolation to be a predictor of loneliness, and both loneliness and isolation have negative effects on physical health, anxiety, and depression (Golden et al., 2009; Kearns et al., 2015; Shankar et al., 2011). Further, the high prevalence of loneliness was deemed an epidemic prior to the emergence of the COVID-19 pandemic (Holt-Lunstad, 2017), resulting in fear that the current pandemic will only worsen this

preexisting issue (Courtet et al., 2020; Sanders, 2020). A recent study examining Google Trends showed that the search volume for the term “loneliness” was the highest ever recorded since Google began measuring trends in 2004 (Banerjee et al., 2020).

Of particular concern is the impact of quarantine-related measures on older adults. Given this pandemic’s influence on older adults’ psychological and physical vulnerability (e.g., Courtet et al., 2020; Shahid et al., 2020), it is essential to gain a further understanding of potential explanatory mechanisms, such as coping strategies and social support, that can promote resilience. Research examining age differences in the relationship between COVID-19 pandemic-related stress and mental health has been mixed. Some have shown that greater pandemic-related stress was associated with higher levels of anxiety in older adults compared to younger adults (e.g., Pearman et al., 2020), while others have found that this relationship is age-invariant (e.g., Tull et al., 2020). There is also some evidence that greater use of proactive coping strategies was associated with lower COVID-19 pandemic-related stress in older adults compared to younger adults (Klaiber et al., 2020; Montano & Acebes, 2020). Additional research is needed on the consequences of the COVID-19 pandemic on psychosocial well-being in older adults, given their physical susceptibility to COVID-19 and their heightened risk of loneliness.

Social support is another mechanism that may function differently across age. According to the socioemotional selectivity theory, maintaining close and emotionally rewarding relationships becomes increasingly important in later life due to shrinking time perspectives (e.g., Carstensen et al., 2003); thus, failure to achieve and maintain close and emotionally rewarding relationships may be particularly distressing for older adults. Prior to the COVID-19 pandemic, older adults were at risk for social isolation and loneliness due to age-related changes (e.g., living alone, shrinking social network; Holt-Lunstad, 2017; Pinguart & Sörensen, 2001; Utz et al., 2014). Amidst the pandemic, many individuals, including older adults, have lost their typical modes of social connectivity and, as a result, are forced to spend more time by themselves at home (Courtet et al., 2020). Older adults may have less access to or be less adept at using technology to virtually maintain social connections and thus may be at increased risk for social isolation. Interestingly, Losada-Baltar et al. (2020) found that during the COVID-19 pandemic, older adults in Spain were less lonely and experienced less distress compared to younger adults, which may be due to differences in coping strategies used, as well as differences in resilience and stress reactivity across age. Additional research is needed to identify how mental health may be differentially affected by background characteristics (e.g., age) and mediating influences (e.g., coping and social support) to inform the developing knowledge base on this topic. These findings can further inform and contribute to the development of targeted interventions to support individuals amidst the COVID-19 pandemic and its aftermath.

The purpose of this study is to add to the emerging body of research examining the influences of COVID-19 pandemic-related stress on mental health, specifically depression, anxiety, and loneliness within the context of the stress and coping model (Lazarus & Folkman, 1984). Because older adults are likely to be vulnerable to the effects of the COVID-19 pandemic, we examine differences in the relationship between pandemic-related stress and mental health outcomes across age. The use of coping strategies (e.g., approach- vs avoidant-focused coping) and presence of social support are important factors implicated in stress appraisal and significantly predict mental health outcomes. Thus, we examine coping style and social support as mediators of the relationships between pandemic-related stress and three mental health outcomes: depression, anxiety, and loneliness, and investigate how these relationships may be moderated by age.

We hypothesized that COVID-19 pandemic-related stress would be positively related to depression, anxiety, and loneliness. Consistent with the stress and coping model (Lazarus & Folkman, 1984), we expected that coping styles and social support would mediate the relationship between pandemic-related stress and psychosocial outcomes. Finally, we hypothesized that the magnitude of the mediation would vary based on age group, such that coping styles and social support would more strongly mediate the relationships between pandemic-related stress and psychosocial outcomes in older adults than in middle-aged and young adults.

Design and Methods

Participants

Participants ($N = 1,354$) between the ages of 18–92 ($M_{\text{age}} = 52.42$, $SD = 17.76$) were recruited from social media posts and ResearchMatch, an online research registry connecting participants with Institutional Review Board-approved studies. Participants completed the survey between April 1, 2020 and May 17, 2020, which corresponded to the initial quarantine and social distancing measures implemented across the United States. To be eligible to participate, individuals needed to be at least 18 years of age and able to read, write, and understand English. Embedded within the survey were items designed to confirm that participants were attending to the questions (e.g., “For psychometric purposes, please select ‘somewhat agree’”). Thirty-six participants (2.7%) were excluded for answering more than one attention confirmation item incorrectly. The resulting sample ($N = 1,318$) comprised 1,015 females (77%), 283 males (21.5%), 15 (1.1%) gender variant/nonconforming individuals, and five responded as “other” or “prefer not to answer” (0.4%). The majority of the sample identified as White (86.9%). The remainder of the sample identified as Black (4.2%), Hispanic or Latino (2.3%), Asian (2.3%), American Indian/Alaskan Native (0.4%), Native Hawaiian or other Pacific Islander (0.2%), more than one ethnicity (2.7%), and 0.9% listed

their race/ethnicity as “Other.” See Table 1 for participant characteristics.

Procedure

A survey was administered via the Qualtrics online survey platform comprising measures of loneliness, health locus of control, posttraumatic stress, subjective well-being, social contact, coping, social support, depression, anxiety,

and sociodemographic characteristics (e.g., age, gender identity, income, etc.). These measures were followed by open-ended items asking participants about their social distancing experiences, including whether and how long (in days) they had been engaging in social distancing. After completing the survey, participants had the option of submitting their e-mail address via a separate survey link to be entered into a raffle to win one of two \$100 gift cards.

Table 1. Participant Characteristics (*N* = 1,318)

Variable	Total <i>N</i> = 1,318	18–39 years <i>n</i> = 375	40–64 years <i>n</i> = 542	65–92 years <i>n</i> = 398
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Age	52.42 (17.76)	27.98 (5.18)	55.44 (6.51)	71.32 (5.10)
Gender				
Male	21.5%	14.1%	19.4%	31.4%
Female	77%	81.9%	79.9%	68.3%
Gender variant/nonconforming	1.1%	2.9%	0.6%	0.3%
Other/prefer not to answer	0.4%	1.1%	0.2%	0.0%
Race/ethnicity				
American Indian/Alaskan Native	0.4%	0.5%	0.4%	0.3%
Asian	2.3%	5.9%	1.5%	0.0%
Native Hawaiian/Pacific Islander	0.2%	0.0%	0.4%	0.0%
Black/African American	4.2%	3.7%	6.3%	1.8%
Hispanic/Latinx	2.3%	4.8%	1.5%	1.0%
White	86.9%	81.1%	86.3%	93.5%
More than one	2.7%	3.2%	3.0%	1.5%
Other	0.9%	0.5%	0.6%	1.8%
Health ^a	2.42 (1.01)	2.27 (0.94)	2.53 (1.08)	2.38 (0.96)
Annual household income				
\$0–\$9,999	3.0%	5.6%	2.4%	1.5%
\$10,000–\$19,999	4.0%	4.0%	3.9%	4.3%
\$20,000–\$29,999	5.3%	5.6%	4.8%	5.8%
\$30,000–\$39,999	7.4%	6.4%	6.8%	8.8%
\$40,000–\$49,999	7.1%	8.5%	5.0%	8.5%
\$50,000–\$59,999	7.5%	9.9%	6.3%	7.0%
\$60,000–\$69,999	7.6%	8.0%	6.8%	8.3%
\$70,000–\$79,999	8.4%	8.3%	7.0%	10.6%
\$80,000–\$89,999	5.3%	3.5%	7.2%	4.5%
\$90,000–\$99,999	6.4%	6.1%	7.4%	5.3%
\$100,000 or more	32.7%	29.3%	38.2%	28.6%
Social distancing time (in days)	32.28 (15.04)	35.53 (17.22)	30.79 (13.65)	31.32 (14.24)
Objective social isolation ^b	3.10 (0.95)	3.00 (0.95)	3.14 (0.98)	3.15 (0.90)
Posttraumatic stress ^c	0.98 (0.63)	1.19 (0.67)	0.97 (0.61)	0.81 (0.55)
Avoidant coping ^d	1.74 (0.39)	1.90 (0.44)	1.69 (0.36)	1.64 (0.34)
Approach coping ^d	2.67 (0.55)	2.66 (0.55)	2.68 (0.55)	2.66 (0.55)
Social support ^e	3.85 (0.95)	3.96 (0.96)	3.76 (0.98)	3.86 (0.90)
Depression ^f	15.24 (5.62)	17.77 (5.96)	15.01 (5.52)	13.18 (4.38)
Anxiety ^g	11.97 (4.94)	14.36 (5.25)	11.79 (4.68)	9.99 (3.94)
Loneliness ^h	5.11 (1.79)	5.56 (1.73)	5.17 (1.86)	4.58 (1.62)

Notes: ^aRepresents participants' self-rated health. ^bRepresents participants' average frequency of contact with children, other family, and friends. ^cPosttraumatic stress was measured using the Impact of Event Scale—Revised (Weiss & Marmar, 1997). ^dAvoidant coping and approach coping were measured using the Brief COPE Scale (Carver, 1997). ^eSocial support was measured using the Medical Outcome Study—Social Support Survey (Sherbourne & Stewart, 1991). ^fDepression was measured using the Patient Health Questionnaire-9 (Kroenke et al., 2001). ^gAnxiety was measured using the Generalized Anxiety Disorder-7 (Spitzer et al., 2006). ^hLoneliness was measured using the UCLA three-item loneliness scale (Hughes et al., 2004).

Measures

UCLA Loneliness Scale

This three-item version of the UCLA loneliness scale assesses how often (hardly ever, some of the time, often) participants report feeling that they (a) lack companionship, (b) feel left out, and (c) feel isolated from others (Hughes et al., 2004). Higher scores are indicative of higher levels of loneliness. The three-item loneliness scale shows adequate internal consistency and good evidence of convergent and discriminant validity (Hughes et al., 2004). Cronbach's alpha in the current study was 0.82.

Impact of Event Scale—Revised

This scale is a 22-item scale assessing posttraumatic stress (Weiss & Marmar, 1997). Participants were instructed to indicate how “distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 Pandemic.” Participants rated how distressing each item was on a 5-point Likert scale ranging from “not at all” to “extremely.” Higher scores indicate higher levels of distress ($\alpha = 0.91$ in the current sample).

Objective Social Contact

Objective social contact was measured by four items assessing social network composition (e.g., “Do you have a husband, wife or partner with whom you live?”), four items assessing number of close social relationships (e.g., “How many of your friends would you say you have a close relationship with?”), and nine items assessing contact with social network (e.g., How often do you: “meet up,” “speak on the phone,” “text message,” “write or e-mail,” or “communicate by Skype, Facebook, or other social media?”) (Schuster et al., 1990; Turner et al., 1983). Response options ranged from 1 = three or more times a week to 6 = less than once a week or never (Smith et al., 2017). A composite mean score was calculated for the nine items assessing contact with social network with greater values indicating greater social isolation (i.e., less contact).

Brief COPE Scale

The Brief COPE Scale is a 28-item scale that asks participants how often they use different avoidant (e.g., “I've been using alcohol or other drugs to make myself feel better”) and approach coping (e.g., “I've been getting emotional support from others”) techniques on a scale of 1 (“I haven't been doing this at all”) to 4 (“I've been doing this a lot”) (Carver, 1997). In the current sample, $\alpha = 0.72$ for the avoidant coping subscale and $\alpha = 0.83$ for the approach coping subscale.

Medical Outcome Study–Social Support Survey

This 18-item survey assesses four facets of social support: emotional/informational support, tangible support, affectionate support, and positive social interaction (Sherbourne & Stewart, 1991). Participants rate how often each type

of support is available to them on a 5-point scale ranging from “all of the time” to “none of the time.” The Medical Outcome Study–Social Support Survey has demonstrated reliability and validity (Sherbourne & Stewart, 1991). In the current sample, α s ranged from 0.93 to 0.96 for each of the subscales.

Patient Health Questionnaire-9

The Patient Health Questionnaire-9 (PHQ-9) is a nine-item measure of depression (Kroenke et al., 2001). Participants rate how often they are bothered by symptoms (e.g., “feeling down, depressed, or hopeless”) on a scale of 1 “not at all” to 4 “nearly every day” ($\alpha = 0.88$ in the current sample).

Generalized Anxiety Disorder-7

The Generalized Anxiety Disorder-7 (GAD-7) is a seven-item scale in which participants rate how often they have been bothered by seven symptoms of anxiety (e.g., “Worrying too much about different things”) on a 4-point scale (Spitzer et al., 2006). Scores range from 0 to 21 and higher scores indicate higher levels of anxiety. The GAD-7 has been shown to be a reliable and valid measure of anxiety (Spitzer et al., 2006). In the current sample, $\alpha = 0.91$.

Data Analytic Method

Descriptive statistics and correlations were conducted using IBM SPSS 25.0, and inferential analyses were conducted using Amos version 25.0 (Arbuckle, 2017).

To conduct a mediation analysis, the predictor (e.g., stress), the proposed mediator (e.g., avoidant coping, approach coping, and social support) and the outcome (e.g., depression, anxiety, and loneliness) should all be related (Baron & Kenny, 1986). Thus, while controlling for personal and situational background characteristics (e.g., age, gender, income, health, time social distancing, and objective social isolation), four models were examined for each outcome: (a) stress predicting the outcome (depression, anxiety, and loneliness), (b) stress predicting the mediator (avoidant coping, approach coping, and social support), (c) the mediator predicting the outcome while controlling for the impact of stress, and (d) the full mediation model with only significant personal and situational background characteristics retained.

Bootstrapping (which is a resampling technique with replacement) is considered superior to other mediation methods (e.g., Preacher & Hayes, 2004; Zhao et al., 2010). Thus, for the mediation and moderated mediation analyses, the 95% confidence intervals for the standardized indirect effects were calculated with 5,000 bootstrapped resamples, and the magnitude of the standardized indirect effects was examined. Because bootstrapping methods require no missing data, instances of missing data were addressed with multiple imputation based on regression (Wu & Jia, 2013). For the moderated mediation analyses, each full mediation

model was then examined across three age groups: younger adults (18–39 years), middle-aged adults (40–64 years), and older adults (65–92 years). Nonoverlapping confidence intervals indicate that the indirect effects are significantly different from one another at the $p < 0.05$ level.

Goodness of fit for the full models was evaluated using the chi-square statistic, where a small, nonsignificant value indicates better model fit; however, the chi-square statistic is highly sensitive to sample size, meaning the larger the sample, the more likely it is that chi-square will be significant (Hooper et al., 2008). Thus, other measures of fit were also evaluated, including the ratio between chi-square and degrees of freedom (χ^2/df), in which values below 5.0 are acceptable (Wheaton et al., 1977), the comparative fit index, in which values above 0.95 indicate good model fit (Hu & Bentler, 1999), and the root mean square error of approximation in which values below 0.06 (Hu & Bentler, 1999) or 0.08 (MacCallum et al., 1996) are adequate. A p value of .05 was used in all analyses.

Results

Correlational analyses indicate that posttraumatic stress was highly correlated with the psychosocial outcome variables of depression, anxiety, and loneliness in the expected direction (see Table 2). Posttraumatic stress was also associated with the proposed mediators of coping style (avoidant and approach) and social support in the expected direction. Avoidant coping and social support were consistently related to the outcome variables in the expected direction, but approach coping was inconsistently and only weakly correlated to the outcomes. Interestingly, length of time social distancing (measured as number of days) was generally not related to stress or the psychosocial outcomes. Similarly, objective social isolation (e.g., having limited contact with family and friends) was related to stress in the expected direction but was not meaningfully related to anxiety or depression. Age was negatively related to posttraumatic stress, each mental health outcome, and avoidant coping such that older individuals were less stressed, had better psychosocial functioning, and were less likely to use avoidant coping behaviors.

Mediation Analyses

We investigated the mediating role of coping styles (avoidant and approach coping) and social support in the relationship between posttraumatic stress related to the COVID-19 pandemic and three separate psychosocial outcomes (i.e., depression, anxiety, and loneliness). Age, gender, income, and self-rated health were included as personal background characteristics, and length of time social distancing and objective social isolation were included as situational background characteristics (Lazarus & Folkman, 1984), but only significant covariances were retained for the mediation analyses. Results of

Table 2. Zero-Order Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1											
2. Gender	-0.14**	1										
3. Health	0.06*	-0.00	1									
4. Annual household income	0.05	-0.08**	-0.22**	1								
5. Social distancing time	-0.12**	-0.03	0.09**	-0.07*	1							
6. Objective social isolation	0.05	-0.12**	0.09**	-0.03	0.03	1						
7. Posttraumatic stress	-0.26**	0.15**	0.15**	-0.07**	-0.00	-0.11**	1					
8. Avoidant coping	-0.28**	0.13**	0.14**	-0.09**	0.01	-0.07*	0.57**	1				
9. Approach coping	-0.02	0.11**	-0.14**	0.11**	-0.02	-0.25**	0.16**	0.14**	1			
10. Social support	-0.06*	0.03	-0.27**	0.32**	-0.03	-0.22**	-0.11**	-0.18**	0.34**	1		
11. Depression	-0.34**	0.13**	0.34**	-0.17**	0.09**	0.07*	0.59**	0.60**	-0.09**	-0.32**	1	
12. Anxiety	-0.35**	0.12**	0.24**	-0.08**	0.02	-0.02	0.69**	0.58**	0.02	-0.19**	0.75**	1
13. Loneliness	-0.22**	0.07*	0.26**	-0.25**	0.07*	0.13**	0.34**	0.37**	-0.12**	-0.52**	0.50**	0.39**

Notes: * $p < .05$. ** $p < .01$.

the mediation analyses are presented in Tables 3 and 4 (see Supplementary Materials for correlations between covariates and study variables). In general, inspection of the 95% bootstrap bias-corrected (i.e., correcting for bias in the bootstrap distribution) confidence intervals of the indirect effect provide evidence of mediation by each of the proposed mediators for all three psychosocial outcomes. However, when examining the magnitude of each standardized indirect effect, results suggest that avoidant coping had the largest indirect effect

between stress and the three psychosocial outcomes, with standardized indirect effects ranging from 0.15 to 0.22. The indirect effect of avoidant coping was largest for the model with depression, suggesting that the relationship between posttraumatic stress related to the COVID-19 pandemic and depression can be partially explained by avoidant coping behavior. For each outcome, the magnitude of the indirect effects for approach coping and social support were close to zero, ranging from -0.01 to -0.03 and 0.01 to 0.05 , respectively.

Table 3. Unstandardized (B) and Standardized (β) Path Coefficients and Model Fit for Models 1–4 for Each Mediator and Psychosocial Outcome

Model	B	SE	β	χ^2	df	χ^2/df	CFI	RMSEA
Avoidant coping as mediator								
M1: Stress \rightarrow depression	5.30	0.20	0.60					
M2: Stress \rightarrow avoidant coping	0.36	0.01	0.57					
M3: Avoidant coping \rightarrow depression controlling for stress	5.44	0.28	0.42					
M4: Full mediation: Stress \rightarrow avoidant coping \rightarrow depression	3.35	0.22	0.38	141.79	15	9.45	0.93	0.08
M1: Stress \rightarrow anxiety	5.44	0.16	0.69					
M2: Stress \rightarrow avoidant coping	0.36	0.01	0.57					
M3: Avoidant coping \rightarrow anxiety controlling for stress	3.35	0.24	0.29					
M4: Full mediation: Stress \rightarrow avoidant coping \rightarrow anxiety	4.20	0.18	0.53	141.76	16	8.86	0.94	0.08
M1: Stress \rightarrow loneliness	0.95	0.07	0.34					
M2: Stress \rightarrow avoidant coping	0.36	0.01	0.57					
M3: Avoidant coping \rightarrow loneliness controlling for stress	1.19	0.11	0.27					
M4: Full mediation: Stress \rightarrow avoidant coping \rightarrow loneliness	0.52	0.09	0.18	140.51	15	9.37	0.90	0.08
Approach coping as mediator								
M1: Stress \rightarrow depression	5.30	0.20	0.59					
M2: Stress \rightarrow approach coping	0.14	0.02	0.16					
M3: Approach coping \rightarrow depression controlling for stress	5.53	0.19	-0.17					
M4: Full mediation: Stress \rightarrow approach coping \rightarrow depression	5.55	0.19	0.62	143.80	13	11.06	0.90	0.09
M1: Stress \rightarrow anxiety	5.44	0.16	0.69					
M2: Stress \rightarrow approach coping	0.13	0.02	0.15					
M3: Approach coping \rightarrow anxiety controlling for stress	-0.81	0.18	-0.09					
M4: Full mediation: Stress \rightarrow approach coping \rightarrow anxiety	5.52	0.16	0.70	145.40	15	9.69	0.91	0.08
M1: Stress \rightarrow loneliness	0.95	0.07	0.34					
M2: Stress \rightarrow approach coping	0.14	0.02	0.10					
M3: Approach coping \rightarrow loneliness controlling for stress	-0.56	0.08	-0.17					
M4: Full mediation: Stress \rightarrow approach coping \rightarrow loneliness	1.02	0.07	0.36	141.79	13	10.91	0.84	0.09
Social support as mediator								
M1: Stress \rightarrow depression	5.34	0.20	0.60					
M2: Stress \rightarrow social support	-0.16	0.04	-0.11					
M3: Social support \rightarrow depression controlling for stress	-1.41	0.13	-0.24					
M4: Full mediation: Stress \rightarrow social support \rightarrow depression	5.09	0.19	0.57	141.46	14	10.10	0.92	0.08
M1: Stress \rightarrow anxiety	5.44	0.16	0.69					
M2: Stress \rightarrow social support	-0.16	0.04	-0.11					
M3: Social support \rightarrow anxiety controlling for stress	5.36	0.16	-0.10					
M4: Full mediation: Stress \rightarrow social support \rightarrow anxiety	5.35	0.16	0.68	142.89	14	10.21	0.92	0.08
M1: Stress \rightarrow loneliness	0.95	0.07	0.34					
M2: Stress \rightarrow social support	-0.16	0.04	-0.11					
M3: Social support \rightarrow loneliness controlling for stress	-0.89	0.04	-0.48					
M4: Full mediation: Stress \rightarrow social support \rightarrow loneliness	0.81	0.06	0.29	140.86	13	10.84	0.90	0.09

Notes: All path coefficients were significant at the $p < .001$ level, and all χ^2 statistics were significant at the $p < .001$ level. CFI = comparative fit index; df = degrees of freedom; RMSEA = root mean square error of approximation; SE = standard error.

Table 4. Standardized Results of Mediation Analyses With 5,000 Bootstrapped Resamples With Coping Styles and Social Support as the Mediators Between Stress and Psychosocial Outcomes

Model	Direct effect	SE	Indirect effect	SE	95% bootstrap bias-corrected CI for indirect effect	
					Lower limit	Upper limit
Avoidant coping as mediator						
Stress → depression	0.38	0.03	0.22	0.02	0.18	0.26
Stress → anxiety	0.53	0.03	0.16	0.02	0.12	0.19
Stress → loneliness	0.18	0.03	0.15	0.02	0.11	0.19
Approach coping as mediator						
Stress → depression	0.62	0.02	-0.03	0.01	-0.04	-0.02
Stress → anxiety	0.70	0.02	-0.01	0.004	-0.02	-0.01
Stress → loneliness	0.36	0.03	-0.03	0.01	-0.04	-0.02
Social support as mediator						
Stress → depression	0.57	0.02	0.02	0.01	0.01	0.04
Stress → anxiety	0.68	0.02	0.01	0.004	0.004	0.02
Stress → loneliness	0.29	0.02	0.05	0.01	0.02	0.07

Notes: CI = confidence interval; SE = standard error. All direct and indirect effects were significant at the $p < .001$ level.

Moderated Mediation Analyses

To examine whether the mediational relationships varied across age, we conducted mediation analyses across three age groups (18–39 years, 40–64 years, and 65–92 years), and examined the 95% bootstrap bias-corrected confidence intervals of the indirect effects. Inspection of confidence intervals and the magnitude of the indirect effects across age showed that age affects the magnitude of avoidant coping as a mediator in the relationship between posttraumatic stress and depression such that avoidant coping more strongly mediates this relationship among 18- to 39-year-olds (indirect effect = 0.26, $p < .05$) compared to 65- to 92-year-olds (indirect effect = 0.11, $p < .05$). Additionally, approach coping may be a stronger mediator in the relationship between stress and loneliness in younger adults (indirect effect = -0.07, $p < .05$) compared to older adults (indirect effect = -0.01, $p > .05$). However, the magnitude of this indirect effect is close to zero. Complete moderated mediation analyses are presented in Table 5.

Discussion

Research has begun to highlight the negative impacts of the COVID-19 pandemic on mental health outcomes (e.g., Banerjee & Rai, 2020). The current study provides additional insight into the influence of pandemic-related stressors on psychosocial functioning and examines differences in these outcomes across age, coping style, and social support. The first goal of this study was to examine the relationships between pandemic-related stress and depression, anxiety, and loneliness. Consistent with research on social support (e.g., Cornwell & Waite, 2009; Hsu & Tung, 2010; Nemeroff et al., 2010) and coping (e.g., Biggs et al., 2017; Lazarus & Folkman, 1984), results indicated

that avoidant coping was associated with increased depression, anxiety, and loneliness, while social support was associated with better psychosocial outcomes in these domains. This suggests that interventions aimed at increasing positive coping behaviors and maintaining social support despite physical distancing barriers may help support psychosocial well-being during the COVID-19 pandemic.

The second goal of this study was to assess coping style and social support as mediating factors in the relationship between COVID-19 pandemic-related stress and psychosocial outcomes. Our results show that avoidant coping mediated the relationship between stress and psychosocial outcomes, particularly depression. This finding is consistent with the stress and coping framework (Lazarus & Folkman, 1984), which suggests that dysfunctional coping is one mechanism that can explain the association between stress and psychosocial well-being (Ben-Zur, 2009; Biggs et al., 2017).

Our final goal was to investigate whether these relationships vary across age. Results showed that avoidant coping more strongly mediates the relationship between posttraumatic stress and depression in younger adults (aged 18–39) as compared to older adults (aged 65–92). Although unexpected, this finding is consistent with other work examining age differences in pandemic-related distress (e.g., Losada-Baltar et al., 2020) and supports the notion that age-related differences in resilience and stress reactivity may contribute to these differential findings (e.g., Lind et al., 2020). Correlational analyses showed that age was related to lower levels of stress and fewer psychosocial problems, further highlighting the potential of increased resilience in older adults during the COVID-19 pandemic to be a protective factor against poor mental health outcomes. Several potential explanations for older adults' resilience have been suggested, such as increased self-reflection, drawing on previous lived experiences, use of memories

Table 5. Standardized Indirect Effects of Moderated Mediation Analyses With 5,000 Bootstrapped Resamples With Coping Styles and Social Support as the Mediators Between Stress and Psychosocial Outcomes

Model	Indirect effect				SE	95% bootstrap bias-corrected CI for indirect effect			
	18–39 years	40–64 years	65–92 years	18–39 years		40–64 years	65–92 years	18–39 years	40–64 years
Avoidant coping as mediator									
Stress → depression	0.26*	0.21*	0.11*	0.04	0.03	0.03	0.20 to 0.34 ^a	0.15 to 0.26	0.06 to 0.16 ^a
Stress → anxiety	0.18*	0.13*	0.09*	0.04	0.03	0.02	0.11 to 0.26	0.08 to 0.18	0.05 to 0.14
Stress → loneliness	0.20*	0.10*	0.14*	0.04	0.03	0.03	0.13 to 0.27	0.05 to 0.15	0.09 to 0.21
Approach coping as mediator									
Stress → depression	-0.07*	-0.03*	-0.01	0.02	0.01	0.01	-0.11 to -0.03	-0.05 to -0.01	-0.03 to 0.002
Stress → anxiety	-0.01	-0.02*	-0.004	0.01	0.01	0.01	-0.04 to 0.01	-0.04 to -0.01	-0.02 to 0.002
Stress → loneliness	-0.07*	-0.02*	-0.01	0.02	0.01	0.01	-0.11 to -0.04 ^a	-0.04 to -0.01	-0.03 to 0.002 ^a
Social support as mediator									
Stress → depression	0.02	0.03*	0.03*	0.01	0.01	0.01	-0.01 to 0.05	0.01 to 0.06	0.01 to 0.06
Stress → anxiety	0.01	0.02*	0.01*	0.01	0.01	0.01	-0.001 to 0.02	0.01 to 0.04	0.00 to 0.03
Stress → loneliness	0.04	0.05*	0.07*	0.03	0.02	0.03	-0.01 to 0.10	0.01 to 0.09	0.02 to 0.12

Notes: CI = confidence interval; SE = standard error.
^aNonoverlapping confidence intervals.
 **p* < .05.

of past challenges to direct current behavior, and increased focus on generativity in old age (Lind et al., 2020).

Other work has similarly shown that younger adults report lower levels of well-being (e.g., low positive affect, high negative affect and perceived stress; Klaiber et al., 2020) in response to the COVID-19 pandemic. This may be due to changes in educational opportunities (e.g., colleges shifting to online learning), diminishing job prospects, and increased financial instability due to the pandemic’s widespread economic impact that may disproportionately negatively affect younger adults. Thus, these age-related differences indicating that avoidant coping more strongly mediates the relationship between posttraumatic stress and depression in younger adults than in older adults may be due both to older adults’ resilience and the negative impacts of the COVID-19 pandemic on factors directly affecting young adults.

Limitations of this study include a lack of data collected prior to the emergence of COVID-19, which does not allow for the assessment of changes in psychosocial functioning. Relatedly, due to the cross-sectional nature of the data, we cannot infer causality in any of the relationships examined. Data were collected between April 1, 2020 and May 17, 2020; while the majority of states had imposed some level of stay-at-home order during this time, several states began reopening during this time which may have influenced study variables, such as time spent social distancing or loneliness. Additionally, the sample comprised mostly White participants and, thus, it is unclear whether the current findings generalize to more diverse samples. Despite racial/ethnic minorities reporting greater stress exposure compared to Whites, prior work has shown that individuals of Black and Latinx groups report lower stress appraisals and comparable or even better mental health compared to Whites (Brown et al., 2020; Gallo et al., 2009; Mezuk et al., 2013). Thus, future research should examine cross-cultural differences in stress appraisals and coping mechanisms in the context of the pandemic using racially and ethnically diverse samples to better elucidate the differential relationships between pandemic-related stress and mental health. Another limitation was the differing time frames included in the measures. For instance, the Impact of Event Scale—Revised (Weiss & Marmar, 1997) asked participants to rate their feelings from the past week while the PHQ-9 (Kroenke et al., 2001) and GAD-7 (Spitzer et al., 2006) measures asked participants to rate their feelings from the past 2 weeks. The time frames do not coincide across measures because we elected to preserve the phrasing of the validated measures.

Implications

Despite limitations, this study provides novel insight into the relationships between COVID-19 pandemic-related stress, social support, coping, and psychosocial outcomes, as well as highlighting age differences in these relationships. Our findings suggest that interventions aimed at decreasing the use

of maladaptive (i.e., avoidant) coping behaviors, increasing positive (i.e., approach) coping behaviors, and maintaining social support despite physical distancing barriers may help support psychosocial well-being during the COVID-19 pandemic. Despite increased physical vulnerability to COVID-19, older adults in our sample showed better psychosocial outcomes. Prior to the COVID-19 outbreak, older adults were considered to be at-risk for social isolation as they were more likely to live alone and have smaller social networks (Holt-Lunstad, 2017); however, our results add to the body of literature highlighting the resilience of older adults.

As the body of research on the implications of the COVID-19 pandemic continues to develop, future studies may consider examining the psychosocial consequences of pandemic-related stress and identifying risk and protective factors. Future studies should consider the complex role of social support in the context of pandemic-related stress by examining the potential buffering impact of social support (Cohen & Wills, 1985) and the impact of different types of social support (e.g., tangible support, positive interactions, etc.; Sherbourne & Stewart, 1991) on mental health. In conclusion, the current study and future studies will help elucidate the complex relationship between COVID-19 pandemic-related stress and psychosocial consequences across age.

Supplementary Material

Supplementary data are available at *The Gerontologist* online.

Funding

F. Falzarano acknowledges support from a National Institute on Aging-funded T32 training program grant (AG049666).

Conflict of Interest

None declared.

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