A longitudinal examination of the protective effect of resilience against anxiety among older adults with high COVID-related worry

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Abstract

This longitudinal study of community dwelling older adults (N = 453) examined consequences of COVID-related worries on changes in anxiety symptoms before relative to during the pandemic. We further evaluated if pre-COVID psychological resilience (PR) buffered the impact of COVID-related worry. Pre-COVID data were collected in September 2018. COVID-related worry and COVID anxiety symptoms were collected in October 2020 (Wave 2). Controlling for pre-COVID anxiety symptoms, we examined if COVID-related worries (e.g., I'm worried that I might die from COVID-19) were associated with increased anxiety symptoms, and whether pre-COVID PR moderated the association between COVID-related worries and prospective increases in anxiety symptoms. COVID-related worries were associated with increased anxiety symptoms ($\beta = 0.005$, $p < .01$), whereas pre-COVID PR was associated with a decrease in anxiety symptoms ($\beta = -0.029$, $p < .05$). PR moderated the association; COVID-related worries were associated with greater increases in anxiety symptoms among those with low pre-COVID PR (Model $\eta^2 = 0.35$). Thus, the extent to which COVID-related worries influenced psychological health was dependent on pre-COVID levels of PR. We conclude the combined vulnerabilities of low pre-COVID PR and high COVID-related worries significantly increased the psychological consequences of COVID-19 for our sample of older adults.

Keywords

COVID-19; anxiety; worry; resilience; older adults

Introduction

The COVID-19 pandemic has been an unprecedented stressor necessitating significant changes to daily life and has presented particular difficulties for older adults (Tyler et al., 2021). Cross-sectional studies conducted during the early stages of the pandemic showed that COVID-related worries were associated with elevations in anxiety symptoms (Gamonal et al., 2020). In fact, a meta-analysis (Schafer et al., 2022) showed not only significant increases in anxiety, but also in depression, and eating pathology symptoms in association with the COVID-19 pandemic regardless of age, race, or region of origin. However, given that COVID-19 mortality rates have remained highest among older adults (e.g., 78% of U.S COVID-19 deaths occurred at 65+ during the first 4 months of the pandemic; CDC, 2021), it is not surprising that concerns about issues like contracting and spreading COVID-19 have been a particular worry among older adults (Jean Francois et al., 2022; Niño et al., 2021).

Unmanaged worry may lead to repetitive negative thought processes about COVID (e.g., I worry a great deal that I may die as a result of COVID-19), and such negative thought processes regarding COVID-19 have been found to be strongly associated with psychological distress (Kang & Kim, 2021). Worry and inability to control worry are primary symptoms of generalized anxiety disorder (APA, 2013), one of the most prevalent mental health problems older adults face (Canuto et al., 2018; Curran et al., 2020). Identifying ways to reduce anxiety responses to stressors has important implications for mental health in later life because persistent anxiety can lead to a variety of significant health consequences that accumulate over time. For instance, anxiety is linked to poor self-reported health (El-Gabalawy et al., 2011), higher rates of disability and diminished well-being (de Beurs et al., 1999), as well as dysfunctional social behaviors and higher levels of loneliness (Losada et al., 2015; Yochim et al., 2013). Karim and colleagues (2021) have even shown that older adults with persistent anxiety have lower gray matter brain volume—a marker of accelerated aging. Consequently, identifying factors that make some older people more or less vulnerable to increases in anxiety symptoms following major stressors like the COVID-19 pandemic has important clinical implications, potentially informing the design of interventions that can more effectively promote long-term health and wellbeing in this population (Steinman et al., 2020).

Initial studies found that having a history of anxiety and reporting higher levels of 'COVID stress' (see Taylor et al., 2020), was associated with an increased risk of developing anxiety and mood-related disorders during the pandemic (Asmundson et al., 2022). However, most of the COVID-related research to date is based on cross-sectional data that only assesses post-COVID levels of anxiety without consideration of pre-pandemic characteristics that may have played a role in shaping these outcomes. The current study addresses critical gaps in COVID-19 research evaluating mental health consequences experienced by older people (Krendl & Perry, 2021). We used a community-based longitudinal study of adults 60+ to

evaluate the specific role of COVID-related worries on changes in anxiety six months into the pandemic relative to two years prior. Further, we consider how differences in pre-COVID coping resources, specifically psychological resilience (PR), influenced these associations.

Factors Shaping Responses to COVID-19 Among Older Adults

Despite universal elevations in problematic psychological symptoms and behaviors associated with the COVID-19 pandemic (Schafer et al., 2022), the effects of the pandemic on wellbeing may have influenced older people in different ways than adults of younger ages (Parlapani et al., 2021). On the one hand, some research demonstrated that, on average, older adults reported fewer and less significant emotional problems related to the pandemic than younger adults (Fields et al., 2022; Gamonal Limcaoco et al., 2020; García-Portilla et al., 2021; Parlapani et al., 2021; Vahia et al., 2020; Wilson et al., 2021). However, other research showed that adverse psychological consequences of the pandemic appeared to be relatively common for older people (Gosselin et al., 2022; Zaninotto et al., 2022), and that more than two in three older adults perceived an increase in anxiety symptoms after the start of the pandemic (Gosselin et al., 2022). In a longitudinal cohort study of older adults living in England, mental health and well-being was found to worsen as the COVID-19 pandemic progressed (Zaninotto et al., 2022).

One reason for differences in research findings related to the psychological consequences of the pandemic for older adults relative to younger adults may relate to the fact that older people experienced different kinds of life consequences associated with the pandemic. Younger adults were more likely to experience problems less specific to the COVID-19 virus itself, such as consequences related to social distancing requirements leading to job loss (Crayne, 2020; Montenovo et al., 2022). Although many older people also experienced increased social isolation and certain financial setbacks, the pandemic's disproportionate risks to older adults' own health and the health of their loved ones manifested in greater COVID-specific worries for older people (Fields et al., 2022).

Another reason that research may show different psychological consequences of the pandemic for older people could be related to differences in emotional processing of stressors as people age. Socio-emotional selectivity theory (SST) argues that older adults have more effective emotion regulation responses to negative stressors than their younger counterparts. Relative to younger people, older adults tend to prioritize positive emotional stimuli and experiences over negative ones, which is referred to as the *"positivity effect,"* a key feature of normal, healthy aging (Mather & Carstensen, 2005). SST researchers showed that during the first few months of the pandemic, older adults maintained higher levels of emotional wellbeing than younger people, which they argued was likely a consequence of their strategic avoidance of stressors imposed by the pandemic (Carstensen et al., 2020). In addition to strategic avoidance of situations that lead to negative emotional experiences (Charles, 2010), older people compared with younger adults also selectively allocate cognitive resources in strategic ways to support their emotional wellbeing (Sasse et al., 2014).

Even though older adults tend to manage negative stressors more successfully as they age, part of effective emotional processing involves identifying stressors that pose a threat to

well-being and recognizing ways to potentially mitigate the threat. This may explain why some research found that older people, compared to their younger counterparts, experienced higher levels of worry related to the health consequences of COVID (Fields et al., 2022; Pearman Hughes Coblenz et al., 2021). Given the disproportionate impact of the pandemic on the health of older people, these increases in worry were warranted and may have been beneficial (Kang & Kim, 2021; Notebaert et al., 2014).

Psychological Resilience and COVID-Related Worry Among Older Adults

Acknowledging the risks of the pandemic could lead to an initial increase in anxiety, but may also ultimately lead individuals to engage in beneficial behaviors and reframe COVID-related worries in ways that provide them with a sense of agency over the challenges imposed by the pandemic. For instance, engaging in proactive coping skills, whereby individuals develop specific goals and strategies for achieving them when faced with particular stressors, was associated with less COVID-19 stress among older adults (Pearman, Hughes, Smith et al., 2021). That is, worry can lead to positive outcomes by motivating the individual to initiate adaptive behaviors (Notebaert et al., 2014), such as social distancing, wearing masks, and other such behaviors that would lessen the probability of contracting and spreading COVID-19.

Researchers argue that individuals with high levels of PR tend to bounce back from major stressors because they have particular characteristics that help them avoid long-term physical and psychological health consequences (Fredrickson, 2001). In this study, we conceive of PR as a personal coping resource that has been shown in other longitudinal research to attenuate negative effects of stressors among older people and serve as a protective resource over long periods of time, shaping trajectories of health and wellbeing (Manning et al., 2016; Taylor & Carr, 2021). There are many definitions of PR. However, most conceptualizations acknowledge that resilient individuals have characteristics that make them more likely to use adaptive coping strategies that are important for responding to worries and major stressors (Verhage et al., 2021). Whereas, chronic worry is a maladaptive coping process, the use of 'cognitive reframing' is a technique used in cognitive behavioral therapy (CBT) that promotes resilient psychological outcomes by helping individuals identify negative thoughts and replace them with more balanced thoughts and adaptive behaviors (Clark, 2013).

Individuals identified as being highly resilient are more likely to maintain better overall daily functioning (Tugade & Fredrickson, 2007). Those who have high PR scores have been shown to be able to handle stressors more readily when they arise (e.g., King et al., 2018; Pearman, Hughes, Smith, et al., 2021). Several cross-sectional studies conducted during the pandemic have found that individuals with higher levels of PR, compared to those with lower PR, reported lower perceived overall stress (Ferreira et al., 2020), as well as lower COVID-related worry, depression, and anxiety (Pearman, Hughes, Smith et al., 2020). In a cross-sectional COVID-19 study of adults of all ages, researchers found that PR moderated the association between stress exposure and anxiety symptoms (Havnen et al., 2020). Further, our own research on older adults showed that pre-COVID resiliency was associated with lower COVID-related worry (Jean Francois et al., 2022).

Another way that older adults strategically leverage more positive emotional responses relates to engagement in social relationships. Social functioning is integral to good psychological and physical health functioning among older adults and has been shown to be strongly associated with use of effective emotion regulation strategies among older adults (Wang et al., 2018). During the pandemic, there was concern that mitigation efforts (e.g., social distancing) may have had a particularly negative impact on older adults – in part because older adults' social networks tend to be smaller than younger adults' networks (English & Carstensen, 2014). Indeed, one study of older adults during COVID-19 found that face-to-face social networks moderated the negative impact of the COVID-19 pandemic on important aspects of mental health (Litwin & Levinsky, 2022). It is not surprising then, that even though social distancing may have been an important and adaptive response to managing COVID-related risks and worries, it did lead to negative mental health consequences for some older people (Carr et al., 2021). On the other hand, the social distancing consequences of COVID-19 may have been less consequential to the psychological wellbeing of those who had strong, established social relationships with friends and family prior to the start of the pandemic knowing they had people they could lean on if something happened to their health.

The Current Study

In this paper, we explore changes in anxiety symptoms in association with the onset of the pandemic. Specifically, relative to pre-pandemic anxiety (collected in September 2018), and controlling for important pre-pandemic factors including social support, we evaluate whether six months into the pandemic, COVID-related worries are associated with increases in anxiety symptoms. Further, we examine if pre-pandemic levels of PR moderate the association between COVID-related worries and changes in anxiety symptoms. We hypothesize that after controlling for pre-pandemic baseline anxiety and the other covariates:

H_1) COVID-related worries will be associated with increased anxiety at follow-up;

H_2) baseline PR will be associated with a significant decrease in anxiety at follow-up; and

H_3) baseline PR will buffer the negative effects of COVID-related worries on anxiety at follow-up

Method

We conducted a longitudinal study of community adults age 60+ in a medium sized city in Southern United States. Our sample was drawn from a volunteer participant registry. We emailed registry members (~2,300) to request participation in the baseline survey administered using Qualtrics in September 2018. A total of 906 individuals completed all questions in the baseline survey. In October 2020 (Wave 2), we resurveyed these individuals. The current study is based on questions drawn from both baseline and Wave 2, in which a total of 483 participants (53% of baseline) completed both surveys. Upon completing the surveys, participants were invited to be included in a raffle for $100. Five individuals were selected from the raffle for the baseline survey and one person was selected at Wave

2. Approval to conduct this study was obtained from the University's Institutional Review Board (STUDY00001298).

Measures

Outcome measure—*Anxiety Symptoms* were measured using a five-item version of the Beck Anxiety Inventory (BAI; Beck et al., 1988), consistent with previous longitudinal studies (i.e., Health and Retirement Study, HRS; Juster & Suzman, 1995). Individuals were asked how often during the past week they experienced each of the items (e.g., "I had fear of the worst happening") using a scale from 1 (never) to 4 (most of the time). Responses were averaged across items for a possible score range of 1 to 4 (baseline α = 0.72; Wave 2 α = .67).

Primary independent variables.—*COVID-related worry* was assessed at Wave 2 using a scale measuring the degree to which participants worried about each of 15 items on the COVID-19 worry scale (e.g., "I worry that I am going to contract COVID-19"; "I worry that I am going to become seriously ill due to COVID-19."). Respondents were asked to rate the severity of their worry using a 7-point Likert-type scale ranging from 1 (not at all) to 7 (a great deal). See Appendix A (α = 0.91)[1].

PR was measured at baseline using the Simplified Resilience Score (SRS; Manning et al., 2016) whereby respondents indicate how strongly they agree/disagree with 12 statements (e.g., "I feel it is impossible for me to reach the goals that I would like to strive for (reverse coded)"; "So far, I have gotten the important things I want in life"). Each item was standardized to range between 0 and 1 and summed (baseline α = .87). See Appendix B.

Control measures.—We controlled for demographic factors, social measures, and health status. Control measures were drawn from baseline unless specified. **Race** was measured dichotomously as non-White/Hispanic or non-Hispanic White. **Educational attainment** was measured continuously as follows: high school or less (1), some college (2), Bachelor's Degree (3), Master's Degree (4), Doctoral Degree (5). **Age** was measured in years. **Marital status** was based on whether individuals indicated being married or in a long-term partnership or not married at Wave 2.

We measured **social relationship quality** at baseline. This measure was drawn from the HRS Survey (Juster & Suzman, 1995). Each domain (i.e., friends, children, other family member) of social support was evaluated based on four questions assessing how respondents felt about their network members (e.g., "How much do they really understand the way you feel about things?"). Participants responded on a 4-point Likert-type scale ranging from 1 (not at all) to 4 (a lot). The alpha scores ranged from 0.88 to 0.92. For respondents who were missing more than one item, their score was coded as missing. Those without children or who did not identify at least one other family member in their social network, were assigned a "0" value for that social support measure. Finally, at Wave 2 we measured the **Social Impact of COVID-19** based on the question: "How much is the COVID-19 outbreak

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[1]As described in Francois et al. (2022), this scale included additional items that were not included in the current study assessing how each worry/concern influenced the participant's functioning.

impacting your sense of social connection?" Responses used a 5-point Likert-type scale ranging from 0 (not at all) to 4 (very much). **Self-rated health** was evaluated at Wave 2 based on the question: "Would you say your health is excellent, very good, good, fair, or poor?"

Analytic approach—To address our study hypotheses, we used ordinary least squares (OLS) regression models. First, we examined the direct effects of PR and COVID-related worry on anxiety at Wave 2, controlling for baseline anxiety. Then, we examined the moderating effect of baseline PR on the association between COVID-related worry and anxiety at Wave 2. To further evaluate our results, we calculated marginal effects of the significant interaction to provide estimates of the effect of COVID-related worry on changes in anxiety for those with high versus low levels of psychological resilience.

Results

Our sample was 65% female, with an average age of 69.38 (SD = 6.0), and thus the majority of participants are considered to be in the young-old category (e.g., 65 to 74 years; Ortman et al., 2014). The majority of participants identified as White, non-Hispanic (79%) and more than half (61%) were married. See Table 1 for sample characteristics. Participants' highest concerns included: "I worry that if I contract COVID-19, I will give it to other people," "I am worried my friends or family members may become seriously ill as a result of COVID-19," "I worry that I will come into contact with someone that has COVID-19".

See Table 2 for complete OLS regression results. Regarding covariates, Model 1 shows that being married was associated with decreased anxiety. Reporting that COVID-19 negatively impacted social connections was associated with increased anxiety. Finally, better health at Wave 2 was associated with decreased anxiety.

Regarding the primary predictors, Model 1 shows that, net of all other factors, greater COVID-related worry was significantly related to increased anxiety ($\beta = 0.005(.002)$, $p < 0.01$). Additionally, greater PR at baseline predicted lower anxiety at Wave 2 ($\beta = .029(.014)$, $p < 0.001$).

Model 2 showed that the interaction between PR and COVID-related worry was significantly related to Wave 2 anxiety ($\beta = -.001(001)$, $p < 0.05$; Model $\eta^2 = 0.35$). To further evaluate the interaction, we calculated marginal effect values for those with low PR (one standard deviation below the mean) and those with high PR (one standard deviation above the mean). Figure 1 shows that those with low PR experienced a significant increase in anxiety in association with COVID-related worry ($p < 0.001$). Conversely, those with high PR experienced only a small, non-significant increase in anxiety even if they also experienced high levels of COVID-related worry. These results show that PR attenuates the association between COVID-related worry and increases in anxiety symptoms six months into the COVID-19 pandemic.

Discussion

This longitudinal study of community dwelling older adults examined the consequences of COVID-related worries on increased anxiety symptoms in association with the onset of the pandemic. We also evaluated the extent to which pre-pandemic levels of PR moderated the association between COVID-related worry and changes in anxiety symptoms. This study is one of the first to evaluate anxiety-related effects of the COVID-19 pandemic among older adults using longitudinal data collected prior to and during the first year of the pandemic.

In support of our study hypotheses, we found COVID-related worries were significantly associated with *increased* anxiety, while baseline PR was significantly associated with *decreased* anxiety among older adults in our study. Further, we found that PR moderated the association between COVID-related worries and increased anxiety symptoms. That is, those with low PR showed significant increases in anxiety associated with COVID-related worries, but those with high PR did not. These findings suggest the relationship between COVID-related worries and anxiety is dependent on pre-pandemic levels of PR. Those at greatest risk experienced the combined vulnerabilities of low PR and high COVID-related worries, which contributed to significant increases in anxiety.

In addition to our primary findings, we observed that social support is related to anxiety. As would be expected, married (or partnered) older adults reported less anxiety at follow-up than non-married older adults. However, pre-pandemic levels of social support quality among friends, children, and other family, was not related to anxiety. This unexpected finding may be because social relationships may have changed over the two-years leading up to the pandemic. Alternatively, the social consequences of the pandemic (i.e., loss of social engagement imposed by the pandemic) were associated with increased levels of anxiety. This suggests that having high quality social relationships alone may be insufficient to off-set the consequences of social isolation, or the consequences of the pandemic may have led some older people to determine that their relationships were not as strong as they originally thought. Interventions to address the social isolation among older adults imposed by the pandemic may involve promoting cultivation of meaningful social interactions with others, even if social distancing is still necessary.

The importance of PR in mitigating the negative impact of worry on the psychological health of older adults is critical. Baseline PR was directly associated with lower anxiety six months into the pandemic. In addition, PR moderated the association between COVID-related worries and anxiety. Our results build upon prior studies that found PR to mitigate negative outcomes related to the COVID-19 pandemic (Grossman et al., 2021; Vannini et al., 2021).

Although it is not possible to directly evaluate the adaptive strategies those with high levels of PR used to manage their anxiety symptoms, we hypothesize that those with high PR are the ones most likely to leverage the adaptive behaviors and emotional processing described by socio-emotional selectivity theory. There are several components comprising PR that may enhance ability to navigate worries associated with the pandemic. PR encompasses emotional regulation strategies and pro-active coping styles that mitigate consequences of

difficult situations (King et al., 2018; Manning et al., 2016).Those with high PR may be those most likely to identify behaviors and solutions to the problems imposed by the pandemic. This could allow them not only to develop a realistic understanding of their own health risks or risks for others around them, but also strategically avoid situations or circumstances that may be anxiety provoking or even identify activities that promote more positive emotional experiences overall. In another COVID-19 study of older adults, higher PR was associated with greater use of adaptive coping behaviors whereas the use of maladaptive coping strategies was associated with increased stress during the pandemic (Vannini et al., 2021). In a study conducted in Italy during COVID-19, adaptive strategies of emotion regulation (e.g., acceptance of emotional experiences, positive and cognitive reframing) were linked to low levels of worry, while maladaptive strategies were positively related to high worry (Sebri et al., 2021). Thus, the positive coping strategies associated with PR may explain how PR buffers the negative effects of pandemic-related worry on anxiety symptoms in older individuals.

The Strength and Vulnerability Integration (SAVI) theory (Charles, 2010) posits that coping skills and psychological resources such as PR improve over the life course. This may be why older adults tend to have lower levels of negative affect compared to younger adults (Charles & Carstensen, 2010). However, these psychological resources are more likely to dissipate if prolonged stressors occur in late life (Roy et al., 2018). In this regard, the pandemic has been an inescapable source of worry and stress for many people. As the SAVI model posits, such chronic stress may deplete psychological resources. Individuals with low PR before the pandemic may be most vulnerable to negative impacts of COVID-related worries. Indeed, we found those with low baseline PR experienced significant increases in anxiety associated with greater COVID-related worries during the pandemic. Conversely, we found those with high levels of baseline PR experienced only small non-significant increases in anxiety associated with COVID-related worries. The impact of COVID-19 and associated worries, stress, and anxiety may have long term negative trajectories that are yet unknown due to its potential impact on multiple biological systems (O'Connor et al., 2021).

Initially, psychological stressors adaptively activate the stress system. When chronically or repeatedly activated however, the products of these systems can damage tissues and contribute to disease development (Heffner, 2011). For older adults, this activation occurs in addition to naturally occurring age-related dysregulation of stress-response systems (Heffner et al., 2011). Prospective studies have shown that the magnitude of the stress response to psychologically adverse events is related to future health and psychiatric outcomes (Turner et al., 2020), and chronic stress increases risk for morbidity and mortality (Donnelly, 2021). Among older adults, stress, and especially chronic stress, may impair coping skills and accelerate biological aging (Harvanek et al., 2021; Yegorov et al., 2020). The brain regions that undergo the most rapid decline as a result of aging are the most highly vulnerable to the effects of stress hormones (Lupien et al., 2009; Lupien & Meaney, 1998). This increase in anxiety may also have long-term effects on health and quality of life. An emerging perspective suggests that anxiety disorders in older adults are associated with accelerated aging across multiple processes involved in neuroprogression (Perna et al., 2016).

Individuals identified as being highly resilient are also more likely to leverage beneficial emotion regulation strategies (Tugade & Fredrickson, 2007). The influence of cognitive control over emotional responses has been labeled emotion regulation – defined as the processes responsible for monitoring, evaluating, and modifying emotional reactions (Thompson, 1994). We argue that an individual's ability to regulate emotion may enhance resiliency in response to stressors; thus, good emotion regulation skills seem to be at the heart of resiliency. Those with good emotion regulation skills are more likely to maintain positive affective states, have high levels of interpersonal functioning, and have better overall problem-solving skills (Diamond & Aspinwall, 2003; Tugade & Fredrickson, 2007).

In thinking about the potential implications of our findings, we argue that identifying strategies to bolster PR in later life could be a key goal. As a result of the pandemic, Vinkers and colleagues (2020) advocated for development of interventions that help augment coping strategies as a pathway for elevating overall PR levels in older adults. Our results provide support to this proposed intervention. Given the toll that stress and anxiety exact on older adults, interventions that can increase PR and emotion regulation skills have potential to decrease problematic worry, incorporate positive coping strategies, and attenuate anxiety symptoms. Such interventions could have an enormously positive influence on quality of life, particularly for psychologically vulnerable older adults who may be more susceptible to the consequences of unexpected major stressors like the COVID-19 pandemic. In this way, resiliency training alongside interventions that promote development of emotion regulation strategies may lead to more effective emotional responses to everyday and unexpected major stressors (Naragon-Gainey et al., 2017). During periods of unexpected stress, interventions directly focused on increasing adaptive strategies and decreasing maladaptive strategies may lead to improved quality of life (Vinkers et al., 2020).

In working with older adults to develop resiliency-related skills, particularly for those who have higher levels of anxiety to start with, CBT interventions may be particularly helpful (Hall et al., 2016). Interventions like CBT are designed to promote skills such as re-evaluating negative thoughts (e.g., cognitive reappraisal) that may otherwise lead to sustained worry in response to emotional situations. CBT promotes skills that increase opportunities for positive emotional experiences which in turn may lead to increased resiliency in later life. Guided by Fredrickson's broaden and build theory of positive emotions (Fredrickson, 2001) and Zautra's dynamic model of affect (Zautra et al., 2005), one study found savoring positive experiences (i.e., the ability to observe and regulate positive experiences) increased psychological well-being for older adults with either high or low levels of resilience (Smith & Hollinger-Smith, 2015). An intervention that focuses on increasing emotion regulation skills by developing adaptive coping strategies in older adults is Problem Adaptation Therapy (PATH; Kiosses et al., 2010), which provides training in cognitive restructuring, emotion regulation, and problem solving (Kiosses & Alexopoulos, 2014). Another example is mindfulness-based stress reduction programs, which have been shown to effectively reduce worry and improve cognitive functioning (Lenze et al., 2014). Further research will be needed to identify the most effective strategies for increasing resilience in older adult populations.

Limitations

Several limitations should be considered. Our community sample was comprised of relatively highly educated and minimally diverse older adults (i.e., primarily non-Hispanic White individuals with higher levels of resources). It is not clear the extent to which our results would generalize to a more heterogeneous older population. Due to the low percentage of minoritized individuals, we were unable to evaluate racial and ethnic differences to determine if PR was differentially beneficial for specific racial/ethnic groups. It should be noted that some studies found the COVID-19 pandemic differentially impacted individuals by race, ethnicity, gender, and age (Babulal et al., 2021). For example, Pearman and colleagues (Pearman, Hughes, Coblenz, et al., 2021; Pearman, Hughes, Smith, etal., 2021) found older white adults displayed greater reactivity to COVID-related stress than white younger adults, but the effects of COVID-related stress were consistently detrimental for the daily anxiety of Black Americans, regardless of age. Future research should also explore whether the findings we observe vary for more minoritized populations and for populations that were more likely to experience more significant financial consequences of the pandemic (Taylor et al., 2022). Furthermore, our sample was comprised mostly of younger aged older people (65–74). Thus, our results may not hold in a sample that includes older, more frail adults.

Additionally, our COVID worry scale was developed specifically for our study at a time when there were no validated scales available. While the internal reliability in the current study was high, a rigorous evaluation of the psychometric properties of the most effective COVID-related measures should be evaluated in future research. Finally, our resiliency measure was obtained two years before the COVID-19 onset. We do not know if COVID-19 may have impacted PR scores. Initial evidence does suggest some adults did experience a decrease in resilience during COVID-19 (Taylor et al., 2022). However, more research evaluating the role of changes in resiliency in older adults could be important for informing treatment strategies during initial stages of a crisis like the COVID-19 pandemic.

Conclusion

Among older adults, COVID-related worries were associated with significant increases in anxiety. However, pre-pandemic PR mitigated the association between COVID-related worries and anxiety, demonstrating a protective effect. Thus, the extent to which COVID-related worries influence psychological health is affected by an individual's PR. Given the toll that stress and anxiety exact on older adults, interventions that increase PR, incorporate positive coping strategies, and attenuate anxiety symptoms could have an enormously positive influence on the health of older adults.

Funding

Appendix A

COVID-19 Worry Scale

Instructions: This questionnaire is designed to assess the level of worry people have about the coronavirus (COVID-19). Read each statement listed below. For each statement, we would like you to 1) rate how worried you feel and on a scale from 1–7, with 1 being *not at all*, 4 being *a moderate amount* and 7 *being a great deal.*

1	2	3	4	5	6	7
Not at all			A moderate amount			A great deal

The COVID-19 Stress measure was based on the 15 questions listed below. The measures were summed, and individuals with a missing value on one or more items were coded missing.

1. I worry that I am going to contract COVID-19

2. I worry that if I contract COVID-19, I will give it to other people.

3. I worry that I am going to become seriously ill due to COVID-19.

4. I worry that if I were to contract COVID-19, medical help would not be adequate in helping me with my symptoms.

5. I worry about my health.

6. I am worried I may die as a result of COVID-19.

7. I am worried my friends or family members may become seriously ill as a result of COVID-19.

8. If I cough, sneeze, or have a sore throat, I am worried that I have COVID-19.

9. I worry my family members may not have enough resources (access to medical care, food, cleaning supplies) to combat COVID-10.

10. If I hear others speak about symptoms on the news, media outlets, or through conversation, I find myself worrying that I may contract COVID-19.

11. I worry that I will come into contact with someone that has COVID-19.

12. I am worried that if I leave the house, I will contract COVID-19.

13. I am worried I will lose friends due to social distancing.

14. I am worried I will not be able to financially provide for myself or my family during this time.

15. I am worried I will not be able to handle being in quarantine.

Please note. The survey included an additional questionnaire that assessed the extent to which each of the above 15 concerns interfered with the participant's functioning. The interference scale was not included in the current study.

Appendix B:

Simplified Resilience Scale

Please indicate how strongly you agree or disagree with the following statements:

1.   Strongly disagree

2.   Somewhat disagree

3.   Slightly disagree

4.   Neither agree nor disagree

5.   Slightly agree

6.   Somewhat agree

7.   Strongly agree

I feel it is impossible for me to reach my desired goals

If something can go wrong for me, it will

I feel that what happens in life is often determined by factors beyond my control

I can do the things that I want to do

In most ways my life is close to ideal.

The conditions of my life are excellent.

I am satisfied with my life.

So far, I have gotten the important things I want in life.

If I could live my life again, I would change almost nothing.

The future seems hopeless to me and I can't believe that things are changing for the better

When I really want to do something, I usually find a way to succeed at it

I can do just about anything I set my mind to

I have a sense of direction and purpose in life

I often feel helpless in dealing with the problems of life.

Other people determine most of what I can and cannot do.

What happens in my life is often beyond my control.

I have little control over the things that happen to me.

There is really no way I can solve the problems I have.

References

APA. (2013). Diagnostic and statistical manual of mental disorders (5th ed.).

Asmundson GJG, Rachor G, Drakes DH, Boehme BAE, Paluszek MM, & Taylor S.(2022). How does COVID stress vary across the anxiety-related disorders? Assessing factorial invariance and changes in COVID Stress Scale scores during the pandemic. Journal of Anxiety Disorders, 87, 102554. doi:10.1016/j.janxdis.2022.102554 [PubMed: 35278802]

Babulal GM, Torres VL, Acosta D, Agüero C, Aguilar-Navarro S, Amariglio R, . . . Quiroz YT (2021). The impact of COVID-19 on the well-being and cognition of older adults living in the United States and Latin America. EClinicalMedicine, 35, 100848. doi:10.1016/j.eclinm.2021.100848 [PubMed: 33997742]

Beck AT, Epstein N, Brown G, & Steer RA (1988). An inventory for measuring clinical anxiety: psychometric properties. Journal of consulting and clinical psychology, 56(6), 893. [PubMed: 3204199]

Canuto A, Weber K, Baertschi M, Andreas S, Volkert J, Dehoust MC, . . . Härter M.(2018). Anxiety Disorders in Old Age: Psychiatric Comorbidities, Quality of Life, and Prevalence According to Age, Gender, and Country. Am J Geriatr Psychiatry, 26(2), 174–185. doi:10.1016/j.jagp.2017.08.015 [PubMed: 29031568]

Carr D, Friedmann E, Gee NR, Gilchrist C, Sachs-Ericsson N, & Koodaly L.(2021). Dog walking and the social impact of the COVID-19 pandemic on loneliness in older adults. Animals, 11(7), 1852. [PubMed: 34206286]

Carstensen LL, Shavit YZ, & Barnes JT (2020). Age Advantages in Emotional Experience Persist Even Under Threat From the COVID-19 Pandemic. Psychological Science, 31(11), 1374–1385. doi:10.1177/0956797620967261 [PubMed: 33104409]

CDC. (2021). Characteristics of Persons Who Died with COVID-19 nited States, February 12–May 18, 2020. COVID Data Tracker. Retrieved from https://covid.cdc.gov/covid-data-tracker/#datatracker-home.

Charles ST (2010). Strength and vulnerability integration: A model of emotional well-being across adulthood. Psychological Bulletin, 136, 1068–1091. doi:10.1037/a0021232 [PubMed: 21038939]

Charles ST, & Carstensen LL (2010). Social and Emotional Aging. Annual Review of Psychology, 61(1), 383–409. doi:10.1146/annurev.psych.093008.100448

Clark DA (2013). Cognitive Restructuring. In The Wiley Handbook of Cognitive Behavioral Therapy (pp. 1–22).

Crayne MP (2020). The traumatic impact of job loss and job search in the aftermath of COVID-19. Psychological Trauma: Theory, Research, Practice, and Policy, 12, S180–S182. doi:10.1037/tra0000852 [PubMed: 32478539]

Curran E, Rosato M, Ferry F, & Leavey G.(2020). Prevalence and factors associated with anxiety and depression in older adults: Gender differences in psychosocial indicators. Journal of Affective Disorders, 267, 114–122. doi:10.1016/j.jad.2020.02.018 [PubMed: 32063562]

de Beurs E, Beekman ATF, van Balkom AJLM, Deeg DJH, van Dyck R, & van Tilburg W.(1999). Consequences of anxiety in older persons: its effect on disability, well-being and use of health services. Psychological Medicine, 29(3), 583–593. doi:10.1017/S0033291799008351 [PubMed: 10405079]

Diamond LM, & Aspinwall LG (2003). Emotion Regulation Across the Life Span: An Integrative Perspective Emphasizing Self-Regulation, Positive Affect, and Dyadic Processes. Motivation and Emotion, 27(2), 125–156. doi:10.1023/a:1024521920068

Donnelly R.(2021). Precarious Work in Midlife: Long-Term Implications for the Health and Mortality of Women and Men. Journal of Health and Social Behavior, 00221465211055090. doi:10.1177/00221465211055090

El-Gabalawy R, Mackenzie CS, Shooshtari S, & Sareen J.(2011). Comorbid physical health conditions and anxiety disorders: a population-based exploration of prevalence and health outcomes among older adults. Gen Hosp Psychiatry, 33(6), 556–564. doi:10.1016/j.genhosppsych.2011.07.005 [PubMed: 21908055]

English T, & Carstensen LL (2014). Selective Narrowing of Social Networks Across Adulthood is Associated With Improved Emotional Experience in Daily Life. International journal of behavioral development, 38(2), 195–202. doi:10.1177/0165025413515404 [PubMed: 24910483]

Ferreira RJ, Buttell F, & Cannon C.(2020). COVID-19: Immediate Predictors of Individual Resilience. Sustainability, 12(16), 6495.

Fields EC, Kensinger EA, Garcia SM, Ford JH, & Cunningham TJ (2022). With age comes well-being: older age associated with lower stress, negative affect, and depression throughout the COVID-19 pandemic. Aging & Mental Health, 26(10), 2071–2079. doi:10.1080/13607863.2021.2010183 [PubMed: 34915781]

Fredrickson BL (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. American Psychologist, 56, 218–226. doi:10.1037/0003-066X.56.3.218 [PubMed: 11315248]

Gamonal Limcaoco RS, Mateos EM, Fernández JM, & Roncero C.(2020). Anxiety, worry and perceived stress in the world due to the COVID-19 pandemic, March 2020. Preliminary results. medRxiv, 2020.2004.2003.20043992. doi:10.1101/2020.04.03.20043992

García-Portilla P, de la Fuente Tomás L, Bobes-Bascarán T, Jiménez Treviño L, Zurrón Madera P, Suárez Álvarez M, . . . Bobes J.(2021). Are older adults also at higher psychological risk from COVID-19? Aging & Mental Health, 25(7), 1297–1304. doi:10.1080/13607863.2020.1805723 [PubMed: 32870024]

Gosselin P, Castonguay C, Goyette M, Lambert R, Brisson M, Landreville P, & Grenier S.(2022). Anxiety among older adults during the COVID-19 pandemic. Journal of Anxiety Disorders, 92, 102633. doi:10.1016/j.janxdis.2022.102633 [PubMed: 36115079]

Grossman ES, Hoffman YSG, Palgi Y, & Shrira A.(2021). COVID-19 related loneliness and sleep problems in older adults: Worries and resilience as potential moderators. Personality and Individual Differences, 168, 110371. doi:10.1016/j.paid.2020.110371 [PubMed: 32904342]

Hall J, Kellett S, Berrios R, Bains MK, & Scott S.(2016). Efficacy of Cognitive Behavioral Therapy for Generalized Anxiety Disorder in Older Adults: Systematic Review, Meta-Analysis, and Meta-Regression. The American Journal of Geriatric Psychiatry, 24(11), 1063–1073. doi:10.1016/j.jagp.2016.06.006 [PubMed: 27687212]

Harvanek ZM, Fogelman N, Xu K, & Sinha R.(2021). Psychological and biological resilience modulates the effects of stress on epigenetic aging. Translational Psychiatry, 11(1), 601. doi:10.1038/s41398-021-01735-7 [PubMed: 34839356]

Havnen A, Anyan F, Hjemdal O, Solem S, Gurigard Riksfjord M, & Hagen K.(2020). Resilience Moderates Negative Outcome from Stress during the COVID-19 Pandemic: A Moderated-Mediation Approach. International Journal of Environmental Research and Public Health, 17(18). doi:10.3390/ijerph17186461

Heffner KL (2011). Neuroendocrine Effects of Stress on Immunity in the Elderly: Implications for Inflammatory Disease. Immunology and Allergy Clinics, 31(1), 95–108. doi:10.1016/j.iac.2010.09.005

Jean Francois G, Carr D, Meynadasy MA, & Sachs-Ericsson N.(2022). Prediction of COVID-19-related distress: the role of anxiety and resiliency. Aging & Mental Health, 1–8. doi:10.1080/13607863.2022.2084714

Juster FT, & Suzman R.(1995). An Overview of the Health and Retirement Study. The Journal of Human Resources, 30, S7–S56. doi:10.2307/146277

Kang HS, & Kim BN (2021). The Role of Event-Related Rumination and Perceived Social Support on Psychological Distress during the COVID-19 Pandemic: Results from Greater Daegu Region in South Korea. Psychiatry Investig, 18(5), 392–399. doi:10.30773/pi.2020.0455

Karim HT, Ly M, Yu G, Krafty R, Tudorascu DL, Aizenstein HJ, & Andreescu C.(2021). Aging faster: worry and rumination in late life are associated with greater brain age. Neurobiology of Aging, 101, 13–21. doi:10.1016/j.neurobiolaging.2021.01.009 [PubMed: 33561786]

King BM, Carr DC, & Taylor MG (2018). Depressive Symptoms and the Buffering Effect of Resilience on Widowhood by Gender. The Gerontologist, 59(6), 1122–1130. doi:10.1093/geront/gny115

Kiosses DN, & Alexopoulos GS (2014). Problem-Solving Therapy in the Elderly. Current Treatment Options in Psychiatry, 1(1), 15–26. doi:10.1007/s40501-013-0003-0 [PubMed: 24729951]

Kiosses DN, Arean PA, Teri L, & Alexopoulos GS (2010). Home-Delivered Problem Adaptation Therapy (PATH) for Depressed, Cognitively Impaired, Disabled Elders: A Preliminary Study. The American Journal of Geriatric Psychiatry, 18(11), 988–998. doi:10.1097/JGP.0b013e3181d6947d [PubMed: 20808092]

Krendl AC, & Perry BL (2021). The Impact of Sheltering in Place During the COVID-19 Pandemic on Older Adults' Social and Mental Well-Being. The Journals of Gerontology: Series B, 76(2), e53–e58. doi:10.1093/geronb/gbaa110

Lenze EJ, Hickman S, Hershey T, Wendleton L, Ly K, Dixon D, . . . Wetherell JL (2014). Mindfulness-based stress reduction for older adults with worry symptoms and co-occurring cognitive dysfunction. International Journal of Geriatric Psychiatry, 29(10), 991–1000. doi:10.1002/gps.4086 [PubMed: 24677282]

Litwin H, & Levinsky M.(2022). Social networks and mental health change in older adults after the Covid-19 outbreak. Aging & Mental Health, 26(5), 925–931. doi:10.1080/13607863.2021.1902468 [PubMed: 33749448]

Losada A, Márquez-González M, Pachana NA, Wetherell JL, Fernández-Fernández V, Nogales-González C, & Ruiz-Díaz M.(2015). Behavioral correlates of anxiety in well-functioning older adults. Int Psychogeriatr, 27(7), 1135–1146. doi:10.1017/s1041610214001148 [PubMed: 24989650]

Lupien SJ, McEwen BS, Gunnar MR, & Heim C.(2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. Nat Rev Neurosci, 10(6), 434–445. [PubMed: 19401723]

Lupien SJ, & Meaney MJ (1998). Stress, glucocorticoids, and hippocampal aging in rat and human. In Wang E.& Snyder DS (Eds.), Handbook of the aging brain, (pp. 19–50.). San Diego, CA:: Academic Press, Inc.

Manning LK, Carr DC, & Kail BL (2016). Do Higher Levels of Resilience Buffer the Deleterious Impact of Chronic Illness on Disability in Later Life? The Gerontologist, 56(3), 514–524. doi:10.1093/geront/gnu068 [PubMed: 25063353]

Mather M, & Carstensen LL (2005). Aging and motivated cognition: The positivity effect in attention and memory. Trends in cognitive sciences, 9(10), 496–502. [PubMed: 16154382]

Montenovo L, Jiang X, Lozano-Rojas F, Schmutte I, Simon K, Weinberg BA, & Wing C.(2022). Determinants of Disparities in Early COVID-19 Job Losses. Demography, 59(3), 827–855. doi:10.1215/00703370-9961471 [PubMed: 35583671]

Naragon-Gainey K, McMahon TP, & Chacko TP (2017). The structure of common emotion regulation strategies: A meta-analytic examination. Psychol Bull, 143(4), 384–427. [PubMed: 28301202]

Niño M, Harris C, Drawve G, & Fitzpatrick KM (2021). Race and ethnicity, gender, and age on perceived threats and fear of COVID-19: Evidence from two national data sources. SSM - Population Health, 13, 100717. doi:10.1016/j.ssmph.2020.100717 [PubMed: 33344747]

Notebaert L, Chrystal J, Clarke PJ, Holmes EA, & MacLeod C.(2014). When we should worry more: using cognitive bias modification to drive adaptive health behaviour. PLoS One, 9(1), e85092. doi:10.1371/journal.pone.0085092 [PubMed: 24416344]

O'Connor RC, Wetherall K, Cleare S, McClelland H, Melson AJ, Niedzwiedz CL, . . . Robb KA (2021). Mental health and well-being during the COVID-19 pandemic: longitudinal analyses of adults in the UK COVID-19 Mental Health & Wellbeing study. The British Journal of Psychiatry, 218(6), 326–333. 10.1192/bjp.2020.212 [PubMed: 33081860]

Ortman JM, Velkoff VA, & Hogan H.(2014). An aging nation: The older population in the United States, current population reports, P25–1140. Washington, DC: US Census Bureau.

Parlapani E, Holeva V, Nikopoulou VA, Kaprinis S, Nouskas I, & Diakogiannis I.(2021). A review on the COVID-19-related psychological impact on older adults: vulnerable or not? Aging Clinical and Experimental Research, 33(6), 1729–1743. doi:10.1007/s40520-021-01873-4 [PubMed: 33999378]

Pearman A, Hughes ML, Coblenz CW, Smith EL, & Neupert SD (2021). Experiencing and Forecasting COVID-19 Daily Stress on Mental Health Reactivity Across Age and Race. The Journals of Gerontology: Series B, 77(4), e16–e22. doi:10.1093/geronb/gbab197

Pearman A, Hughes ML, Smith EL, & Neupert SD (2021). Age Differences in Risk and Resilience Factors in COVID-19-Related Stress. The Journals of Gerontology: Series B, 76(2), e38–e44. doi:10.1093/geronb/gbaa120

Perna G, Iannone G, Alciati A, & Caldirola D.(2016). Are Anxiety Disorders Associated with Accelerated Aging? A Focus on Neuroprogression. Neural Plasticity, 2016, 8457612. doi:10.1155/2016/8457612 [PubMed: 26881136]

Roy B, Riley C, & Sinha R.(2018). Emotion regulation moderates the association between chronic stress and cardiovascular disease risk in humans: a cross-sectional study. Stress, 21(6), 548–555. doi:10.1080/10253890.2018.1490724 [PubMed: 30084712]

Sasse LK, Gamer M, Büchel C, & Brassen S.(2014). Selective control of attention supports the positivity effect in aging. PLoS One, 9(8), e104180. doi:10.1371/journal.pone.0104180 [PubMed: 25093459]

Schafer KM, Lieberman A, Sever AC, & Joiner T.(2022). Prevalence rates of anxiety, depressive, and eating pathology symptoms between the pre- and peri-COVID-19 eras: A meta-analysis. Journal of Affective Disorders, 298, 364–372. doi:10.1016/j.jad.2021.10.115 [PubMed: 34740748]

Sebri V, Cincidda C, Savioni L, Ongaro G, & Pravettoni G.(2021). Worry during the initial height of the COVID-19 crisis in an Italian sample. The Journal of General Psychology, 148(3), 327–359. doi:10.1080/00221309.2021.1878485 [PubMed: 33522456]

Smith JL, & Hollinger-Smith L.(2015). Savoring, resilience, and psychological well-being in older adults. Aging & Mental Health, 19(3), 192–200. doi:10.1080/13607863.2014.986647 [PubMed: 25471325]

Steinman MA, Perry L, & Perissinotto CM (2020). Meeting the Care Needs of Older Adults Isolated at Home During the COVID-19 Pandemic. JAMA Internal Medicine, 180(6), 819–820. doi:10.1001/jamainternmed.2020.1661 [PubMed: 32297903]

Taylor MG, & Carr D.(2021). Psychological Resilience and Health Among Older Adults: A Comparison of Personal Resources. The Journals of Gerontology: Series B, 76(6), 1241–1250. doi:10.1093/geronb/gbaa116

Taylor MG, Carr DC, & Jason K.(2022). Financial Hardship and Psychological Resilience During COVID-19: Differences by Race/Ethnicity. The Journals of Gerontology: Series B, 77(7), e117–e122. doi:10.1093/geronb/gbab173

Taylor S, Landry CA, Paluszek MM, Fergus TA, McKay D, & Asmundson GJG (2020). COVID stress syndrome: Concept, structure, and correlates. Depress Anxiety, 37(8), 706–714. doi:10.1002/da.23071 [PubMed: 32627255]

Thompson RA (1994). EMOTION REGULATION: A THEME IN SEARCH OF DEFINITION. Monographs of the Society for Research in Child Development, 59(2-3), 25–52. doi:10.1111/j.1540-5834.1994.tb01276.x [PubMed: 7984164]

Tugade MM, & Fredrickson BL (2007). Regulation of Positive Emotions: Emotion Regulation Strategies that Promote Resilience. Journal of Happiness Studies, 8(3), 311–333. doi:10.1007/s10902-006-9015-4

Turner AI, Smyth N, Hall SJ, Torres SJ, Hussein M, Jayasinghe SU, . . . Clow AJ (2020). Psychological stress reactivity and future health and disease outcomes: A systematic review of prospective evidence. Psychoneuroendocrinology, 114, 104599. doi:10.1016/j.psyneuen.2020.104599 [PubMed: 32045797]

Tyler CM, McKee GB, Alzueta E, Perrin PB, Kingsley K, Baker FC, & Arango-Lasprilla JC (2021). A Study of Older Adults' Mental Health across 33 Countries during the COVID-19 Pandemic. International Journal of Environmental Research and Public Health, 18(10), 5090. [PubMed: 34064973]

Vahia IV, Jeste DV, & Reynolds CF III. (2020). Older Adults and the Mental Health Effects of COVID-19. JAMA, 324(22), 2253–2254. doi:10.1001/jama.2020.21753 [PubMed: 33216114]

Vannini P, Gagliardi GP, Kuppe M, Dossett ML, Donovan NJ, Gatchel JR, . . . Marshall GA (2021). Stress, resilience, and coping strategies in a sample of community-dwelling older adults during COVID-19. Journal of Psychiatric Research, 138, 176–185. doi:10.1016/j.jpsychires.2021.03.050 [PubMed: 33862301]

Verhage M, Thielman L, de Kock L, & Lindenberg J.(2021). Coping of Older Adults in Times of COVID-19: Considerations of Temporality Among Dutch Older Adults. The journals of gerontology. Series B, Psychological sciences and social sciences, 76(7), e290–e299. doi:10.1093/geronb/gbab008 [PubMed: 33423054]

Vinkers CH, van Amelsvoort T, Bisson JI, Branchi I, Cryan JF, Domschke K, . . . van der Wee NJA (2020). Stress resilience during the coronavirus pandemic. European Neuropsychopharmacology, 35, 12–16. doi:10.1016/j.euroneuro.2020.05.003 [PubMed: 32446705]

Wang J, Mann F, Lloyd-Evans B, Ma R, & Johnson S.(2018). Associations between loneliness and perceived social support and outcomes of mental health problems: a systematic review. BMC Psychiatry, 18(1), 156. doi:10.1186/s12888-018-1736-5 [PubMed: 29843662]

Wilson JM, Lee J, & Shook NJ (2021). COVID-19 worries and mental health: the moderating effect of age. Aging & Mental Health, 25(7), 1289–1296. doi:10.1080/13607863.2020.1856778 [PubMed: 33291948]

Yegorov YE, Poznyak AV, Nikiforov NG, Sobenin IA, & Orekhov AN (2020). The Link between Chronic Stress and Accelerated Aging. Biomedicines, 8(7), 198. [PubMed: 32645916]

Yochim BP, Mueller AE, & Segal DL (2013). Late life anxiety is associated with decreased memory and executive functioning in community dwelling older adults. Journal of Anxiety Disorders, 27(6), 567–575. doi:10.1016/j.janxdis.2012.10.010 [PubMed: 23298889]

Zaninotto P, Iob E, Demakakos P, & Steptoe A.(2022). Immediate and longer-term changes in the mental health and well-being of older adults in England during the COVID-19 pandemic. JAMA Psychiatry, 79(2), 151–159. [PubMed: 34935862]

Zautra AJ, Johnson LM, & Davis MC (2005). Positive affect as a source of resilience for women in chronic pain. Journal of consulting and clinical psychology, 73(2), 212. [PubMed: 15796628]
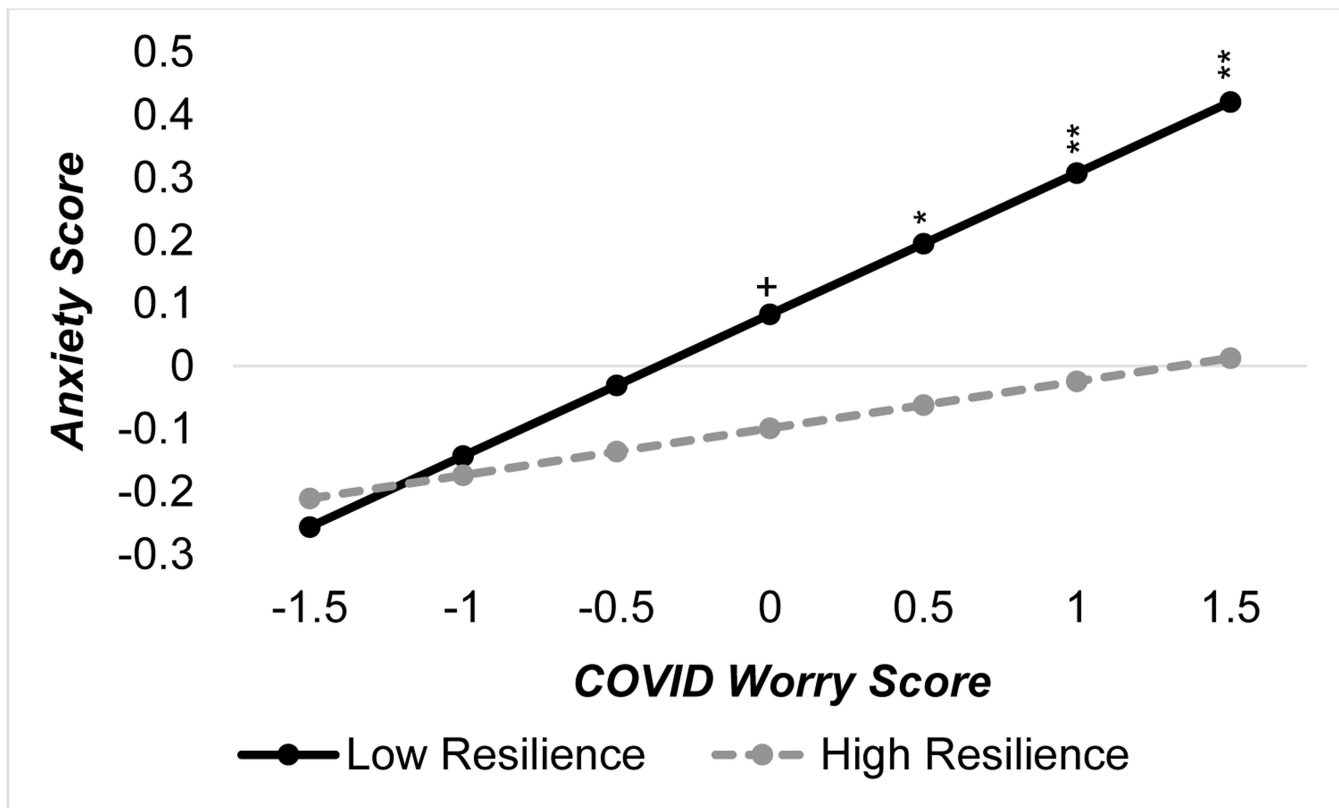
Figure 1:
Predicted Anxiety Symptoms in Older Adults with High and Low Psychological Resilience (PR) by COVID Worry Score

Notes: Low PR is one standard deviation below the mean, and high PR is one standard deviation above the mean. Significance indicates a significant difference between low versus high PR at a given COVID Worry Score: ** $p<0.01$; * $p<0.05$; + $p<0.10$. Figure is based on Table 1, Model 2. All measures are standardized.

Table 1:

Descriptive Characteristics of Study Sample

N = 453	Mean or %	SD	Min	Max
Dependent Variable				
Anxiety (Wave 2)	1.45	0.45	1.00	3.20
Primary Predictors				
Anxiety (Baseline)	1.47	0.46	1.00	3.20
Psychological Resilience (PR)	10.01	1.6	3.05	12.00
COVID Worry Score (Wave 2)	37.42	14.93	15.00	98.00
Covariates				
Social Impact of COVID-19	2.48	1.11	0.00	4.00
Female	65%			
Non-Hispanic White	79%			
Education	3.33	1.06	1.00	5.00
Age	69.96	5.75	62.00	92.00
Married	61%			
Self-Rated Health	2.29	0.92	1.00	5.00
Social Support from Friends	3.05	0.99	0.00	4.00
Social Support from Children	2.65	1.46	0.00	4.00
Social Support from Other Family	2.75	1.14	0.00	4.00

Note. All covariates were measured at baseline aside from social impact of COVID-19, marital status, and self-rated health.

Table 2:

OLS Regression Models Predicting Change in Anxiety Symptoms

	Model 1		Model 2	
N = 453	**beta**	**Robust SE**	**beta**	**Robust SE**
Baseline Anxiety Score	0.360 ***	(0.053)	0.363 ***	(0.053)
Psychological Resilience (PR)	−0.029 *	(0.014)	0.028	(0.032)
COVID Worry Score	0.005 **	(0.002)	0.019 *	(0.007)
PR X COVID Worry			−0.001 *	(0.001)
Social Impact of COVID	0.049 **	(0.017)	0.050 **	(0.017)
Female	0.040	(0.040)	0.038	(0.040)
Minority	0.023	(0.071)	0.033	(0.072)
Educational Attainment	0.006	(0.019)	0.008	(0.019)
Age	0.003	(0.003)	0.003	(0.003)
Married	0.090 *	(0.040)	0.086 *	(0.039)
Self-Rated Health	0.078 ***	(0.023)	0.081 ***	(0.023)
Social Support: Friends	−0.010	(0.023)	−0.011	(0.023)
Social Support: Children	−0.001	(0.013)	−0.003	(0.013)
Social Support: Other Family	−0.000	(0.018)	0.002	(0.018)
Constant	0.472 +	(0.281)	−0.104	(0.413)
R-squared	0.340		0.345	

Note: Statistical significance indicates statistically significant association with anxiety at Wave-2:

***
$p < 0.001$;

**
$p < 0.01$;

*
$p < 0.05$;

+
$p < 0.10$.

All covariates were measured at baseline except social impact of COVID-19, marital status, and self-rated health.