



Prior psychosocial profile and perceived impact of the COVID-19 pandemic: insights from the Baltimore Longitudinal Study of Aging

Ann Zenobia Moore¹ · Pei-Lun Kuo¹ · Toshiko Tanaka¹ · Eric J. Shiroma² · Chee W. Chia³ · Qu Tian¹ · Giovanna Fantoni³ · Melissa Kitner-Triolo⁴ · Chad Blackshear⁵ · Michael Griswold⁵ · Linda M. Zukley⁶ · Susan M. Resnick⁴ · Luigi Ferrucci¹ · Eleanor M. Simonsick¹

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Abstract

Stress, social isolation, and changes in health behaviors during the COVID-19 pandemic period may have a lasting influence on health. Here, the correlation between current or prior demographic, social and health related characteristics, including psychosocial factors with perceived impact of the COVID-19 pandemic assessed by questionnaire during the early pandemic period is evaluated among 770 participants of the Baltimore Longitudinal Study of Aging. In multinomial logistic regression models participants with higher pre-pandemic personal mastery, a construct related to self-efficacy, were more likely to report “both positive and negative” impact of the pandemic than a solely “negative” impact (OR: 2.17, 95% CI: 1.29–3.65). Higher perceived stress and frequent contact with family prior to the pandemic were also associated with pandemic impact. These observations highlight the relevance of psychosocial factors in the COVID-19 pandemic experience and identify characteristics that may inform interventions in future public health crises.

Keywords Pandemic experience · Perceived stress · Personal mastery · COVID-19

Ann Zenobia Moore, Pei-Lun Kuo, Toshiko Tanaka are the first authors.

Susan M. Resnick, Luigi Ferrucci, Eleanor M. Simonsick are the last authors.

✉ Ann Zenobia Moore
mooreaz@mail.nih.gov

¹ Translational Gerontology Branch, National Institute on Aging, NIH, Baltimore, MD, USA

² Laboratory of Epidemiology and Population Science, National Institute on Aging, NIH, Bethesda, MD, USA

³ Laboratory of Clinical Investigation, National Institute on Aging, NIH, Bethesda, MD, USA

⁴ Laboratory of Behavioral Neuroscience, National Institute on Aging, NIH, Bethesda, MD, USA

⁵ Department of Data Science, University of Mississippi Medical Center, Jackson, MS, USA

⁶ Clinical Research Core, National Institute on Aging, NIH, Bethesda, MD, USA

Introduction

The Coronavirus Disease 2019 (COVID-19) has presented an unprecedented challenge for the world community [1]. This pandemic has caused a tremendous burden of morbidity and mortality especially among older adults [2]. Interventions implemented to slow virus transmission dramatically impacted daily life including loss of income and healthcare, alterations to work-life patterns, changes in patterns and modes of communication, and increased social isolation [3]. Even in the absence of experiencing COVID-19 illness the pandemic has brought major disruptions and unanticipated changes to daily life [4, 5].

To understand how the experience of the pandemic might impact the health of older people, a questionnaire was implemented in the Baltimore Longitudinal Study of Aging (BLSA) targeting the experience and perspective of BLSA participants with respect to COVID-19, including behavioral change, access to food and medical care, impact on work, and feelings of stress and depression. We anticipate that this period may have a broad influence encompassing both acute and long-term disease management and functional status. Whether resilience, the ability to adapt to challenges, may be

influenced by specific pandemic experiences or prior physical or emotional health remains unknown. As a first step toward characterizing these patterns, we grouped responses to a multiple choice question on positive or negative impact on life: negative, positive or a third category defined by a response of “both positive and negative” and evaluated whether demographic and socioeconomic characteristics, experience with COVID-19 illness, indicators of prior health status or psychosocial factors are associated with perceived impact of the pandemic. Recognizing the unprecedented national and community response to the COVID-19 pandemic, we took an agnostic approach to the data analyses making no a priori predictions about the direction of association with this outcome.

As an ongoing longitudinal cohort study that enrolls healthy participants across a broad age range and includes an extensive battery of physiologic, cognitive and functional measurements, the BLSA provides an opportunity to contextualize the effects of the COVID-19 pandemic within the trajectory of health across the life course. In this paper, using measurements acquired both before and during the COVID-19 pandemic, we aim to address factors that shape the pandemic experience of BLSA participants.

Methods

Started in 1958, the BLSA is a continuous enrollment cohort study of community dwelling adults that evaluates the aging process [6]. Recruited predominately from the Baltimore-Washington, D.C. area (Fig. 1), participants are free of major chronic conditions and functional and cognitive impairment at enrollment; participants return for clinic-based study visits at age-dependent intervals [6]. BLSA participants have provided written informed consent and all BLSA study protocols have been approved by the National Institutes of Health Intramural Institutional Review Board. The study sample for the analyses described below includes 770 participants with BLSA COVID-19 questionnaire (BLSA-CQ) data available in the data entry system (Research Electronic Data Capture) [7, 8] by August 31, 2020 and a response to the pandemic impact question.

BLSA-CQ questions of interest

The BLSA COVID-19 questionnaire (BLSA-CQ) assesses participant experiences with COVID-19 disease and other changes during the early pandemic period, including social and behavioral changes (Fig. 1, Supplementary Text S1). The primary outcome, perceived pandemic impact, was derived from one multi-choice question on the extent to which participants viewed the COVID-19 outbreak as having a positive or negative impact on their life. Participants

were not asked to specify the type of impact only the level of severity using one of eight potential responses. For analytic purposes responses were grouped as “negative” (extremely/moderate/somewhat negative), “positive” (no impact, slightly/moderately/extremely positive), or “both” corresponding to a choice of “both positive and negative” (Supplementary Text S2). Participant age, household characteristics, and experiences related to COVID-19 at the time of questionnaire completion were inferred from BLSA-CQ items. Participants also responded to questions on the frequency and mode of communication with others and feelings of social isolation through multiple choice questions. Aspects of behavior change were queried including what participants did to keep safe, changes in time spent on specific activities and self-reported coping strategies. Details of questionnaire implementation and analytic categorization of variables are provided in supplementary methods (Supplementary Text S2).

Measurements from the prior in-person study visit

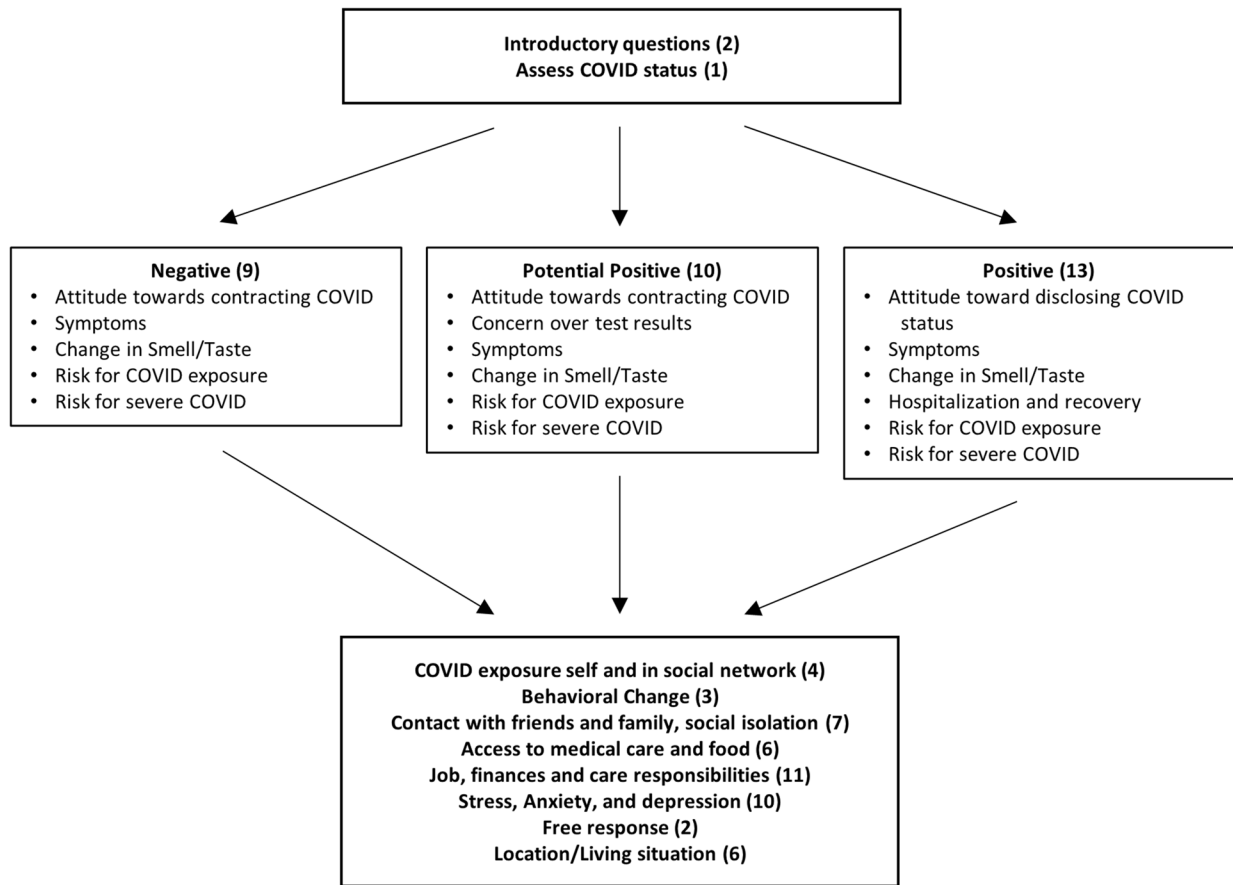
Questionnaire items capturing a pre-pandemic psychosocial profile included the frequency participants reported contact with others, level of happiness, frequency of feeling downhearted or blue, and need for more emotional support. A subset of six items from the Perceived Stress Scale capture anxiety symptoms and life stress over the past month [9]. Personal mastery, often called control beliefs, is determined from level of agreement/disagreement with two statements on how life challenges are addressed [10].

Participant sex, race, highest grade completed, health care coverage, and sufficiency of family income were also based upon questionnaire items as well as self-rated health, physical health and mental health composite scores drawn from the 12-item version of the 36-Item Short Form Survey (SF-12) [11]. Physical performance tests are administered in the BLSA using standardized protocols including usual gait speed over 6 m and the short physical performance battery (SPPB) [12].

Statistical analyses

Descriptive statistics were used to characterize the distribution of variables across participants. Multivariable multinomial logistic regression models for the three-category pandemic impact variable were used to assess the association between participants’ characteristics and their perception of the pandemic. Backward selection was applied to model parameters using a threshold of $p < 0.1$, technical covariates, time and method of questionnaire administration as well as time since last study visit, were maintained regardless of statistical significance. Participants were excluded from the

A



B

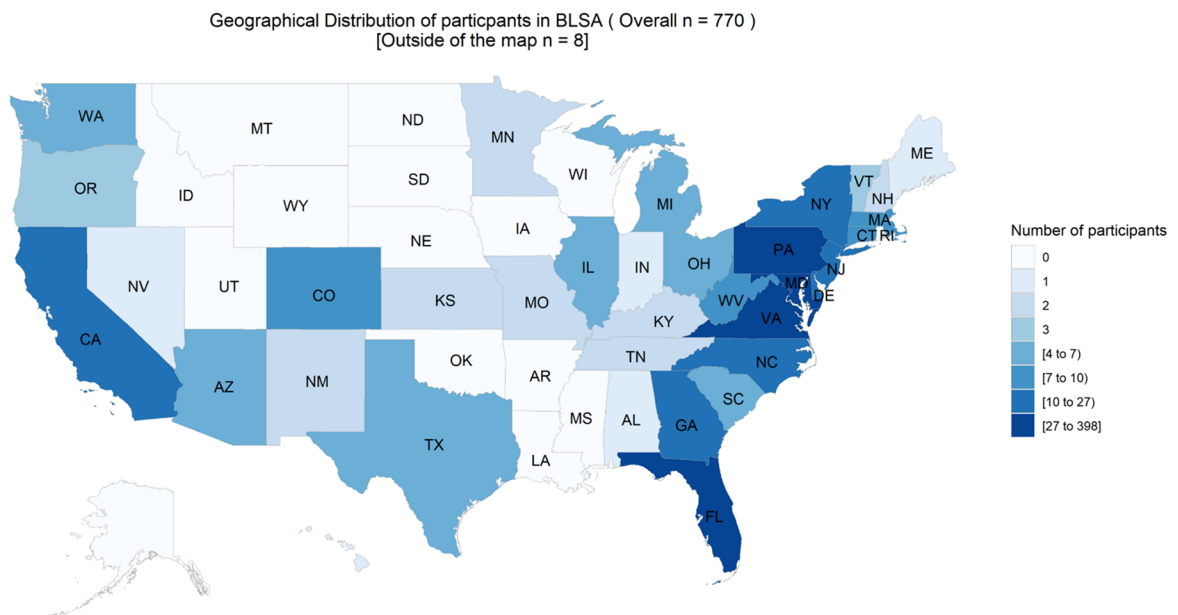


Fig.1 **A** Structure of the BLSA-CQ. The number of questions in each section is indicated parenthetically. **B** Geographical distribution of BLSA participants included in the analytic sample ($n = 770$).

multivariable analyses if they had incomplete covariate data ($n = 165$) and/or most recent study visit greater than 5 years of BLSA-CQ ($n = 96$). The association between psychosocial variables of interest and activities and experiences during the pandemic period were evaluated in multivariable logistic regression models adjusted for covariates consistent with the final pandemic impact model. All analyses were completed in R version 3.6.1; the ComplexHeatmap and choroplethr packages were used for selected figures [13–15].

Results

The analytic sample includes 770 participants who completed the BLSA-CQ including the question on perception of the impact of the pandemic on their life by August 31, 2020; 687 (89.1%) were completed by telephone. Mean age was 71 years (range: 25–103), 44.0% were male and 25.2% identify as Black (Supplementary Table S2). At the time of questionnaire completion most participants resided in the MD/DC/VA area ($n = 514$, 66.8%) (Fig. 1). This group of BLSA participants is highly educated, has high socioeconomic status and high self-rated health—95.8% responded good, very good or excellent (Supplementary Table S2).

The most common responses to the pandemic impact question were consistent with negative impact ($n = 489$, 63.5%); 172 (22.3%) participants selected “both positive and negative”, and 109 (14.2%) participants selected either “no impact” or a level of positive impact (Supplementary Tables S1 & S2). In the final pandemic impact model assessing the association with factors evaluated prior to the pandemic, demographic characteristics and some variables related to health and function, including perception of risk for severe illness, were associated with the pandemic’s impact on participants’ lives (Fig. 2, Supplementary Table S3 Model 3). A subset of psychosocial factors was also associated with endorsing “both positive and negative” impact. When compared to the “negative” group, prior expression of a need for more emotional support (OR: 1.76, 95% CI: 1.05–2.96) and high personal mastery (OR: 2.17, 95% CI: 1.29–3.65) were positively associated with the “both” group. When the “positive” group was the reference group, higher frequency of contact with children or relatives was negatively associated, while higher sum of perceived stress scale items was positively associated with the “both” group. This model also indicates similar trends for these characteristics in the negative impact group: participants with a higher perceived stress scale score had higher odds of indicating a negative pandemic impact (OR: 1.98, 95% CI: 1.09–3.61).

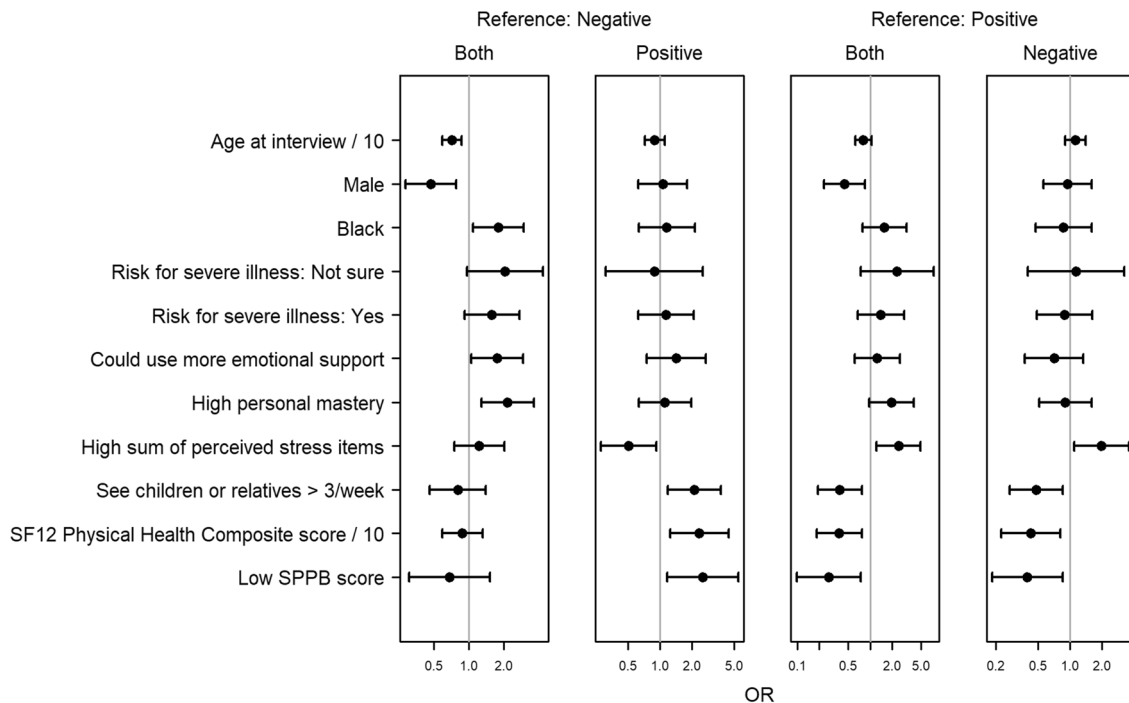


Fig. 2 Odds ratios and confidence intervals from multivariable multinomial logistic regression models estimating the association between pandemic impact and parameters selected through backward selection from a pool of covariates representing demographic characteristics, socioeconomic characteristics, experience with COVID-19, indicators

of prior health status, as well as prior psychosocial factors. Models were evaluated in the subset of BLSA participants whose most recent study visit was within 5 years of BLSA-CQ completion and who had complete covariate information ($n = 537$) and also included technical covariates

The four psychosocial indicators associated with perceived pandemic impact were evaluated in multivariable logistic regression models for indicators of specific experiences and reactions during the pandemic period including changes in communication, feelings of isolation, as well as behavior changes (Supplementary Table S4, Fig. 3). High personal mastery was associated with reporting more time spent outdoors (OR: 1.54, 95% CI: 1.01–2.36) and lower likelihood of doing less exercise (OR: 0.70, 95% CI:

0.47–1.03). Participants with higher perceived stress and a need for more support reported increased feelings of lack of companionship, being left out, and feeling isolated during the pandemic. In contrast, higher frequency of contact with children or relatives at the prior visit was associated with lower likelihood of feeling a lack of companionship and feeling isolated and lower likelihood of avoiding contact with friends and family. While themes are noted across communication and behavior changes, no comparisons achieved

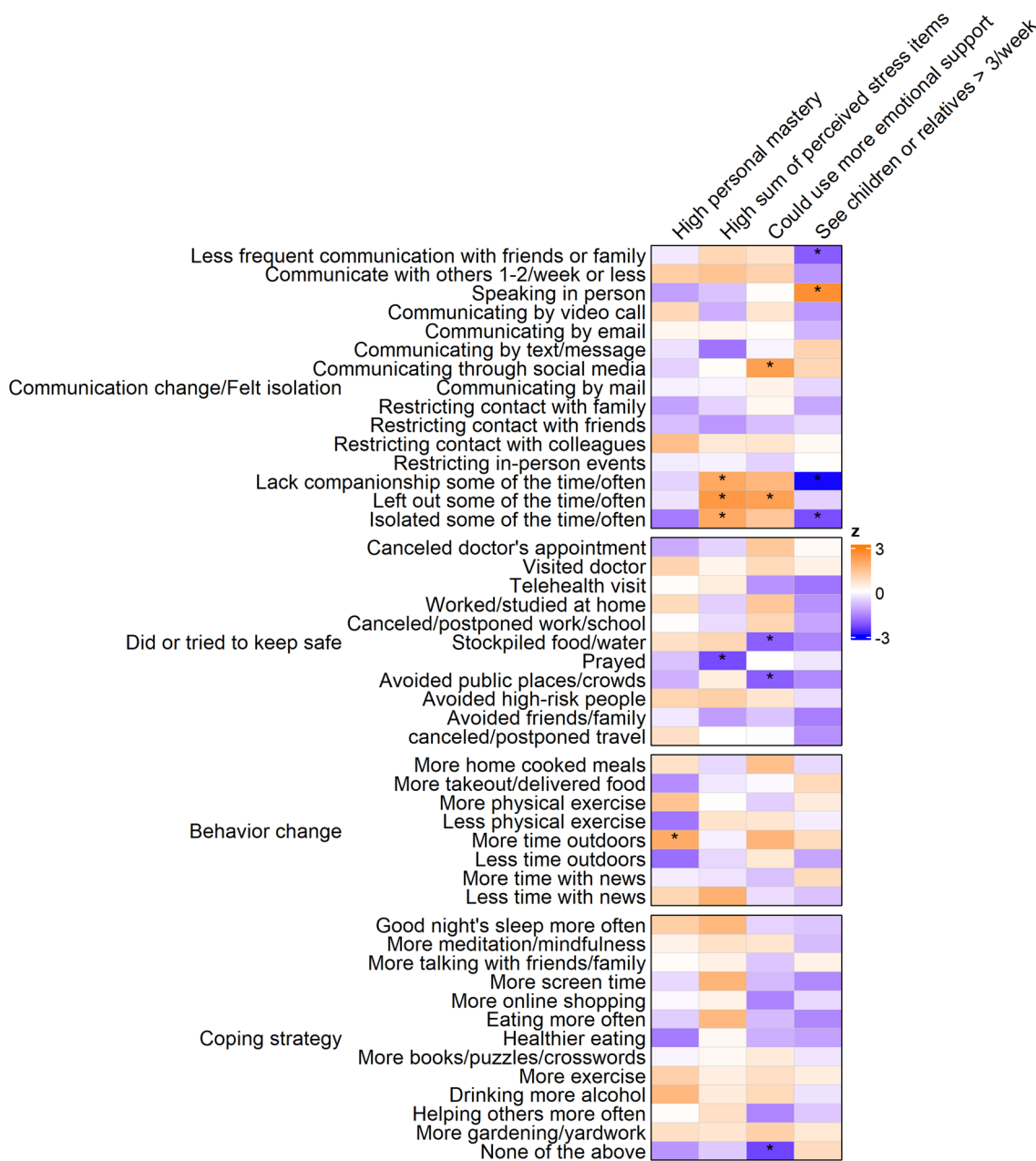


Fig.3 Z-scores from multivariable logistic regression models evaluating the association between psychosocial factors of interest evaluated prior to the COVID-19 pandemic and communication, feelings of isolation, behavior change, and coping strategies during the pan-

demic period (n = 537). Models were also adjusted for age, sex, race, perception of risk for severe illness, SF12 physical health composite score, low SPPB score and technical covariates. Each row represents selected coefficients from a multivariable model (*p < .05)

a multiple test corrected threshold for statistical significance (Supplementary table S4).

Discussion

In the BLSA, we evaluated factors associated with the perceived impact of the COVID-19 pandemic on participants' lives. Expectedly, the most frequently endorsed responses to the question on the pandemic's impact were consistent with perception of a negative impact. However, a moderate proportion of participants chose "both positive and negative": we hypothesize that this is an indicator of the complex nature of the pandemic period as well as the adaptability of a subset of participants when confronted with circumstances that might otherwise be viewed as wholly negative. High perceived stress was associated with both negative pandemic impact and "both positive and negative impact". Interestingly, the "both" response was also positively associated with high personal mastery. Plausibly, individuals responding "both" were able to make resilience promoting choices: we observed a positive correlation between personal mastery and some behavior changes that may benefit mental health, including increased exercise and outdoor activity.

We observed consistency between prior visit psychosocial profile and reactions during the pandemic period: self-report of behavior changes, coping strategies and activities for protection. For example, trends of increased feelings of lack of companionship and feeling left out during the pandemic in participants specifying a need for more emotional support in the last year. However, the odds of indicating not using a coping strategy were lower in this group and the need for more support was positively associated with categories of pandemic impact that include positive perspectives. Together these observations suggest that indicating a need for support may reflect awareness of the importance of support for personal well-being. A second example is the inverse relationship between frequency of family contact and negative pandemic impact as well as associations with communication behaviors suggesting that participants with prior frequent family communication maintain consistent communication through the pandemic period with a positive influence on their experience.

Our findings add to recent observations on the relevance of strong prior social networks, as well as current social support and mindfulness for protection of mental health during the COVID-19 pandemic period [16, 17]. Consistent with other work, which found psychosocial characteristics such as personal mastery and other resource measures negatively correlated with pandemic related psychological burden in all adults [18], vulnerable adults [19], and older adults [20], BLSA participants with more personal

resources including awareness of their need for social support and high personal mastery tended to report pandemic impacts incorporating positive perspectives.

We believe this study makes an important contribution to the growing body of observations surrounding the experience of older adults during the COVID-19 pandemic period, but we recognize limitations. Although BLSA participants come from many regions and backgrounds they are a well-resourced, relatively healthy and functionally robust population not fully representative of the general population. However, these features may also yield a sufficient number of participants with positive experiences to discern effects. In the BLSA we were also able to draw upon measurements evaluated in the same participants before and during the pandemic. Distinguishing characteristics ascertained prior to the COVID-19 pandemic that describe those at high risk of adverse experiences, may serve to inform efforts to promote resilience by identifying beneficial behavior changes and/or coping strategies for respective psychosocial profiles. Our observations also provide a foundation for evaluation of the perceived impact of the pandemic, a broad measure of the pandemic experience, and its relation to post pandemic health outcomes.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40520-022-02126-8>.

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Author contributions All authors contributed to the study conception and design. Collection of new data was overseen by Linda M. Zukley and Eleanor M. Simonsick. Analyses were completed and the first draft of the manuscript was written by Ann Zenobia Moore, Pei-Lun Kuo and Toshiko Tanaka. All authors read and approved the final manuscript.

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Data availability The datasets analyzed during the current study are available through the BLSA website (<https://www.blsa.nih.gov/>) on reasonable request.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical approval All BLSA study protocols have been approved by the National Institutes of Health Intramural Institutional Review Board.

Informed consent BLSA participants have provided written informed consent.

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