Author’s response to reviews

Title: Longitudinal and reciprocal associations between financial strain, home characteristics and mobility in the National Health and Aging Trends Study

Authors:

Laura Samuel (lsamuel@jhmi.edu)
Sarah Szanton (sarah.szanton@jhu.edu)
Christopher Seplaki (Christopher_Seplaki@URMC.Rochester.edu)
Thomas Cudjoe (tcudjoe2@jhmi.edu)
Roland Thorpe Jr (rthorpe@jhsph.edu)
Emily Agree (Emily.Agree@jhu.edu)

Version: 1 Date: 21 Oct 2019

Author’s response to reviews:

We thank the reviewers for their thoughtful comments and advice. We believe the peer review process has strengthened the manuscript and we are grateful for their feedback. Our response to each comment is summarized below.

I have read the manuscript thoroughly. The manuscript may interest many readers of this journal because the authors focus on reciprocal relationships among financial strain, home environment, and physical mobility, which appear unique and important. One of the strengths of the manuscript is the use of a nationally representative sample of American older adults who need care. The manuscript is generally well written. I have several comments that I hope will be helpful to further improve the manuscript's significance.

1. A figure of the conceptual framework will help readers understand the hypothesis of this study. Because this study deals with six variables, each of which are interrelated, it was difficult for me to understand the hypothesis clearly in the Introduction section.

We have added a reference to Figure 1 in the introduction and expanded the figure legend to clarify which relationships depicted in the figure correspond to the hypothesized associations and which relationships are not.

2. Please use sub-sections for each variable in the Measurement section for better readability. Key variables such as walking scores, financial strain, and the home disorder index should be verified by citing appropriate references.
We have added headers to the measurement section and have added citations for key variables, except for moving and home modifications, which are measured with dummy indicators.

3. I do not understand the reason the authors included income as a covariate in the analyses. What does financial strain adjusted by the actual income level mean?

When adjusting for income, associations with financial strain can be interpreted not as absolute income level, but whether the income is sufficient to meet daily needs. This is important because there is a large variability in cost of living and household expenses among older adults. For example, some older adults pay one-third or more of their income towards housing expenses (i.e. rent or mortgage) but other older adults who live with family or have paid off a mortgage may not have monthly housing payments. As another example, the minimum U.S. Social Security check may be sufficient for an individual living alone, but may not be sufficient for a grandmother raising grandchildren. We have added a sentence to the measurement section to justify accounting for income in this study.

4. The discussion appears redundant, particularly in the 1st and 5th paragraphs.

We thank the reviewer for identifying this issue. We have trimmed paragraph 5 to avoid redundancies.

5. I suppose the number of cases (n = 3234) in Table 3 is incorrect because this analysis limited the cases involving the ability to walk.

We thank the reviewer for identifying this issue. This comment prompted us to look again at our analytic models. In discussion with the Mplus software support team, we realized there was a bug in an older version of the software that was arising in the specific scenario of using sampling weights to analyze a subset of the sample. The bug was fixed in the most recent update for the Mplus software (version 8.3). We, therefore, updated our software and successfully ran the model for Table 3 again on the 2467 participants who completed the walking test in the 2014 follow up examination. As shown in the updated Table 3 and results section, some relationships with home modifications and relocations were altered in the new models, but inferences related to our hypothesized associations were unchanged.

6. I suggest that the authors add additional supplementary figures, reflecting the findings in Tables 2 and 3 to their final model (Figure 2), for better understanding. I do not mean to put coefficients on the figures, but to clearly indicate significant and non-significant arrows differentially (by using bold or colored lines, etc.).

We thank the reviewer for this suggestion. We have added supplementary figures that distinguish the statistically significant associations from non-statistically significant associations for all results presented in Tables 2 and 3.
Major comments:

(1) Structure equation model would not be popular as much as no necessity of descriptions of statistical model like Poisson or logistic regression model. The authors need easy-to-understand description showing the correspondence between estimated values in the tables and parameters using the model.

We thank the author for raising this issue. We have clarified the approach in the statistical analysis section. Also, for the results section, we have added supplemental figures that distinguish the statistically significant structural associations from the non-statistically significant associations. These two figures graphically represent the inferences drawn from results in Tables 2 and 3. Together, we hope these changes guide the reader in interpreting structural equation model results.

(2) The model the authors used in this manuscript is considered the most appropriate in the authors' thought. Describe how it is superior from the model building briefly, and discuss its acceptability from the point of goodness of fit statistically.

We have added one sentence to the methods and another to the results. Models with RMSEA values <0.05 were deemed to have good fit, based on recommendations for structural equation modeling. (See MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. Psychol Methods. 1996;1:130–49.)

(3) I did not understand how revealing reciprocal relationships among financial strain, home disorder, relocation, home modifications and mobility can contribute to solve issues related to the elderly. It is desirable that the authors show a real-world issue their theory can solve.

We thank the reviewer for making this important point. We have revised the 6th and 7th paragraphs of the discussion section to clarify the significance and implications of the results. We have focused that content on the following two key implications:
1. First, these results identify home disorder, home modification and relocation as potential targets for home environmental interventions.
2. Secondly, since renovations and modifications can be costly, these results show that older adults with financial strain should be prioritized for such interventions.