Author's response to reviews

Title: Explanations of socioeconomic differences in changes in physical function in older adults: results from the Longitudinal Aging Study Amsterdam

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Author's response to reviews: see over
Dear Editor,

June 28, we received that our manuscript was re-reviewed. You give us the opportunity to revise our manuscript according to the comments of a new reviewer (referee 2) (MS:1209846251851164).

We have now revised the paper following the reviewers’ comments. Below you will find the specific reply to the reviewer’s comments. Any changes and new text are in blue.

I hope you will reconsider our paper in its present form and find it acceptable for publication in your journal.

Yours sincerely,

Annemarie Koster
Response to comments reviewers

Reviewer 2: James S House

Major Compulsory Revisions

1. The main aim of the present study is to examine the contribution of a number of potential explanatory factors to explain SES differences in physical function. In preliminary analyses we tested interactions with SES and age and SES and sex. Because of the significant interaction between SES and age we stratified the analyses for age. To study SES differences in both younger-old and older-old adults was not an a priori aim of the study. Nevertheless, we agree with the reviewer that it will strengthen our paper if we focus on this empirical aim as well. At the end of the introduction we have added a paragraph (including references) in which we explain this aim more clearly (page 3 of the revised manuscript, line 24 – page 4, line 6). To make the paper more consistent we also described this issue in the methods section more clearly. For example, in the study sample section we will already mention the number of participants in each age group (page 5, lines 9-10). We will start the statistical analyses section with the sentence that all analyses were stratified for two age groups and that we formally test the interactions between SES and age (page 7, lines 20-21). See also our response below to related comments. As the reviewers suggests, in the discussion we now focus more clearly on the strength of this paper that we were able to study SES difference in physical function in both younger-old and older adults (see also our response on the final point of minor essential revisions below)

Minor Essential Revisions

1. We acknowledge the reviewer’s comments that the consequences of non-response should be addressed more properly. The response rate for the first LASA cycle was 81.7% Attrition between the LSN interview and the first LASA cycle was significantly associated with age, but not with gender. This information was added to the study sample section of the methods (page 4, line 24 – page 5, line 1). Attrition in LASA was
mainly due to mortality. Participants without follow-up data had significantly worse physical function scores at baseline in comparison to people who remained in the study. Furthermore, these people had a significantly lower SES compared to our study population. The association between SES and physical function may therefore have been underestimated. Whether the relative contribution of explanatory variables was equally underestimated remains unknown. This issue is discussed in the final paragraph of the discussion (page 14, lines 15-22).

2. We agree with the reviewer that the description of the income variable in confusing; the measure being used is an estimate of individual income rather than household income. We have changed this, by removing the term household (page 5, line 16 and line 19). The household incomes of respondents with a partner were multiplied by 0.7 to make them comparable to the incomes of respondents in a one-person household. Net income is income after taxes. Similar results are found when we use total household income and adjust for household size in the analyses.

3. Our ways of handling missing data were in line with other LASA papers. We have, however, also considered other ways of handling missing data and have performed some sensitivity analyses. For example, because of the large number of missing data on behavioral factors, we created a missing category for this group. However, the missing data may have led to misclassification, especially in the older age group as there were more missing data on behavioral factors than in the younger age group. In a sensitivity analyses, we showed that the contribution of behavioral factors is very similar when we exclude person with missing data. This issue was mentioned in the fourth paragraph of the discussion (page 14, lines 9-12). Missing values for psychosocial factors were replaced by group means. This could, however, have led to an attenuation of the effect of these factors in explaining the SES differentials. In additional analyses, however, in which subjects with missing values on psychosocial factors were excluded, the contribution of these factors in the explanation of SES differences in physical function was also very similar. This issue was also discussed in the fourth paragraph of the discussion where the drawbacks of the study are discussed (page 14, lines 4-9).
4. We defined a two-level hierarchy to form random regression models to describe the individual variability in the longitudinal development of physical function. The first level is defined by longitudinal time (in terms of the number of the observation) and the second level by the respondents. Longitudinal time is included in all models in order to test the influence of time on physical function. The first model includes SES (education or income) as well as the interaction between SES and longitudinal time to determine the how the effect of SES on physical function develops over nine years of follow-up. The model also includes sex and age and two interaction terms that were statistically significant; the interaction between age and longitudinal time and between sex and longitudinal time. This information was added to the statistical analyses part of the methods (page 8, lines 2-10). Interactions between each covariate (the variables that were added in model 2-4) and longitudinal time were also tested (page 8, lines 12-14). We hope this clarifies the description of the multilevel modeling. For the interpretation of the coefficients in table 3 and 4 we also present figure 1 that graphically shows the physical function score over nine years of follow-up for each SES group (See also our comments, point 6).

5. We agree with the reviewer that the interaction between SES and age should be described more fully in the methods and results (see also comments above under major compulsory revision). We added this information to the statistical analyses section of the methods (page 7, lines 20-21) and the results section (page 8, lines 19-21). We tested interactions with age as a continuous variable as well as age different categories. We choose two age groups with a cut-off of 70 years. The cut-off was close to the median age (69 years) in the study population. In this way we had two about equally large groups, both with an age range of 15 years.

6. We agree with the reviewer that the interpretation of these coefficients is complex. For this reason we added figure 1. This figure shows the physical function score over 9 years of follow-up for each SES group. The difference in physical function score at baseline is the intercept as presented in table 3 and 4. The slope of each line in the figure is the SES*time interaction term that is also presented in the tables. We could not only show the baseline differences in physical function between SES groups but also trend of the SES differences over time (whether SES differences widen over time or not). We tried to explain the coefficients in the third paragraph of the results section (page 9, line 20 -
Education and income effects were indeed estimated in separate models rather than in one single multivariate model. (See also our comments, point 4)

7. We found significant differences in slope between SES groups in the lowest age group. These differences could not be explained by any of the variables that were added in model 2-4. It would be likely that interaction between each explanatory variable and time (similar to SES*time interaction) could reduce the slope differences. However, as we mention in the final paragraph of the results (page 11), the coefficients were difficult to interpret which may be due to the complexity and potential over-fitting of the models and, therefore, did not add to the explanation of the slope differences.

8. The main focus of the discussion in its former version of the paper was on the explanation of SES differences in physical function in both age groups which was different in younger-old and older-old adults. In the second paragraph we will now focus on the age differences we found in SES differences in physical function (page 11, line 24 – page 12, line 18). In the third paragraph of the discussion we discuss how to explain the age-specific explanation of the SES differences. Although this may be speculative; our findings may give directions for future research where the specific pathways must be examined in more detail (as mentioned in the final sentence or the conclusions). In the younger-old age group the decline of physical function was mainly due to the onset of physical function problems rather than a decline of existing physical function problems in the oldest-old. It is very likely that this underlies the age-specific explanation of SES differences in physical function in our study. We agree with the reviewer that the fact that the explanatory variable are all measured at baseline is a limitation of our study. The contribution of these factors may have been larger if these factors could have been considered longitudinally. This issue is discussed in the fourth paragraph of the discussion where a few drawbacks of the study are discussed (page 13, lines 12-15).

Discretionary Revisions

1. Like the reviewer suggests we have added the approximate years of education to the description of the education categories (page 5, lines 17-19).
2. The scaling we used was in accordance with other LASA papers. We have not used other scalings of physical function.

3. The medical examination did not include a diagnosis of all diseases.

4. We have changed the wording in this paragraph to make clear we have separate measures of instrumental and emotional social support (page 7, lines 5-6 and line 11).

5. a. We have changed the sentence as the reviewers suggests.

   b. We have changed the sentence into “the highest age group this association was present for education, but not for income”.