Author’s response to reviews

**Title:** The Role of Gender in the Association between Personality and Task Priority in Older Adults’ Dual-Tasking While Walking

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**Author’s response to reviews:**

Dear Editor:

We would like to thank the reviewers for their thoughtful and helpful comments, which we believe helped us greatly improve the manuscript. Below is our response to each of them. We’ve marked all changes in red throughout the manuscript.

Reviewer reports

Michele Callisaya (Reviewer 1): The Role of Gender in the Association between Personality and Task Priority in Older Adults’ Dual-Tasking While Walking

This study examined the associations of personality with dual-task walking, as well as whether sex modified these associations. In a sample of 73 generally healthy participants there were no associations between personality and dual-task performance. However when examining sex differences, extraversion was negatively associated with DTC-motor for men and conscientiousness was positively associated with DTC-cognition for women.

This study is reasonably clearly written. It provides an adequate argument in the introduction for the aims of the study and interprets the results appropriately in the discussion. Strengths of the study also include the measurement of dual-task cost for both the motor and cognitive tasks. It is of interest to readers of BMC Geriatrics.

I have the following comments:

Introduction

Comment: 1. The introduction appears quite long - but this might be ok for this journal?
Response: The introduction (now “Background”) adheres to the journal’s requirements.

Comment: 2. Page 6 line 2: Perhaps tone down the comment “the potential is clear” - or justify further.

Response: The comment has been removed.

Comment: 3. Page 6 line 4-5 the author’s state “….represents the relationship between personality and DT walking has yet to occur.” Ref 25 also addresses this question?

Response: Ref 25 focused on two traits only: neuroticism and extraversion. The present study investigated the relationship between the full spectrum of the FFM personality factors and DT in order to understand the nature of the relationships between them. We’ve added this statement to the text.

Methods

Comment: 4. Were the ST subtraction and ST subtraction whilst walking tasks performed for 1 minute as well?

Response: Yes. Both were performed for 1 minute. This information has been added to the text.

Comment: 5. Coding: please specify how gender was coded (1=?) so that Table 1 can be interpreted. The same for the personality variables eg did higher scores equal higher levels of extraversion.

Response: Thank you for your comment. This information has been added in the current revision.

Comment: 6. How were participants selected for the study?

Response: Participants responded to advertisements in their community. This information has been added to the text.

7. Were participants asked to prioritize either task or were no instruction given.

Response: No. Participants were asked to conduct the two tasks to the best of their ability. This information has been added to the text.

Comment: 8. Statistical analysis page 8. First sentence needs to be clearer. I would suggest dividing into 2 sentences.

Response: This sentence has been rephrased.
Comment: 9. Please provide more information on how you determined if a variable was a mediator in your models.

Response: In the Statistical Analyses section, we’ve added the following: “These covariates were considered potential mediators of personality associations with DTC performance. Attenuation attributed to the possible mediators under consideration was calculated using the formula 100 x (β Model 1 − β Model 2) / (β Model 1) (e.g. Hagger-Johnson et al. [1]).”

Results

Comment: 10. Were personsality traits in the same or separate models?

Response: We’ve noted in the Statistical Analyses section that the main effect variables of the FFM traits were entered simultaneously to isolate the unique effect of each domain.

Comment: 11. Page 9 line 60 - please provide results (beta coefficient, SE or 95% CI) for each personality trait with dual task performance (or just those that had effect modification by sex).

Response: We’ve added the results for the personality traits that had effect modification by gender. The results appear under the subheading “Gender Differences: Exploratory Analysis.”

Comment: 12. Were there any sex differences in characteristics - eg age, MOCA. Is there any other information to characterize the sample eg. Diabetes, OA etc. It would also be useful to show (in a table) values for the personality and dual task variables by sex.

Response: We’ve added a new Table 1 that includes this information.

Comment: 13. Line 11, 17 - was there evidence of these women diverting more attention to the walking task?

Response: There is no clear evidence; however, it is a possible explanation. Further caution has been added to the text.

Bettina Wollesen (Reviewer 2): The study focusses a relevant topic of research on DT performance. Since there are many conflicting results in DT walking performance of older adults it might be worthwhile to understand confounding factors, may be personality as well.

However, this approach has some structural weaknesses. These are a result out of a lack of information in the introduction and the methods. Moreover, the methods need to be reflected carefully.

Introduction

Comment: The introduction is well written and guides to the main aims of the study.
However, the different theoretical DT models as reported by Lacour et al and Wollesen et al are not discussed. However, this is necessary to understand the anticipated effects of the own DT-setting (arithmetic).

Moreover, if there is the idea, that personality might influence the DT walking, than there should be some more examples, how different personalities react and if a special personality might lead to concerns or fear of falling, which has a huge impact on DT walking performance (eg. Model by Williams & Young, 2015).

A clear research question and hypothesis is missing at the end of the introduction.

Response: We’ve added a reference regarding potential theories underlying the DT effect: “Wollesen and Voelcker-Rehage [2] reviewed the main theories that explain the underlying mechanism of the DT effect.”

In the same line, we’ve added information regarding the link between psychological factors, personality and risk of falls: “Moreover, psychological theories linked fear of falling and anxiety to falls [3]. The link between anxiety and personality is well established [4, 5]. However, the contribution of personality to DT walking deterioration and prioritization with aging, which increases risk of falls, remains to be explored.”

Additionally, a clear research question is emphasized, followed by a hypothesis: “Thus, the objective of the current study is to explore the association between personality and DT walking performance in community-dwelling older adults. Based on our previous investigation [6], we hypothesize that people with higher Extraversion and higher Conscientiousness perform DT better and thus have lower DTC.”

Methods

The method section leads to some open questions and methodological concerns.

Comment: P7 L51 This section can either be moved to the introduction or the beginning of the methods.

Response: We cannot find line 51 in page 7. Please clarify, and we will be happy to revise accordingly.

Comment: Planned statistical analyses

This section is unclear, you can either use t-tests or regression analyses but not t-tests for a regression analysis, this might be a grammar problem. T-tests do not allow to include covariates, what exactly do you mean when you say that “covariates were controlled (P8 L10)”? How did you test x, y, z, as a “moderator”? Which test procedures did you use? Is this all part of the regression analysis that you are presenting in Table 1?
Response: Thank you for your comment. In the current revision, we’ve rephrased the Methods
section, and we hope it is clearer now. “SPSS 19 software was used for the following analyses:
(1) to perform t tests contrasting ST with DT performance, (2) to assess whether DTCs were
significantly different from zero, and (3) to calculate ordinary least squares (OLS) regressions,
and to examine the associations between personality factors and the ability to divide attention
between the two tasks of walking and subtracting by 3. In the first step of the regression analysis,
the main effect variables of the FFM traits were entered simultaneously, to isolate the unique
effect of each domain. In the second step of the regression, control variables of age, gender,
MoCA, body weight, physical activity and chronic disease were entered. In the third step,
because of sex differences related to changes in both personality and mobility [7, 8], we tested
gender as a moderator by using interactions of the FFM with gender. We used the centered
values of the FFM in testing these interaction terms to reduce multicollinearity and facilitate the
interpretation of interactions if found in our data analyses. The regression models with the
interactive associations also include the linear, centered terms. To reduce the possibility of
multicollinearity among the interaction and quadratic terms and their component predictors, all
predictors were centered prior to the regression runs [9]. In Table 2, only significant interactions
are shown.”

Comment: Table 1 is a result and should be moved to the results section.

Response: Table 1 has been moved to the Results section and now appears as Table 2.

Comment: Did you perform a sample size calculation? You are performing a range of tests, how
did you define statistical significance?

Response: We aimed to collect 10 participants for each main variable (i.e. five personality
factors and gait performance).

Comment: The recruitment procedure is unclear: where did the participants come from? Was
everybody included, how many were excluded? Is it chance that your participants where half
male and half female? In the older generation it is expected to have more female participants.
Since gender is your main interest (title), I would have expected that you intentionally included
approx. 50% of each gender. Why is this not in the methods section?

Response: We’ve expanded our description of the recruitment procedure: “90 participants were
recruited (55 female and 35 male), and 10 did not meet the inclusion criteria (for five Hebrew
was not the first language, two reported back pain during walking and three did not complete the
protocol).”

Comment: The setting is unclear: where was the data collected and when and by whom? Was
there more than one investigator who performed the test?

Response: Data were collected in community centers by one investigator.

Comment: It is not explained in the method section why the delta R² was used and how it was
calculated and how we can interpret this calculated coefficient of determination.
Response: We’ve added the following sentence to the Statistical Analyses section: “In order to complement the inferential statistics of p-values, the effect size of the main effects of the FFM was also calculated as the square of the Pearson correlation r (R2) to reflect the proportion of variance shared by the FFM and DTC [10].”

Comment: Discussion

I do not agree with the conclusion on page 11 line 26-28. As the different DT model were not discussed sufficiently, the interpretation due to the model by Yogev-Seligman is vague. Moreover, the conclusion on page 13 line 1-3 about the resource allocation is a suggestion. As you did not measure resource allocation you can only suppose that there might be an association. I would agree if you argue that there might be influences of personality, however, this really needs further investigation.

I would recommend to overwork the methods and to interpret the results more carefully concerning the DT models.

Response: We’ve revised the conclusion in page 13 to be more suggestive than definitive: “In conclusion, findings from this study highlight the association between personality and DT performance during walking in older adults.”

We’ve expanded on other models in the Background section and now articulate our potential conclusions more cautiously.