Author's response to reviews

Title: Physical Environmental Factors Related to Walking and Cycling in Older 
Adults: the Belgian Aging Studies

Authors:

Jelle Van Cauwenberg (jvcauwen@vub.ac.be) 
Peter Clarys (pclarys@vub.ac.be) 
Ilse De Bourdeaudhuij (ilse.debourdeaudhuij@ugent.be) 
Veerle Van Holle (Veerle.VanHolle@UGent.be) 
Dominique Verté (Dominique.Verte@vub.ac.be) 
Nico De Witte (nico.de.witte@vub.ac.be) 
Liesbeth De Donder (liesbeth.de.donder@vub.ac.be) 
Tine Buffel (tine.buffel@vub.ac.be) 
Sarah Dury (sarah.dury@vub.ac.be) 
Benedicte Deforche (benedicte.deforche@vub.ac.be)

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Author's response to reviews: see over
Dear editor and referees

The authors wish to thank the editorial team and referees for their useful comments and possibility to revise the manuscript. We have revised our manuscript and, thanks to the comments, the authors think the manuscript has improved markedly. You find a point-by-point description of the changes made below.

On behalf of all the authors,

Kind regards

Jelle Van Cauwenberg

A. Comments of the Associate Editor

1. Please include a title page in the manuscript file. This should contain; Title, Author list, Affiliations (department names, institution name, street name, city, zip code, country), email addresses. The author list and email addresses must be identical in the manuscript file and on the submission system, and it must be clear which affiliation pertains to each author.

The authors’ email addresses have been added to the title page (rule 20-30):

E-mail addresses:

Jelle Van Cauwenberg: jvcauwen@vub.ac.be
Peter Clarys: pclarys@vub.ac.be
Ilse De Bourdeaudhuij: ilse.debourdeaudhuij@ugent.be
Veerle Van Holle: Veerle.VanHolle@UGent.be
Dominique Verté: Dominique.Verte@vub.ac.be
Nico De Witte: nico.de.witte@vub.ac.be
Liesbeth De Donder: liesbeth.de.donder@vub.ac.be
2. Experimental research that is reported in the manuscript must have been performed with the approval of an appropriate ethics committee. Research carried out on humans must be in compliance with the Helsinki Declaration (http://www.wma.net/e/policy/b3.htm), and any experimental research on animals must follow internationally recognized guidelines. A statement to this effect must appear in the Methods section of the manuscript, including the name of the body which gave approval, with a reference number where appropriate. Please specify the name of the committee.

The name of the committee and a reference number have been added (rule 163-164):

The study was approved by the ethical committee of the hospital of the Vrije Universiteit Brussel (B.U.N. 143201111521).

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The manuscript has been read and corrected by a senior professor who has done a sabbatical in the United States.
B. Comments of reviewer 1

1) Did authors perform any tests for interactions before dividing total sample into subgroups? In order to justify the necessity of subgroup analyses, tests for interactions should be performed. As authors concluded (Line 325), there might not be any rationale for subgroup analyses. If significant interactions between each environmental variable and subgroup categories (i.e., area of residence, age, gender) are evident, then the sample should be stratified and analyses performed (and odds ratios presented respectively).

Whether the interactions (effect modifications) are significant or not affects the overall structure of this paper. I recommend the following structure of analyses to strengthen the design of the paper:

(1) PA-sociodemographic relationships (Table 1 & 2);
(2) Frequency distribution of environmental variables (new, see also comment 4);
(3) PA-environment relationships in total sample (new);
(4) Test for interactions between each environmental variable and subgroup categories (new) and
((5) PA-environment relationships in subgroups where the significant interactions are observed (similar to Table 3-5)).

The authors agree with the reviewer that performing tests for interactions are appropriate and would add to the value of this paper. First, second and third order interaction effects have been analyzed and when significant the sample was stratified into the corresponding subgroups. This is described in the methods section as follows (rule 219-229):
First, relationships with demographics, number of functional limitations and area of residence were calculated within the total sample using a multivariate model. Secondly, first, second and third order interaction effects with urbanization, age category and gender were analyzed for each environmental factor. If none of the interaction effects were significant the main effect of this environmental factor was analyzed in the total sample. Main effects for environmental factors with significant third, second or first order interaction effects will be presented consecutively in the corresponding subgroups. In case of significant third order interaction effects, no second and first order interaction effects were presented. In case of significant second order interaction effects, no first order interaction effects were presented. All analyses were controlled for level of education and number of functional limitations. Significance level was set at 0.05.

According to the recommendations of the reviewer, the result section has been restructured as follows:

1) Descriptive statistics

-Table 1: descriptive statistics (including demographics, municipalities’ characteristics and walking/cycling behaviors)

-Table 2: means and frequencies of the environmental factors in the total sample and subgroups.

2) Analyses in the total sample

-Table 3: Predictors of walking and cycling in the total sample (demographic predictors and area of residence).

-Table 4: Main effects of environmental factor in total sample
This table represents the main effects of the environmental factors for which no significant interaction effects with area of residence, age and/or gender were observed.

3) Analyses in subgroups

- Table 5: Third order interaction effects and main effects in subgroups
- Table 6: Second order interaction effects and main effects in subgroups
- Table 7: First order interaction effects and main effects in subgroups

The results and discussion section has been rewritten according to the new analyses and results.

2. Line 124-131: Does this method of measuring PA with questionnaire and older-volunteer collectors have any results of reliability and validity tests? If yes, describe it in the methods section. If no, describe it in the limitation section.

The following description of peer research was added to the methods section (148-159):

*The project of the Belgian Ageing Studies used a participatory data collection methodology, namely peer research. Older adults were involved in the study, not only as the research target group, but they adopted the role of researchers by delivering and collecting questionnaires in their peer group. The questionnaire was meant to be self-administered, but volunteers were allowed to clarify the meaning of questions, when this was requested. The older volunteers were recruited within their municipalities and received several training sessions. In each*
municipality, on average between 30 and 50 volunteers participated in the project. Peer research has the advantages of face-to-face research (which has a higher response rate), while minimizing the social desirability. Furthermore, it results in more complete questionnaires and a high response rate [23]. In the present study, first response rates ranged from 65 to 85%, depending on municipality.

3. Line 171: There is no description about “education” in the measures section. Please describe it.

The description of the “education” measure has been added (rule 167-170):

Level of education was assessed by the following question: ‘What is the highest degree of education that you have obtained?’ A 10-item response scale ranging from ‘no degree’ to ‘university degree’ was provided. Responses were dichotomized into ‘no tertiary education’ versus ‘tertiary education’.

4. Line 229-231: Information about the frequency distribution of perceived environmental variables is important for readers to judge whether the authors’ interpretation is reasonable or not. Were urban participants more likely to perceive good access to services compared to rural participants?

As described above a table depicting the frequency distribution has been added (table 2). The following has also been added to the discussion section (rule 404-406):
However, no marked difference between urban, semi-urban and rural participants is observed in their ratings on the ‘short distances to services’ – measure (table 2). Possibly, urban, semi-urban and rural residents perceive distances differently.

5. Line 238 & 312-313: Walking facilities and aesthetics were negatively correlated with walking for transportation, and safety was negatively correlated with cycling for transportation and walking/cycling for recreation. Change descriptions.

This section was deleted in the revised manuscript. Similar findings are now described as follows: The perceived presence of walking facilities was related to more walking for transportation.

6. Line 305-306: Different results would be observed if the questionnaire asked “daily” habits of walking or cycling for recreation. Please refer to the potential influence of the different frequencies.

The authors acknowledge this comment and added the following to the limitations section (rule 527-530):

A second limitation is that walking and cycling for transportation was expressed as daily habits while walking/cycling for recreation was assessed as a weekly habit. Consequently, caution is needed when comparing results for these transportation and recreational walking and cycling.

7. Line 313-319: Please move to the Discussion section.
C. Comments of reviewer 2

Was physical activity level assessed? If so, it would be interested to know if those walking or cycling for transport, or recreation, were meeting the physical activity guidelines, or what proportion of their overall physical activity came from walking or cycling.

It’s a pity the walking or cycling for recreation was asked in the single question.

Overall physical activity was not assessed, so unfortunately we are not able to determine which subgroups (based upon PA behaviors) meet the PA guidelines or to which degree walking and cycling contributed to their overall PA level. The authors acknowledge the limitations of the PA measures in the limitations section (rule 305-306):

*However, aggregating walking and cycling for recreation might have obscured relationships with these behaviors.*

This matter is also discussed in rule (495-502):

*One might expect recreational walking and cycling to be more common in the green and quiet rural areas. However, results of the present study suggest that urban older adults walk or cycle for recreation in city centers and shopping streets. This is supported by the positive relationships for number of shops and short distances to services. However, Van Dyck and colleagues [28] reported more recreational walking but less cycling in urban compared to rural neighborhoods in Flemish adults. These opposite relationships might have resulted in no relationship for the combination of recreational walking and cycling in the present study.*
There does not appear to be a question about presence of cycling facilities?
Overall there are only quite a small number of questions about the environment asked – and this limits the interpretation of the data and should be acknowledged.

The authors recognize that some potentially important environmental factors were not assessed. We have added the following to the limitations section (rule 532-533):

*Thirdly, some potentially important environmental factors were not assessed (e.g. presence of cycling facilities).*

It should be explained why adults from semi-urban areas were excluded. Simply to make two very different groups over-simplifies the situation, with many respondents living in semi-urban areas. Also, why exclude those 60-65 years?
These exclusions effectively halve the sample, which is a significant.

The authors agree that excluding participants from semi-urban areas over-simplifies the situation. Therefore, we have included the data from semi-urban participants in the analysis. However, we did not include data from participants aged 60-65 years as a substantial part of this group will still be employed and might therefore differ in their transportation and recreational activities from retired people. Secondly, this study is part of my PhD thesis and in order to remain consistent across studies we consider it not feasible to include the 60-65 years age group.

The methods section has been adapted according to the above described changes (rule 161-163):

*For the present study, respondents aged < 65 years were excluded, resulting in a final sample of 48,879 older adults within 135 municipalities (36 urban, 50 semi-urban and 49 rural municipalities).*
The introduction appeared to ‘mix-up’ the material on walking and cycling, and I wondered if it might be easier for the reader for the walking material to be grouped together, and the cycling material grouped together? I understand that some of the issues are the same, but there are also differences, and some readers will want to focus on one or the other.

Only two previous studies focused on older adults’ cycling behavior; Kemperman et al. 2009 focused on total cycling and King et al. (2011) focused on a combined measure of transportation walking and cycling. We have adapted the introduction in order to make the distinction between walking and cycling more clear (rule 116-125):

Su and colleagues [12] found living in the inner city of London to be related to less walking for transportation, whilst Borst and colleagues [13] reported no relationship in the Netherlands. A concept explaining possible relationships between area of residence and walking for transportation is walkability (a composite score of residential density, land use mix and street connectivity) as urban areas will generally be classified as more walkable compared to rural areas. Walkability has been found to relate positively to transportation walking [14] and a combined measure of transportation walking and cycling (King et al., 2011) in US older adults. No previous studies investigated the relationship between area of
residence and older adults’ recreational walking, recreational cycling or cycling for transportation.

Check for English grammar – (eg not exactly sure what “through peer research” means-in methods)

As described above, the manuscript has been read and corrected by a senior professor who has done a sabbatical in the United States. A description of peer research has been added to the methods section (148-159):

The project of the Belgian Ageing Studies used a participatory data collection methodology, namely peer research. Older adults were involved in the study, not only as the research target group, but they adopted the role of researchers by delivering and collecting questionnaires in their peer group. The questionnaire was meant to be self-administered, but volunteers were allowed to clarify the meaning of questions, when this was requested. The older volunteers were recruited within their municipalities and received several training sessions. In each municipality, on average between 30 and 50 volunteers participated in the project. Peer research has the advantages of face-to-face research (which has a higher response rate), while minimizing the social desirability. Furthermore, it results in more complete questionnaires and a high response rate [23]. In the present study, first response rates ranged from 65 to 85%, depending on municipality.

The results section should state more of the main findings in the text – eg that a third of this age group walking daily for transport and one in five cycled is high be international standards.

The results are more extensively described in this revised version of the manuscript.

In the discussion, the authors need to acknowledge that the relatively high levels of daily walking and cycling means that the sample may be quite different from samples of older adults in other countries.

This has been acknowledged by adding the following to the limitations section (rule 530-532):
Furthermore, given the relatively high prevalences of walking and cycling in our sample, our findings might not be completely applicable to other contexts.